Introduction and scientific background

Welcome, Marco, and thank you so much for agreeing to be part of the M. S. Neuroimmune Summit. Now, what I'd like to have you do is introduce yourself briefly explain why you have this area of expertize.

Well, first of all, let me thank you and let me thank all the people who will have the patience to hear me and who will understand me, despite my broken English and a thick accent.

Well, I was born in 1956 in Florence, Italy. And you can tell from my accent. I graduate as a medical doctor over there in 1980, and then I move there for several years to the United States to work as a researcher first and most welcome in North Carolina, Big Pharma, and then for the US government at the NIH in Bethesda.

I was appointed a full professor of molecular biology at the University of Florence, and over the years I've published more than 200 scientific articles in peer reviewed journals to essentially dealing with two main topics of interest to oncology, that is the science of cancer and neurosciences.

You may think that these are two fields that are separate, are different, and of course they are. I mean, the cancer and Alzheimer's disease or multiple sclerosis apparently have nothing to do with each other.

And they don't have anything to do at the level of symptoms, at the level of disease. But they have much to do like all other diseases at the level of molecular biology, as I say, that maybe these didn't say these.

I have a Ph. D. in molecular biology. I was teaching molecular biology for some 30 years. And when you go at a DNA level, you'll find out that, for example, two completely different diseases like cancer and actually there is not one cancer that at least a 600 different types of cancer in autism and as well as autism, it is not one single disease.

It is called a spectrum for a reason. Two completely different things. But at the molecular level, if you look at the genes that are responsible or that are associated with both diseases, you find that striking similarities.

So that's where my background is. And where does it come from? From a curiosity interest. How it is possible that we only have a 20,000 genes that are not that many and we are as complex as we think we are.

And we have diseases that are so different from each other, but they have something common. So what is these as something in common? And can we do something about these?

Can we truly help fighting a cancer or autism or neurodegenerative diseases? I could go on, but I don't want to bore you because, you know, in almost 40 years of research and experiences and mistakes and a lot of mistakes, I have learned a lot.

And I shall be happy to share all these with you. But I try to summarize as best as I can. You know what I love about your comments right now, Marco, is that at the molecular level, are there root causes of these disorders, whether it's cancer, Alzheimer's, multiple sclerosis, have a great deal of similarities in by addressing that root cause and focusing how we help our biology function more properly, we often defy the are able to show that many of these same approaches are helpful across many different disease states, which actually drove my partners crazy at first when I started focusing all of the stuff.

Now they're calling me this brilliant innovator and I'm sure the same happened to you, Marco.

Consciousness and the brain

Now we want to talk a little bit about consciousness and where is that located? Consciousness is in the brain, in our

self. Where where is my consciousness located?

Well, you know, this is a question that has afflicted the philosophers for, I would say, thousands of years. And maybe even earlier than that even Neanderthal man.

Maybe they ask themselves that where what is the consciousness first, where it is located and where does it go when we terminate our lives on this earth?

So these are questions that are kind of the fundamental questions of life. Now, thanks to a rejuvenation of science in this field that for many, many years, if not millennia, have been relegated to the real mouthfeel of it.

Now, a real scientist, when I say reassessed, I mean a physicist, a molecular biologist, medical doctors. Now they are dealing with this problem. And actually, for the past, I think 27 some years here in Arizona, I am calling or your interviewing me and I am sitting in my office in the Phenix metropolitan area in Arizona.

Well, not far from here in Tucson, there has been a conference on the science of consciousness going on for almost 30 years now with the participation of a Nobel laureates, including recently Sir Roger Penrose, that will go to his Nobel Award, I think a couple of years ago.

Now, all these scientists came to some very interesting and I would say surprising conclusions. We tended to think that our consciousness resides inside our brains, and our brains are more or less like computers, actually, as a matter of fact, that artificial intelligence that tries to mimic the workings of our brains and the more we know about our brains, the more we know about A. I.

and by. But there are some striking observation. The first one came out in the year 2007, and it was published in a famous medical journal called The Lancet, one of the most prestigious medical journals.

And then over there, some French researchers, they clearly demonstrated that we can live a perfectly normal life without having an anatomical brain. So if you go to Lancet in the of the year 2007, this is publicly available.

And look for a paper entitled Brain of a White Collar Worker. You will find this striking a CAT scan and MRI images that showing that this man, a perfectly normal guy who had gone up and who underwent a CAT scan simply because he had a backache.

I mean, common a common ailment. And serendipitously, they found out that he had absolutely no brain inside is a skull because of a congenital malformations called hydrocephalus that had never been diagnosed.

So scientists began to question, fine, if we can live without anatomically our brains, where does consciousness reside? And here came at first I thought, as he said, my professors to vomit off of Tucson, Arizona, and Sir Roger Penrose from England, a Nobel laureate recently.

And they postulated that the consciousness actually arises not in their synapses, that is, the connections between the neurons and the sense of our brain.

So but inside the sense that in some tiny structure called microtubules, small tubules made of proteins by sort of a quantum computation analysis. And I mean all these three words, they should merit explanation, explanation that I'm unable to give because I know very little, if anything, about quantum or quantum.

And quantum computation is something extremely difficult. So let's assume that some quantum mysterious phenomena occur inside these cells of our brains, and we don't need the many cells.

And that's how they explained that people without brain could function perfectly well. This is called all or hypothesis orchestrated objective reduction hypothesis.

You can go to Wikipedia and you'll find a lot about it, but more recently actually, I had the honor and privilege to

attend that and speak at the conference in Tucson last year.

More recently, it has been demonstrated that actually consciousness occurs at the level of DNA. Now this opens to a completely novel perspective because everything that is alive on this earth that has ever been alive on this earth is made of DNA.

Actually, DNA is the common universal molecule that up until now, we say, contains the genetic information. And this is obviously true. But now we know that also inside DNA, these are computer quantum computational phenomena occur.

Now, why does this open a completely normal perspective? Because in the meantime, it was also another discovery was made that is equally important. Mike Brooks, you know, up until 20 years ago, you wanted to get rid of all the microbes you met, so you wanted to exterminate all microbes.

Microbes are enemies. And actually some of them they are. I mean, bacteria, viruses as parakeet, fungi, etc., they could cause diseases. So definitely you want to sterilize as much as you can, but only up to a certain point, because now we know that we are made of microbes.

Actually, there are books entitled 10% Human. What? What do they mean? That I am a human being and I made of a human cells and I have a certain number of human cells.

But if I counted the number of microbial cells, bacteria, fungi, viruses, even that are inside my body, in my gut, in my mouth, in all my skin, everywhere, then these are number of microbial cells is ten times higher than the number of human cells.

So I'm only a $0.01 human. And in that 9/10 are microbes sense and something very new and I'm sure you're aware of them maybe most of the audience is not is that we have of microbes are not only in our gut not the gut microflora has always been not in our nose in our mouths but we also have microbes inside our brains.

Now, this is kind of new. It was first observed serendipitously in 2013 by Canadian researchers who were working on HIV and AIDS. And so completely unrelated, the field, they were looking for microbes in the brains of people who had died of AIDS.

And they found, you know, and those microbes that go on the brain because of the immune system, because the immune system is not working in AIDS. But they also found microbes in the brains of perfectly healthy people.

And so that's how ten years ago the concept of a brain microbiota actually was the first to publish a scientific article. What I mentioned, the brain microbiota came out.

So just like everybody knows now that we need the microbes in our intestines because they help me digestion, they help with production of vitamins, so neurotransmitters and so on.

Now we are realizing that we also need the microbes inside our brains as a step step. This is a very momentous declaration. Everyone that the microbes in our brain have a useful role to play and we shouldn't be necessarily afraid of them.

We have to learn how to live and have a collaborative relationship, I presume. Now, Marco, I'm going to have you continue, but that's a very exciting and a very, very interesting statement that you've made.

Thank you. Well, actually, I wasn't the first to discover the microbes in our brains. And I say that that Arcadian ideal researchers have worked on this field since 2013.

But I was the first to postulate an association between disruption of what we now call the brain microbiome. That is, the array of microbes inside of our brains.

Brain microbiome and disease

These eruptions of these abundance of microbes and neurological diseases such as multiple sclerosis, autism, Alzheimer neurodegenerative diseases, and why actually this was an easy exercise of logic, because we now know that if we disrupt our gut microbiome, for example, by taking antibiotics, something bad occurs not only at the level of the gut, but at the level of the immune system, for example.

So I mean, it's only logical that if we disrupt or we alter the balance of the microbes inside our brain, so something bad might happen. As a matter of fact, quite recently it was demonstrated that in the brains of people with multiple sclerosis, the biodiversity of the brain microbiome is much lower exactly as it happens during diseases of the gut, such as Crohn's disease or other chronic conditions of the gut.

And so but so Marco. If things are disrupted in my brain now because I have M. S., are there strategies that I can use to help bring that my brain microbiome into better balance?

It is the easiest thing on the planet to what do you do when your gut microbiome is disrupted? Because, for example, you had to take some antibiotics, you take a lactic acid, a fermented or lactic acid bacteria, you take a yogurt or a key feel.

So it's so simple. And based on this, we developed an approach that is based on an entire microbiome transplant, if you want to call it so, because now we know exactly which microbes are resident in the brain, in the healthy brain.

We know that during a neurodegenerative disease, it's chronic diseases. The balance of these microbes altered and we know that their biodiversity is reduced exactly as it happens during a chronic conditions with the gut.

Okay, so the episode I want to sign up. How do how do I get well after microbiome? Well, you know, there are many probiotics, actually. There are thousands of probiotics on sale.

You go to your local grocery store and you find it in their shelves. So what we did there was to develop something that is a little bit more than that.

I don't know if you're familiar with the field of autism. Now, in autism, it had always been postulated that there was a link between the disruption of the gut microbiome and autism.

But up until recently it was thought that this was because we know the gut microbiome is involved with the immune system and also with the production of neurotransmitters.

So it was thought that it was kind of an indirect action. About ten years ago, a very good friend of mine who unfortunately passed away, Dr. Jeff Bradstreet, who was at the time the undisputed authority in the world of autism, talked about our approach.

And you say that Marcus approach, you know, I don't want here to make kind of a commercial advertisment. So you'll find out what my approach is called.

But I can tell is Bravo, which in Italian means good. And that's the name of our approach. And he said, Bravo is much more than a probiotic. It is an entire eco system.

And that's what we did. We reconstituted the ecosystem of microbes, plus what is called the nowadays they are a theater of activities. That is everything that the microbes produce proteins, sugars, fats, vitamins, that a neurotransmitter.

And we reconstituted these under the form of something that is edible. You can eat it. And so you eat these microbes together with their theater of activity, and they go in our gut as usual.

But we also introduce something that activates a sense of the immune system, like macrophages and these

macrophages that they bring the microbes into the brain because they constantly this is a traffic of activated macrophages and activated lymphocytes.

It is a continuous re circulation and they work like a Trojan horses. That is, they bring the microbes with them and they deliver the microbes inside the brain.

So essentially by reconstituting the microbiome of the gut with this approach of ours and by stimulating the macrophages, we reconstitute also the brain microbiota.

And we have a plenty of clinical evidence that this leads to an improvement. For example, in autism, for example, in neurodegenerative conditions, you know, here it is like the egg and the chicken.

Nobody knows which comes first. Nobody knows which whether first comes at the neurological condition and then the microbiome is disrupted or the other way around.

And nobody knows this. But we all know now that all of chronic conditions are associated with a disruption of the microbiome. They say the same happens for the skin, for example.

So it's everywhere in our bodies. So if we reconstitute the microbiome for the skin, for example, there are skin probiotics and they do work that are probiotics for the gut.

And now we also have probiotic for the brain. These are definitely reestablished imbalances and these helps going back to your first question, and this is where things have become truly interesting.

If consciousness is located in DNA, microbes, they do have DNA, are microbes conscious? And nowadays the answer is definitely yes. Our microbes intelligent.

The answer is definitely yes. If you wish, I can send the papers not published by me. Absolutely not by esteemed assigned. Is that you talk about bacterial intelligence and they demonstrate that not only microbes are intelligent, using whatever definition of intelligence that we like to use for us humans, it applies to microbes.

What exactly? But they also, unlike what humans do many times they cooperate with each other. So they cooperate probably much better than what we do as humans.

They also fight each other and it is good in a sense, because if they fight our enemies, they're our friends. And that's actually what happens. So microbes are intelligent microbes.

They do have consciousness and this has been thoroughly demonstrated. Now, the point now comes to another war that it is kind of mysterious entanglement, since the microbes, they do live inside our brains, in our guts and everywhere in our bodies.

And since microbes that they have, consciousness is there and consciousness entangled with our, according to some preliminary observation, the answer is yes.

And that actually. Is going on. Marco, this is such a interesting statement. They want to clarify it for everyone. I think Marco just said that the consciousness that I have is a cooperation between the DNA in my brain and the microbial DNA residing in my brain.

Did I get that right? Exactly. So and you were able to express these in much less water than I have been able to do these. And I appreciate summarizing it so well and so correctly.

What I am desperate, trying to say. Then let's think about these today. I'm giving you a number of information that I hope are new and interesting. As I said at the beginning of this conversation, we humans are made of roughly 20000 to 22000 genes.

So there are 22,000 pieces of information in our human DNA. And we are the way we are because of our genes and we transmit these genes to our progeny and we receive them from our ancestors.

And so basic genetic how many genes are there in their collective human microbiome? So in the microbes that we have in our bodies, how many what? Nobody knows for sure.

Microbiome-based therapies and ecosystem approach

But according to some estimates, the number of microbial genes is of the same order of magnitude of the atoms in the entire universe, not a lethal number.

I think it is called adding to the number. The number of atoms in the universe are ten to the 88 zero, so the number of microbiologists only for humans.

So let's not talk about dogs and cats and plants and everything else that is on this planet. And so the number of microbial genes in the collective human microbiome, according to some estimates, is equal to the number of atoms in the universe.

So we truly are cosmic objects are small and our microbes are even smaller. But the amount of information is a so astronomical we could say that, you know, this requires a complete change of paradigm the way we think.

So to answer your question, where is our consciousness located? Well, most likely not in our brains, even though our brains are there, they work and they perform all the functions that neurologists have described for decades, if not centuries, but we can do with our brains.

And so it means that our consciousness is kind of diffuse. So now let's move to some even more exotic concept that is consciousness as something intrinsic to the universe, as oriental religions have always said for the past 3000 years or so, what it appears the soul, because according to the philosopher, that the child or some consciousness is also also in those particles like atoms or neutrons or even subatomic particles.

So quarks and neutrinos, whatever. Now, if consciousness is intrinsic to the universe, could it be that our brains or our bodies simply tap into the intrinsic consciousness of the universe and the microbes because of their astronomical number?

The astronomical number of genes on the microbes that they truly help in these. Like if you seem too nice, let's say our bodies are like a radio receiver or C emitters and synthesize into the intrinsic consciousness of the universe.

Could this be the case that explains a lot of things. Well, let's move for a second. I see that you are muted. Maybe I am, but now that you're muted, not electronically, that you are not speaking.

So as you receive. Yeah, I'm hearing I'm fascinated. I'm like, Oh my gosh. And I'm going to interrupt for a moment. Marco. I love science fiction. And one of the stories that I loved was that the pilots were were trained, were traveling the universe in living starships.

And I've come to realize that you and I are the living starship, and the bacteria that reside in us are guiding us through the universe, co-mingling our bacteria.

And, you know, the bacteria and viruses have been around for billions of years, longer than multicellular organisms. And we may be servants to them in ways that we've never even contemplated.

And as I listen to you, I'm like, Oh, my God, that is so true. That's science fiction described a reality that we have this very cooperative relationship with our microbes and that we may be serving them at a higher level.

And I'm going to hand this back to you. This is such an interesting conversation. This is true. But it's also true that the other way around, it is not only that we are like a vehicle to transport the microbes, but also the microbes that

help us not most likely, not only on this earth, but, you know, whatever happens next, now, this might become metaphysical.

So I stopped here, but I wanted to go to something much more mundane. We all know, and I think this is a century old information, that there are electrical signals in our brains.

I mean, the electroencephalogram. Now, every time an electrical particle more certainly there's an associated that magnetic field so we emit continuously electromagnetic fields and this can be measured it is called a magnetic electroencephalography is something that is measured and nothing fancy or exotic here.

So let's say that roughly we have 100 billion neurons, cells in our brains. So we can say that we over 100 billion transmitters of electromagnetic fields.

And again, this is not science fiction. These something is measured on a daily basis. In a clinical settings, we observe 100 billion receivers because everything that transmits also receives.

Our DNA is a structure as a fractal antenna that is able to send and receive electromagnetic signals. So here we are still in the real amount of classical physics.

Maxwell type, not quantum here. So could it be that simply we continuously tap into the consciousness of the universe and we receive information from the consciousness of the universe simply through radio waves, simple, easy radio waves known for more than 100 years.

Could it be? Well, certainly it is. And some experiments that they do demonstrate that we are even sensitive to the earth magnetic field. It is very, very weak.

But, you know, the same magnetic field that moves the needle of the compass, moves the things inside our brains, and we are sensitive to that, actually.

Also, these wells demonstrated no more than one year ago. Actually, it was a student, a very young girl, who presented these astonishing results at the conference in Tucson last year.

Now, if we then go down to the quantum level, a quantum level is always something mysterious and fascinating up to the point that Einstein said. We called it the spooky, anxious, spooky phenomena at a distance, spooky action of this stuff.

Now, if we go down to the quantum level, then our consciousness and the consciousness of microbes is entangled and tangled. Minter goes beyond to space and time.

So this means that it remains entangled essentially forever or as long as the universe exists. So these are then open to perspectives about what happens to our consciousness after we leave this earth.

Well, if we think that our consciousness is as somehow entangled with that of microbes, microbes, they stay. They remain. After our bodies are gone. And they were here before, as you say.

Yes. So this opens up a number of perspectives. And I ended my presentation in Tucson saying something that maybe didn't make many people happy. I say, well, if we consider and it was a kind of a technical presentation, kind of complicated and because it involved the entanglement between the microbes and the Oracle or theory or several different roles as to Amara, the professor's job.

But at the end of my presentation, I said, Well, if we consider the microbial involvement, then the topic of the persistence of consciousness beyond our bodies becomes more a microbiological problem than a philosophical problem.

So I brought things down to earth. This is not much philosophy. It is microbiology, which is much more mundane

than philosophy. But and probably people weren't happy when I say these words.

But, you know, it could be microbes. We're here before we were here as humans or as mammals or as fish, and they will be here. I mean, they can survive in outer space, probably.

They travel in the face of comets. So, you know, it's kind of fascinating and going back to very trivial and mundane things that we tried with our approach that actually all our research and development and even manufacture products, of course, in Switzerland, which is, you know, kind of a strange place for exotic things.

So with our approach of reconstituting the brain microbiome we are trying in our from our legal angle or our legal perspective to tap in this consciousness of the universe.

Consciousness, microbes, and the future of medicine

This is like such an amazing, amazing conversation that is really shifting how I'm thinking about health in my self care program. I'm like, okay, I am totally on well on several things.

Mark One is I hope you're writing a book for the lay public. This is such an interesting topic. I know I want to read that book and I want to come to yours.

I'm going to have to start reading your scientific papers. You have such an interesting outlook on brain health, vitality and the things that all of us could be doing to support my brain health.

And I'm thinking, at the very least, I'm going to be eating a lot more fermented foods with every meal I usually eat about a pint a day of kimchi and sauerkraut.

Maybe I need to up that to a quart and increase my diversity here. And I'm going to see what what you're up to in terms of the brain microbiome products that that you've helped develop.

This is just so interesting and such a novel and profound understanding of, I'd say, the very latest science on brain health and vitality. Thank you so much for your kind words.

As a matter of fact, I already wrote a book, but it is ten years old now. But you know, the title still to be yes, it is called Your Third Brain. I think you can find on Amazon.

It's a third brain. In and brain because at that time I thought we had three brains. So now I know we have four. And actually I gave an interview to a Spanish magazine a few years ago.

The name also Quatro, so cerebral we have a full brain. So what are these for? Brains. What? First of all, the first brain, the one we have inside the skulls file a second brain, the so-called enteric nervous system that are the neurons embedded in the walls of our GI tract from them out to the anus.

A huge number of neurons interconnected and connected with our brains inside our schools. And this is called the second brain. I didn't designated it.

It is no second brain and then the third brain. I thought at that time were the microbes in our guts, because at that time I didn't know much about the microbes inside their brains.

So I said they are the third brain because they do produce the neurotransmitters like GABA or dopamine, a number of other neurotransmitters, and they do affect our first brain and second brain.

As a matter of fact, by changing the gut microbiome, you change mood. People are talking about psycho biotics. So you can change the mood, you can change the attitude, you can change a number of things.

I thought that's the third brain, and this is where the title of the book came from. And then and now I say, Well, what

about the microbes inside our brain?

So they are our fourth brain. And maybe the fourth brain is, let's say, the most of all in science. So there is nothing more important than anti-cancer.

But, you know, at least it is the newest and we know very little about it. But, you know, the microbes inside our brains with the entanglement over their consciousness, with our as I say, they open a completely new perspective.

And so I feel that we may be on the verge we already are in a completely new era of medicine. And this is not even mentioning the viruses. The human environment is even more complex and more biodiverse that the microbiome, well, they belong to the microbiome because they are microbes in us in a sense.

But we know absolutely nothing about the human virus very, very little. Well, let me tell you this. In our approach, we took care also of the viruses.

So in our products, we not only have the lactic acid bacteria and bifidobacterium are very good things, but we also have their microbes. So they are called the phages bacteriophages and they are the microbiome of the microbiome because the microbes themselves, they need those viruses inside them to protect them against pathogenic viruses.

And we integrated all of these. So that's why I relate doctor breasted call it to an entire ecosystem, not simply a couple of probiotics, but an entire ecosystem.

So viruses, the consciousness of viruses, you know that there are viruses that are bigger than microbial, than bacteria. It's called Mimi virus. And it may be they are the ancestors of our chromosomes.

So maybe the eukaryotic cells that these human cells or the cells of the dogs of all the eukaryotic cells, they came from the fusion of ancestral bacterial cells.

And ancestral viruses like the Mimi virus was discovered in Marseilles, France. And the DNA of the Mimi virus, or something similar to that, formed the primitive chromosomes from which our chromosome derives.

So we can say that our DNA, our chromosomes, is a viral origin. Yes. I mean, there are several studies supporting this theory suggest that. Yes, absolutely.

So you see. Okay, things are changing. Marco, this has been so amazing. I could spend the rest of the day and probably the rest of the week engaged in this wonderful conversation, learning so much from you.

What I'd like to have you do, though, is tell all of our listeners what is the one thing you hope them that they would get from this really wonderful conversation we've had?

Well, to change the angle that you use to look at your hands when we have a problems with our health, most likely they are due to imbalances. As you know, this is a very old concept.

The Chinese medicine, Oriental Oriental philosophy is based on this. So I'm not against antibiotics or chemotherapy for cancer. Actually, I have a specialization in radiology.

I know very well about radiotherapy and when it is needed, it works very well. But in a broader sense, by reestablishing the balance of the different components of our bodies and including and maybe foremost, the microbiome might be a great help.

So what I'm saying, the core message of my talk is we are much, much more complex than what modern science or modern medicine wants us to believe. We are simply observing the tip of the iceberg from a distance.

So we're not even close to that iceberg. And we know that we are only observing the tip most about our bodies, the way we function, the way we develop diseases is unknown.

We know many things, but most is unknown. And most likely the microbiome plays a big role, a fundamental role, and we are discovering this now. Most likely our consciousness are all intermingled or entangled.

So the core message is that look at your health from a different perspective. Take into consideration the role of the microbiome. Do your own research, just look for microbiome medicine.

You will find a lot of information you want to know about my researcher. Go to Google Scholar. You can go to the regular Google Bar. Google Scholar is more focused.

Go go to Google Scholar and type in my name and you will find everything from papers to patent applications to books, everything else, everything that is in between.

And of course, if you have any question, please write me a table, says all my contacts, and I should be happy to try. At least try to answer any question you may have.

Okay. Well, Marco, this has been one of the most amazing conversations I've had. You I want to thank you so much for agreeing to be interviewed and for the amazing work that you do.

Thank you. Thank you so much. It has been an honor and a privilege talking with you, and I hope I've been able to convey even a little part of your message.

Thank you, Marco. Thank you.