Dr. Grisanti: I would like to introduce someone that I'm very fond of, I have tremendous respect for, someone I have known for quite a number of years and this is going to be a real treat for everyone this evening to have this presentation specifically by Dr. Aristo Vojdani. I would like to introduce him – a little background. Dr. Aristo Vojdani obtained his MSC and PhD in the field of Microbiology and Clinical Immunology at Bar Ilan University, Israel, with post doctorate studies in tumor immunology at UCLA. He's a professor of neural immunology at the Carrick Institute for Graduate Studies and an adjunct professor at both the Department of Preventive Medicine at Loma Linda University and the National University of Health Sciences at the Lincoln College of Professional, Graduate and Continuing Education. He is a past professor at the Charles Drew/UCLA School of Medicine and Science. His research of more than 45 years has resulted in the development of more than 400 antibody assays related to the role of environmental triggers in many autoimmune disorders. He holds 15 US patents for laboratory assessments and has published about 160 articles. He is the CEO and Technical Director of Immunosciences Lab and is Chief Scientific Advisor for Cyrex Labs. He sits on the editorial board of six scientific journals and has received the Herbert J. Rinkel Award, the Linus Pauling PhD Award, and the F. R. Carrick Research Institute's Lifetime Achievement Award.

So I want to welcome Dr. Aristo Vojdani. Dr. Vojdani what I'm going to do right now is I'm going to pass the controls and you will see something on your computer in just a second. You should see something has just popped up which allows you to share your screen and the people participating will see your screen.

Aristo Vojdani: Yeah, just a second, yes.

Dr. Grisanti: Okay, just click on that and then we'll see your screen.

Aristo Vojdani: Is it okay now?

Dr. Grisanti: I can't see your screen but let me see, it should pop up, is there a button on your computer to show your screen.

Aristo Vojdani: I pressed it already.

Dr. Grisanti: Yeah, I could see it now, I could see it now.

Aristo Vojdani: Okay, great.

Dr. Grisanti: Perfect. That's good I could see perfect.

Aristo Vojdani: Now I don't see it. Are you still there?

Dr. Grisanti: I'm here yes.

Aristo Vojdani: Okay. We have to go back to the presentation. We'll, just do it like this okay. Okay, do you still see our screen?

Dr. Grisanti: Yes, I do, I do see the screen yes.

Aristo Vojdani: Let me find the PowerPoint. We are bringing back the PowerPoint.

Dr. Grisanti: Yeah, no problem.

Aristo Vojdani: Okay.

Dr. Grisanti: Okay let me see. Yup I see your slide.

Aristo Vojdani: Okay. Shall we start?

Dr. Grisanti: Yes, I'm ready, yes you can start.

Aristo Vojdani: Okay, Grisanti thank you so much for inviting me to be part of the Functional Medicine University.

Dr. Grisanti: Thank you.

Aristo Vojdani: And as your guys are watching, this beautiful class of wine I hope I end up my presentation, the participants will come to conclusion that when we test for IgG or IgA antibodies against various food antigen, it is not about food allergy, it is about food immune reactivity and autoimmunity. So food immune reactivity and autoimmunity and also I hope that they will learn that the proper testing for food IgG and IgA testing makes a huge difference in detecting our immunity. I made the few first slides, just on January 2, 2015 from Genetic Engineering where they talk about the fight against autoimmune diseases because according to Autoimmune Disease Association 53 million Americans are suffering from autoimmune diseases. One in six and about 10% of the world population is suffering from autoimmune diseases. The cost is about $1 billion a year just you know and the symptoms can appear in the brain, in the internal organs and the connected tissue, everywhere in the body or immunity can attack every single component of our body. And there are more than 80 different forms of autoimmune diseases, some of them are targeting a single

tissue, some of them are targeting many tissues simultaneously. Example a systemic lupus erythematosus versus multiple sclerosis. So the cost $100 billion a year, one in six Americans suffer from autoimmune disease.

So therefore it is very important to have biomarker to detect autoimmune diseases at the early stage as possible. So that will enable monitoring of progression and prognosis of the disease and that way we hope to improve disease management. So in this slide you see DX stands for diagnostic versus RX which is treatment. And I made this slide to look at you know two different options that we have in our society. The old school wait until 53 million or more Americans will develop full blown autoimmune disease. Put them on immune suppression which may develop infection. Give them immunotherapy, the result of that could be cytokine storm because when we inhibit one cytokine we can enhance additional cytokines and to suffer for many, many years. That's exactly what's happening when you get for example you develop rheumatoid arthritis. You have to be on medication and immunotherapy and so forth.

So the new school of thought which functional medicine is supporting, I'm supporting that use predictive antibodies to find the triggers of autoimmunity and to find those triggers at the earliest stage of the disease as possible. So by removing the triggers and repairing the damage to the new system we can halt the progression of autoimmune diseases and avoid many years of suffering. I think you know I'm sure the participants are agreeing with me that it's better to be a part of the new school versus the old school. Also in relation to autoimmune diseases I share with you this very simple slide. The article which I read in past 5 to 10 years which some of them that I used in one of the review articles which I will share with you later on that genes are playing only a minority role, about 30% of the diseases. The infectious stages of autoimmune diseases are associated with genetic. The other two thirds are associated with toxic chemicals and dietary components and today in this webinar my emphasis will be mainly on dietary components as the major cause of autoimmune diseases. Maybe we'll have opportunities in the future – we'll talk also about toxic chemicals and we'll talk also about the role of infection in autoimmune diseases in the future.

So in relation to autoimmune diseases we have to discuss about two major mechanisms that are protecting us against autoimmunity. One of them is oral tolerance because failure in oral tolerance can result in enhanced intestinal permeability to large

molecules and may result in many autoimmune disorders. The second mechanism is central tolerance which is associated with lymphocyte, the T cell maturation in the thymus and so therefore defective thymic expression of a single molecule is sufficient to induce an autoimmune response to multiple organs. But really when we analyze these two mechanisms of actions we know that it is the oral tolerance which is prone to many, many new states because our mucosal immune system, our digestive tract is in contact with many, many thousand if not millions of antigens on a daily basis and therefore those antigens can affect our oral tolerance and the result of that could be permeability may follow with autoimmunity.

And so therefore we need to learn a little bit about the loss of immune tolerance which is the precursor of antibody and cell mediated immune response. An article which I would like to share with you is about oral tolerance in neonates from basics to potential prevention of allergic diseases. So oral tolerance refers to the observation that prior feeding of an antigen induces local and systemic tolerance to that antigen and this is going to happen usually in the first few months or the first year of our life. Physiologically this process is probably of central importance for preventing inflammatory responses to the numerous dietary and microbial antigens present in the gut. Defective oral tolerance therefore can lead to gut inflammatory disease, food allergies, celiac disease and autoimmunities.

And again the best example you know that you see in this slide that oral tolerance which is a state of active inhibition of immune responses to an antigen through the oral route as the child is born after exposure to bacteria in the air after being in contact with the mother’s skin and so forth, the immune system will start it's maturation process and after six months or a year will have these beautiful type of cells cause regulatory T cells which can regulate immune system and suppress immune reactivity against food antigens as well as bacterial toxins, in this case I'm talking about friendly microbiota. And so therefore all these wonderful material which is part of the breast milk is helping in maturation of the immune system and regulation of the T-REx cells and that's why I'm emphasizing here that in maternal milk we have antigens, we have free antigens, we have complexes but there are two major tolerogenic or anti-inflammatory or regulatory cytokines. TGF-beta and IL-10 those can regulate the T-REx cells and therefore will prevent any immune reaction to dietary proteins and bacterial antigens.

So therefore if you have a patient with IgG or IgA or IgM antibodies against gliadin, against a banana or any food antigen, the real meaning of that is the patient is having (inaudible) (00:16:45) in oral tolerance against that food antigen. So therefore the best way to prevent future immune reactivity against that food to repair the breakdown in oral tolerance which is through activation of regulator T cells which by the way the best two factors are Vitamin D and Vitamin A. Why? because the surface of regulatory T cells we have receptors for both, Vitamin D and Vitamin A.

So to summarize this part the defective oral tolerance can result in gut inflammation, gut inflammation due to release of bacterial toxins and so forth can cause enhanced gut permeability and if you do not repair enhanced gut permeability it can result in food immune reactivity and autoimmunities.

And these are some of the factors that can disrupt oral tolerance. Maternal exposure to xenobiotics, to medication and so forth. The mother's diet is extremely important. Breast feeding, baby formula versus the hydrolysate formula make huge difference. The digestive enzyme, how functional are the digestive enzyme in those individual. The integrity of gut microbiota, good bacteria versus the bad bacteria. The time of the introduction of the solid food is going to determine good oral tolerance or bad oral tolerance. And finally use of drugs or medication and other xenobiotics and genetics also play a minority role in this situation as well.

So I'm going to take this to the next level that exposure to environmental toxins, in this case xenobiotics, could be a major cause in breakdown in oral tolerance as it is summarized in this article by this group of scientists from 1998, published in 1998 that pesticides report: bound xenobiotic residues in food commodities of plant and animal origin – I'm not going to read all of that but to summarize it for you guys that here chemicals such as organophosphates from air, from water, from products that we are using, from crops, from meat, from dairy products, from fish, from water and all of that, it gets into our body and unfortunately some people think that when we get exposed to chemicals, a few hours later the chemicals get metabolized and out of our body, that's not the case. About 10 or 20% of chemicals or their metabolites unfortunately manage to bind to human tissue and we call that the body burden of chemicals. So ask yourself this question, when the chemicals bind to human tissue or chemicals bind to the food antigen what will be the result. When chemicals bind to food

antigen we are going to react to that food antigen, meaning our oral tolerance breaks down because our oral tolerance is built against pure foods but not against pesticides plus the food antigens. When pesticides and chemicals bind to human tissue our immune system is going to attack that and the results of that could be autoimmunity. So to more simplifying that I'm looking at Mr. Peanuts where you see lots of immuno acids which are components of the protein. So peanuts contain 63% protein, 22% fat, 10% fiber and the most herbicides and heavy metals. So what is the consequences of having all these chemicals in peanuts or any other food that we consume on a daily basis. This is the best scenario where peanut proteins are absolutely pure, no chemicals. So our digestive enzymes are going to digest the proteins to peptides, the peptidase are going to break down the peptides to amino acids and then we absorb them. Even if like the one with that chain that even one chain of those peptides, if it's not digested properly we have the T-REx cells, the green cells by producing TGF-beta and IL-10 can suppress the immune response against the acetic peptide and therefore we call that induction of oral tolerance, no antigen presentation, no immune reactivity against the peanut protein. This is beautiful scenario if the food is absolutely clean and pure and therefore our immune system is going to work properly and no harm is done. But unfortunately the next scenario which is this that the peanut is contaminated with aflatoxins as you can see the red with heavy metal, the blue, pesticides in green. So what will be the consequence of that? The bottom line will be that the digestive enzymes will not be capable to digest these proteins properly and therefore many peptides will be accumulated in our digestive tract where it can penetrate the barriers and then regulatory T cells in this case can prevent only or can inhibit or do suppression or tolerance against few peptides but others there's so much peptide in there, the peptides eventually will be presented by antigen presenting themselves to the T cells and the T cells and finally antibodies are going to be produced against food antigens in this case the peanut proteins, aflatoxins, heavy metals as well as the pesticide. So this is one of the major mechanism that why we are reacting to so many foods that we did not react against them 50 years ago or 100 years ago.

Now we are going to mechanisms involved in food immune reactivity. Right at the beginning of my presentation I talked about that the topic today is about food immune reactivity and autoimmunity. It's not about allergy. Classical allergy to food is IgE mediated. Number one which causes histamine basophil release by mass cells due to FcR1. But there are alternative pathways also that IgG is involved through macrophages, platelets,

basophil, neutrophil, immune complexes and so forth. So therefore the real food allergy is IgE mediated which is not the topic of my talk today. I'm talking about food immune reactivity and autoimmunity.

I'm sure most participants are familiar with food IgG or IgA or some other methodologies that are tested by different laboratories. So that's why I'm asking this question, what really these labs are measuring? What is the scientific mechanism behind this testing? And where is the clinical correlation of the test results with patient symptomatology that have been published and peer reviewed in scientific journals. Those are very valid questions and hopefully we will have some answers for them.

So that's why last year in 2014 I wrote 7 different manuscripts which are going to be published in this month of Journal of Alternative in Health and Medicine. This is one of those 7 manuscripts which I highly recommend that when within next two weeks that journal volume will be available that hopefully all of you will read that. So this first article is about the evolution of food immune reactivity testing. Why food IgG or IgA antibody may not be reproducible from one lab to another and sometimes not even in the same laboratory. And I was the first person who developed food IgG testing in 1985 and so therefore I believe I'm qualified to ask that question in 2015.

So here reviewing all the methodologies which are performed by about 20 different laboratories all over the country. The first test which was available when I got involved around 1984-85 called cytotoxic testing meaning you take a drop of blood, mixing it with food antigen and under microscope you observe change in the structure of the cell and cell changes its size and therefore based on change in the cell size you say the patient is reactive or not reactive to that **cell**. In 1985 after State of California got involved and laboratories could not show reproducibility some laboratories tried to come back and automate these tests and therefore on the left we see the continuation of cytotoxic testing which is actually cell-based assay. That's one group of testing done in laboratories, in different laboratories. One of them is MRT, mediator release test. I don't think they are measuring mediator release. They are measuring again cell sizing, if you read more about the test. The ALCAT is another one which is antibody leukocyte and again a reactivity test. This is another version of cytotoxic testing which is done by automated machinery. The A stands for Antibody and A has nothing to do in this case in my opinion to antibodies because they are not measuring antibodies against the foods.

The third one is Lymphocyte Reactivity Assay again also they do cytotoxic testing by observing under microscope the cell sizing and therefore again I'm asking this question where is the correlation with clinical symptomatology. So the answer is you know I'm waiting for answers, I could not find any published articles in the scientific journal in order to answer this question. On the other hand after this continuation of cytotoxic testing I was responsible for development of IgG and IgA testing by ELISA and today we know there are some studies who showed correlation with clinical symptomatology with some disorders and still we need to do more research, I'm not saying that this is 100% perfect test. So these are you know the two type of tests which are done, some of them we have clinical correlation with symptomatology and the other group we do not have any correlation with clinical symptomatology.

Regarding the testing, this is one of the most important slides that I would like to share with you which I made it recently. In the middle where we talk about the core principle of laboratory testing. There are four core principles of any laboratory testing in the field of immunology actually. Number one, purity of the antigen. If you are not using pure antigen you are going to get many false positive results. The optimized antigen, the optimized antigen is also equally important. Why? Because you cannot take based on weight like a certain amount of dried antigens of apple versus antigens of banana or peanuts who has many, many, much 10 times or sometimes 50 times more protein than apple or banana. So we cannot take equal weight of these two antigens, put them on the plate and then measure antibody against them. You can get many false negatives and sometimes false positive results if you do not optimize the antigen.

Number 3 is antigen specific validation. This is something only the laboratories understand but it is important to validate every antigen against itself. So when you validate milk you have to validate it against milk antigen. You validate corn you have to validate it against corn antigen. You cannot take for example apple and validate it against orange.

Finally the fourth one is the parallel testing. What do I mean by that meaning if you do the test in a single determination you can get false positive or false negative results. But when you do it in duplicate and you compare the results then you can enhance both the specificity and the sensitivity of the results.

So those are the four core principles of any laboratory testing in the field of immunology. In addition to that around we have raw versus cooked, cross-reactive pan antigen, multiple food proteins, meat glue, lectins and agglutinins, artificial food coloring, recombinant protein and synthetic peptides, gums, oleosins and also it's important to measure IgG and IgA which I'm going to discuss a little bit more in detail.

So purity of each antigen is important for reproducibility of the test results. Here example of impure corn you extract the corn without purification of the major antigens of corn and then you put them on the plate and you measure antibody, the result of that is color development. If you have high levels of the antibodies, if no antibodies, we should not have any colors and some of these will. So where you have some color that's positive and a little bit color or greenish color which is as I said should not be there, that is completely negative, should be negative. But here another example that, when you optimize the antigen concentration and you look at the plate here when you do duplicate testing you see there is fantastic correlation between all these duplicates with the exclusion of one right in this area that you see one **well** is positive but the other **well** is negative. This is where we are not sure whether that patient is positive for corn protein or IgG or IgA antibodies against corn protein or that is false positive. Unless you do this in duplicate you are not going to detect these kind of results and in this situation I do recommend repeat methods in triplicate and then when all three **well** (00:35:19) corresponding to each other then you will report that positive or negative. So this is the difference between purified antigens versus impure antigen.

Raw versus cooked and I published an article in a scientific journal a few years ago that some individuals can make antibody against raw food but not the cooked and some they may react against the cooked but not against the raw. And so therefore in reality we have to measure antibodies against food if we eat it raw, we measure antibodies against raw vegetables for example but if we cook meat then we have to measure antibodies against cooked meat and not raw meat. Otherwise we are going to get some false positivity. I gave examples of asparagus because asparagus is one of those that people can eat it raw and can eat it also cooked but look although about 13% of 288 individuals, healthy people, so called I tested reacted to raw asparagus when the cooked asparagus or steam asparagus 29% reacted to that, meaning after cooking asparagus became more antigenic and therefore more antibody produced against that.

Simple example is how much heat can affect egg white protein. You know every day in the morning we are making omelets and so forth and we see the process of denaturation of egg white and of course if you take that in the form of raw versus cooked egg white these are completely two different worlds of antigens. Many people may not react to raw egg white as soon as we cook it becomes denatured and therefore becomes more antigenic and therefore will react to it. This is one of the best examples. So for example if you cook egg for two minutes, three minutes, one hour, four hours and 10 hours, look a change in the color of the proteins so easily we can see that which is the result of denaturation of the protein by the heat and therefore change in its antigenicity. And so therefore one may react to an egg, cooked for two minutes but not one hour and some individual may react against egg cooked for one hour but not raw or two minutes.

Lectins and agglutinins are carbohydrates or glycoproteins combined to carbohydrates. They are almost everywhere, almost 30% of food that we consume contains lectins and agglutinins and so therefore we have to measure antibodies against food lectins and agglutinins. And I chose this slide from textbook of Food Allergies and Intolerance by Jonathan Brostoff who summarized how much lectins are involved in induction of diseases. Diabetes, why lectins can bind to islet cells and therefore mechanism of autoimmunity. Lectins can bind to glycosaminoglycans and proteoglycans and therefore rheumatoid condition, rheumatoid arthritis, lectins can bind to IgG, aggregate IgG and that's why our IgM will attack our own IgG which is rheumatoid factor. Wheat Germ Agglutinin can inhibit the motility of fibroblasts causing excessive fluid retention and therefore stiffness in connective tissues.

Lections are involved in nephritis and infertility, so therefore it is important to see if the patient is exposed to lectins and agglutinins. It is important to see whether or not lectins are not digested in the gut and managed to get into the blood and the only way we can find out if the patients react against these lectins which are glycoproteins and make antibody against them.

Reaction to oils in seeds and nuts. Oils contain proteins called oleosins. Yes we can react to proteins in oils and we can make IgG or IgA or IgE antibody against them. Therefore if you are reactive to peanuts you cannot have peanut oil and here example of individuals who were tested for immune reactivity against peanut, peanut butter, peanut agglutinin and peanut oleosin meaning proteins in the oil as peanuts. About 12% reacted to peanuts. These are the 288 that we tested. About 10% peanut butter, about 8%

against peanut agglutinin but when it came to peanut oleosin about 19% meaning peanut oleosin are highly, highly antigenic, more than peanut agglutinin and other peanut protein.

Gums. I know gums are everywhere but just look in the middle of this slide. What is the size of the gum molecule? Gums are huge molecules. They are very large. If egg albumin is about 50,000 Daltons, gums start from 200,000 and go all the way high as 5,000,000 Daltons. So that's why I made this slide, the structure of gums, its' like bottlebrush, whether it's real, the brush that we clean bottles with or bottlebrush tree. So the middle core is a protein, connected with many, many carbohydrates. So even after breakdown by digestive enzymes some of these proteins and polysaccharides could become antigenic, we can react against them and we can make antibody against. And that's why when we tested about 10 to 15% of the population reacted to gum antigen. The next item which is very, very important and unfortunately our children are exposed, everybody is exposed to this food coloring which are classified as toxic material. Ask year this question: why when a child is having lollipop the tongue becomes blue or red or green because of (inaudible) (00:43:27) binding of food coloring to proteins in our tissue and that sets the stage for production of antibodies against food coloring plus our own tissue. And these are some of the disorders associated with food coloring: breakdown in oral tolerance, interference with digestive enzymes, enhanced intestinal permeability, food immune reactivity, hypersensitivity, allergy, atopic dermatitis, hyperactivity, liver toxicity, mitochondrial dysfunction and many, many more. And so therefore to show you the importance of removing these toxic chemicals called food coloring from the diet of your patient because these food colorings are interfering with the function of our digestive enzyme. At the top you see the sequence of albumin where the enzyme trypsin like scissors can cut peptides to amino acids and hopefully those amino acids will be absorbed. But unfortunately when the chemicals are bound to these peptides where it's shown below down that the scissors cannot work why because the chemicals inhibiting the functionality of digestive enzymes. So therefore if a protein was supposed to be digested within an hour when food colorings are added to the same protein will take 8 to 16 hours to digest the same protein. So please, this is one of the most important home taking message, remove some of these toxic chemicals from the diet of your patients in order to prevent autoimmunity.

And then another factor which is used in many, many, many product opportunities called meat glue and these products not only

contain transglutaminase they add to that even casein and many, many other factors in order to make the meat to look this good. And so therefore many people can react – cannot react to meat. But to react to meat containing meat glue as it's shown in this slide that when I tested those 288 individuals 9% reacted to meat meaning without meat glue but about 28% reacted to meat containing meat glue and so therefore meat glue is everywhere in the restaurant and many products which we buy from supermarkets without realizing. So therefore please pay attention to what your patients are using and remove the meat glue from the diet of your patient as much as possible.

So when it comes to testing or panel of testing for food immune reactivity, that testing should reflect the patient's actual diet. For example if we are using raw food, we have to test antibody against raw. If we use cooked food we have to measure antibodies against cooked food. The same thing whether it's vegetables or fruits and nuts and seed, cooked meat and meat glue, fish versus shellfish, we have to measure antibody against gum, food coloring, oleosins, lection and agglutinins and even some digestive enzymes such as bromelain.

Regarding food immune reactivity and autoimmunity it is very well established that wheat proteomes can cross react with about 20 different tissue antigens therefore multiple sclerosis, thyroid disease, Addison's disease, type 1 diabetes, autism, migraine headache, neuromyelitis optica, epilepsy, ataxia and so forth. The same thing in relation to milk proteins and autoimmunity. Milk proteins are involved in celiac disease, Crohn's disease, Behçet's disease, MS, rheumatoid arthritis, Uveitis and many more.

So therefore the issue is food immune reactivity and autoimmunity. So I went back to scientific journals and Journal of Immunology 2014 showed that Polygalacturonic acid which is major component of pectin found in apple, quince, orange, grapefruit and berries can cross react with major oat antigens in the joint. So therefore we have to review the scientific journals and find the foods that cross react with human tissue and in this if your patient is suffering from joint disorders then we have to remove some of these pectins which are very beneficial to human but not for those who are suffering from joint disorder.

Additional item that I looked at the literature which was published in 1990, they took blood sample from patient with scleroderma. The scleroderma patient will make antibodies against SCL-70. So they took blood from these patients, purified their serum, their

antibody 100% against SCL-70, then they reacted that with many foods. Wheat Germ Agglutinin, peas, corn and spinach reacted with acidity, purified serum from patient with scleroderma. So therefore if you have patient with scleroderma you have to remove those for food items from their diet.

Another example exactly did similar experiment from patient with lupus. As you know patient with lupus reacts against ribonucleoprotein, small ribonucleoprotein after acidity purification with small ribonucleoprotein they reacted that acidity purified antibody with many foods soy, carrots, corn and spinach were highly reactive. Therefore based on these findings I do recommend to remove soy, carrot, corn and spinach and maybe others from the diet of patient with systemic lupus erythematosus.

Glycine-rich protein, glycine-alanine repeats are found also in the following foods: beans, cereal, fruit, vegetables and gelatin. These can cross react with procollagen, with collagen, with actin, epidermal keratin, ribonucleoprotein and the last one please remember this one, Epstein-Barr Virus Nuclear Antigen. So glycine-rich protein can cause false positivity on your Epstein-Barr Virus and if you have patient with Epstein-Barr virus antibody can cause false positivity and your food IgG or IgA. And they gave us the mechanism of cross reactivity, the degree of homology between these food antigens versus human tissue versus Epstein-Barr Nuclear Antigen, the red indicate amino acid similarities between two different peptides in all the cases is above 50% and it is enough to have 30 to 35% amino acid similarity in order to cause cross reactivity. So therefore to test for all of this is important in patients with autoimmunities to remove these from their diet and hopefully that's where you will make huge change in their clinical situation.

Another article which I would like to share with you is about Aquaporins. What are Aquaporins? Aquaporin 4. These are water channel proteins as part of the astrocytes in blood brain barrier. And in this article which was published in Journal of Neuroimmunology 2013 the scientists found that human Aquaporin in our blood brain barrier cross reacts with four different vegetables or seeds Aquaporin. And these are soy, tomato, corn and spinach. So (inaudible) (00:53:45) is I think multiple sclerosis or neuromyelitis optica. Please consider removing soy, tomato, corn and spinach from their diet. Why? Because these four items contain Aquaporin 4 with more than 70% amino acid similarity with human Aquaporin and when antibodies produced against the vegetables and the soy Aquaporin can cross

the barriers, open the tight junction and activate the astrocytes and microglia and the results of that could be damage to the neuron and neuromyelitis optica.

So I would like to share with you just in a few slides that a case report that 36 year old female working in the candy manufacturing for many years, patient developed multiple chemical sensitivity with recurring severe skin rashes. Patient was highly reactive to almost all medications and vitamins. Would not take any vitamins and medication due to reaction, we call those universal reactors. The allergies, the skin testing for many foods, inhalants and environmental and other than reactivity to feathers and house dust mites, no other reactions were observed.

Both IgG and IgE food immune reactivity assays were performed, very strong reaction with various food colorings and gums were detected in these patients which was not detected based on skin testing because these are two different mechanism of action.

And here example, patient made huge amount of antibodies, both IgG and IgE again Brilliant Blue, Tartrazine, Allura Red, Guar Gum, Mastic Gum in particular, and Gum Arabic. And so therefore in this situation only testing like this can help us to detect the environmental triggers and by removing the environmental triggers in this case we have no choice, by removing the patient from the environment that he or she was working at, only that way can help to reduce the level of IgG and IgE antibodies. So patient was transferred to a different work environment all gums and artificial food coloring were removed from her diet, skin rashes, symptoms of multiple chemical sensitivity, improved after three months but after a few months the patient decided to go back to the same work environment unfortunately after deadly exposure to gums and food coloring, patient had severe immune reaction meaning produced more IgG and IgE against gums and food coloring and her clinical conditions became much worse and therefore this time she decided completely to get out of that work environment. So this is a classical example where we identify the trigger to use the right methodology, remove the triggers and hopefully that way we will be able to reverse the course of immune reactivity and autoimmunity.

So the case conclusion was exposure or E, the case conclusion is that exposure to food coloring and gum can cause both IgE and IgG mediated immune response, removal of the patient from its toxic work environment can result in significant improvement without testing for IgE and IgG antibodies against food coloring

and gum and relying on skin testing alone the patient's actual condition and it's triggers could have been missed and potentially even leading to autoimmune disorders.

So with that I would like the last couple of slides I would like to give you a little bit of information, when the immune tolerance is broken, which is the root cause of immune reactivity to food and the root cause of our immunity, what can we do. So here in this slide I would like to now to share with you that if you give soluble fiber to your patient such as starch, pectin, fructan, cellulose and so forth, the good microbiota loves these items. So they take up these starch, pectin, fructan and cellulose and the good bacteria will grow significantly. When the good bacteria grow, they release three very important chemicals which are crucial for repairing the gut barriers or for a good function of the gut barrier. Acetate, butyrate and propionate. And as you can see that these acetate, butyrate and propionate act on T-REx cells because there is a receptor on T-REx cells called GPR-43 for acetate, butyrate and propionate. That way acetate, butyrate and propionate regulate, activate the T-REx cells. The T-REx cells divide and they make a lot of IL-10 and TGF-beta and IL-10 and TGF-beta prevent inflammatory responses against food antigens, against bacterial toxins if the patient will be exposed to them later on.

So therefore it is important to feed our gut microbiota with healthy material so that will produce acetate, butyrate and propionate to activate the T-REx cells and T-REx cells will regulate our mucosal and cellular immune responses. I think this is one of the best example for you know how to treat patient with food immune reactivity and autoimmunity. And finally finding I would like to close that we need to have biomarkers. The best method to detect in this case to detect food immune reactivity – when we detect those triggers we have to remove the triggers from the environment of the patient as it was shown in a case the patient with reaction to gums and food coloring. And then using the slide that I showed earlier that to feed our good bacteria in order to release all those wonderful factors to activate the T-REx cells in order to repair our barriers.

That was the last slide and this is really the final slide that I would like to share with the participants, where to read about this whole issue that I did publish an article about the potential link between environmental triggers and autoimmunity, published in 2014 volume of journal called autoimmune diseases, highly recommend to read that article. Then in alternative therapies, in health and medicine there are 7 manuscripts, dealing with this webinar that

you know I had only limited time to discuss with you. So please wait just about two weeks and get that issue of alternative therapies in health and medicine and find more information about this webinar that we discuss today.

Finally if you would like to have more information about the kind of testing that I discussed during this webinar. If you would like to set up an account with Cyrex Labs which they just launched there are already 10 which is dealing with food immune reactivity and autoimmunity. They launched that yesterday and by opening an account by joining the Cyrex you know just go to JoinCyrex.com where you can have access to the following material. We wrote one of the best clinical application guide about 70 pages of material that you read about. It's important. Then there are 180 for each single food whether it's modified or cooked or raw. Specification sheet that will be available to you. There are 14 different webinars about food, immune reactivity and autoimmunity. That plus more you can get from Cyrex by joining Cyrex.com and hopefully we will have additional opportunity in the future to talk about the other environmental triggers involved in autoimmunity. Today I just discussed the role of dietary components in autoimmune reactivity, food immune reactivity and autoimmunity. In the future I'll talk about chemicals as the cause of autoimmune reactivity and finally we'll deal also with infectious agents.

Thank you so much and thank you Dr. Grisanti again for giving me this opportunity to share this important information with your participants.

Dr. Grisanti: Thank you Doctor. I appreciate it so much. I'll see you at the week, I'm coming down to Florida so I'll see you in a few days.

Dr. Aristo Vojdani: All right.

Dr. Grisanti: Good night everyone. Thank you so much. Good night.