Helminthic Therapy, Autoimmunity, and Evolutionary Mismatch

Christine Schaffner, N.D. interviewing
Michael McEvoy PhD, LCSW

Christine Schaffner, N.D.
Welcome, everyone to the Mycotoxin and Chronic Illness Summit. I'm Dr. Christine Schaffner, and I'm here with my colleague and dear friend, Michael McEvoy. And we're gonna be talking about helminthic therapy, autoimmunity and evolutionary mismatch. Welcome, Michael, it's really great to see you.

Michael McEvoy PhD, LCSW
Thank you for having me, Christine.

Christine Schaffner, N.D.
Yeah, well, I think you're in this beautiful setting for this amazing topic, and this is something that I've been continually intrigued by, and I just always trust your perspective. And I know that you researched an incredible mount before you formulate an opinion. So I'm really excited to hear what you have to say today. And as the title kind of alludes to, I wanna first dive into this idea of what you share as an evolutionary mismatch, and its relevance to chronic illness. So can you just set the stage for the conversation and share your thoughts about this?

Michael McEvoy PhD, LCSW
So evolutionary mismatch is a term that was sort of first used in the 1940s by, I believe the person attributed is Ernest Mayer. And, essentially, evolutionary mismatch has to do with the fact that there are certain inherited genetic traits that were once advantageous in a certain type of environment, which have now become maladaptive in a new or different or changed environment. And so this concept of evolutionary mismatch is we start to look at it, start to understand that it's really central to understanding the genetic involvement with the rising tide of chronic disease in the modern world. And it also leads us to envisioning new treatments that could potentially augment and fulfill the genetic code for certain individuals that are more in aligned with producing inflammation. But if those individuals had exposure to certain types of helminths, or parasites, that a lock and key mechanism is almost established to the point where if they're missing a certain environmental vector, and I wanna talk about briefly an article that I published in the Holistic Primary Care magazine that really ties this concept together.

We really need to take a step back and look at how evolutionary biology has been very much relegated from the discussion of modern medicine and chronic disease. And a lot of that has to do with politics, with the fact that medicine by its virtue of trying to identify pathogens as the sole vectors in disease, have become obsessed with that effort. And in this process, medicine still in my opinion, does not have the maturity to investigate the concept of inheritance and genomics through the lens of evolutionary biology. This has a lot to do with the creation of molecular biology, which is about 100 years old. And I would argue that molecular biology, which is the template that we use to study genetics today as well as the basis of modern medicine, is more of a technology than it is a fundamental science. Molecular biology has a lot to do with Neo-Darwinism and the principles of Neo Darwinists, such as survival of the fittest. The Neo-Darwinists got the upper hand in the creation of molecular biology and as a result of that became obsessed with sort of their own personal eugenicist views of what they wanted medicine to become. But in that process, evolutionary biology has largely been relegated from the textbooks as well as from the discussions in modern disease and in modern medicine. It's very

interesting because if you look at the population data, and the epidemiology between the first world countries and the third world countries, we see a large disparity in the types of diseases that show up. And I specifically mean that the disparity is that in the first world nations, there is a high prevalence of inflammatory diseases. I'm talking about a high prevalence of allergy, atopy, eczema, psoriasis, autoimmune diseases, rheumatoid arthritis, lupus, inflammatory bowel diseases, on and on and on, neurodegenerative diseases, inflammatory diseases like type 2 diabetes and cardiovascular disease. These diseases have been largely minimized and to a large extent absent in third world geographies. And the question is always come up as to why is that, why does that disparity actually exist? And this was the basis of the hygiene hypothesis, which later became sort of the evolutionary mismatch hypothesis, which is that certain genotypes are predisposed to producing inflammation. Why is that the case? Because our gene pool, and our immune system, has evolved specifically because of diverse pathogen interactions. We do not have an immune system, unless we have millions of years of pathogen interaction. And those pathogen interactions are not only capable of producing inflammatory immune responses, they also create adaptive symbiosis.

The concept of symbiosis was really pioneered by a wonderful biologist by the name of Lynn Margulis. And she really led the flame to showing us that organisms evolved together, and that, from this research, we have to very closely redefine what pathogenesis really is. Because as we've come to learn over the past several decades now, and there's been many years of clinical trials that have been done on helminthic therapy, ingesting either orally or cutaneously inoculating yourself with various helminths, or worms, or their eggs, to arrest various inflammatory autoimmune diseases, many successful clinical trials have been performed. But through that knowledge, we have gained a deeper understanding that what we call pathogens needs to be carefully, carefully redefined. Because, for example, trichuris suis, which is a helminth, is classified by the Centers for Disease Control as a parasite. However, trichuris suis has clearly demonstrated the ability to arrest inflammatory bowel disease, in a significant percentage of patients. I'm talking about Colitis and Crohn's disease, there were two randomized clinical trials conducted in 2005 that clearly showed that significant benefit. So we have to really now look at, we have to really, in

my opinion, revisit and redefine pathogenesis through these new lenses, because what we are learning from the clinical trials and what we're learning from metabolomics testing that has been done on how helminths interact with our immune system, how they down regulate and dampen the Th1 autoimmune response, how they dampen and attenuate the sought after immunological pathways that are centrally discussed in these autoimmune diseases, the lock and key mechanism of helminthic therapy becomes more clear as we start to unravel this.

Christine Schaffner, N.D.
Wow. So that's a lot to take in because the people who are listening, right, this is focused on mycotoxins, but also the chronic illness world, right. So this is a very, and I have similar thoughts I haven't dug as deep to you, but I do feel that our health is highly, I mean, we've evolved, right? We have microbiome, we've got virome, we've got microbiome, like, that's not this war against microbes, right. It's this evolution as you said, and then how I've made sense to that modern life has kind of insulted our terrain so much that some of these things can become opportunistic, and then thrive in our body and create symptoms. And so this is like a whole nother narrative, right, that we're missing a potential parasitic infections that might not even be called parasites, 'cause they're offering value to the patient's health because of our modern, maybe more sterile, less diverse world. So it's kind of like, there's some similarity in these themes, because I think biodiversity, adaptation, resilience, all of these things are key to health. But we're looking at it from a whole different angle, 'cause parasites are really common, right, in this patient population who are chronically ill, and we have all these anti parasitic strategies and cleansing the bowel, and getting rid of things. And so, do you feel like these two ideas still can interact with each other, or is there a conflict there?

Michael McEvoy PhD, LCSW
So the difference between a parasite and a helminth is actually very simple. A parasite feeds off of the host, a helminth provides a mutually beneficial relationship between the host and the colonized worm. And so as we begin to look back throughout history, we realize that protists and worms have been a part of the

human biome for such a long, long, long time, that their absence is only, their absence has only appeared within the last couple of 100 years because of sanitation practices, the increased incidence of, the increased use of antibiotics and other immuno modulatory therapies. But the key distinction, is that helminth provides a mutually beneficial relationship, whereas a parasite feeds off of the host. So when I'm talking about helminthic therapy colonization, I'm not talking about colonizing with parasites, I'm talking about colonizing the biome with ova or worms that are not capable of moving outside of the intestinal biome, but are at the same time capable of releasing various molecules into the host, which regulates or modulate many of the inflammatory receptors that we know are involved in various autoimmune diseases.

Christine Schaffner, N.D.
Thank you for the distinction, the clarification. And, is there ever a situation where a helminth can become parasitic because of terrain or other conditions in the or is that not a possibility?

Michael McEvoy PhD, LCSW
Well, that's a great question, and it comes down to individuality. I'm not necessarily suggesting that helminthic therapy is ideal for everybody, but I think that it's first important to ask who are the patients that would benefit the most? And we know from what's already been published that type one autoimmune diseases, Th1 driven autoimmune diseases are primary candidates. We know, just speaking of CIRS for a moment, I know that this is really about your summit, it's very much about that. I wrote an article a couple of years ago on my website, metabolichealing.com, it's a free article, it's available for anybody. And the title of that article is, CIRS & Helminth, Is This The Missing Link? And I made the, I just asked the question that, is it possible that CIRS, which is the chronic inflammatory response syndrome, responds to various either mold or mycotoxins or so called biotoxins, can that be possibly related to a long term multi generational biome depletion of helminths? And as we start to peel it away we realize that, as Ritchie Shoemaker has done his important research uncovering that chromosome 6, the MHC II region, which is the HLA class of genes, HLA II, is largely involved in the genetic association to CIRS. What's interesting about

that is that helminths directly act to inhibit the Major Histocompatibility Complex II, versus MHC I, is more driven by viral pathogen selection, MHC II has been more driven by parasite selection and parasitic peptides. There has been a flurry of studies that have shown that certain helminths can secrete statin protease inhibitors. We know that one of the way that fungi and mycotoxins can adversely affect the respiratory tract is by the secretion of various proteases. We know that helminths can directly interact and inhibit this process. We also know that many people that have CIRS and autoimmune disease, many people that have CIRS may have autoimmune disease also, or may have, whenever I work with clients taking an inventory and just seeing if there's that going on, or if it's in the family. And oftentimes, I find that's the case. So there's clearly a link between auto immunity and CIRS and the possible interaction between diverse pathogen exposure versus not diverse pathogen exposure. And what do I mean when I say diverse pathogen exposure? Again, when you have a biome that has diversity, a diversity of microorganisms, the diversity creates a situation where you become less susceptible to the pathogenesis of single pathogens. The less diversity of microorganisms you have, the more susceptible you are to the pathogenic effects of single pathogens.

And that again, has a lot to do with the fact that we have all evolved with microorganisms as symbionts. What we call pathogens, is sort of a misnomer, because we can live with tons of, and I've run stool tests, and I'm sure you have to, and we deal with a lot of sick patients so whenever you see a sick patient, you run a stool test, you can find anything wrong with them by looking at a stool test. But if you look at a healthy cohort, not too many good scientists are actually looking at controls, they're only looking at, let's just study the sick people, let's not look at the controls. But I've actually seen many healthy people, including myself, that would show various pathogens in the stool, yet we present no symptoms. Why is that? How is it we present no symptoms whatsoever, but we have all of this colonization of all these so called pathogenic microorganisms? They've done studies in Africa that have shown that healthy indigenous people living off of the land truly, in remote regions of Africa are loaded with bacteria that are strongly associated with Crohn's disease, yet don't possess those symptoms whatsoever. How is that? And I think that what we really need to do is to take a step back and really redefine pathogenesis as different

degrees of dis-symbiosis, the ability or the inability to tolerate other microorganisms. Because immunology is very much about adaptation, the ability to adapt, and to get stronger, to learn literally, biological plasticity to actually learn from the pathogen exposure that you had, that your immune system gets smarter, it remembers what to do, it remembers not to overreact next time. That's the level that we need to get, because we can get rid of, we can try to get rid of mold from our environment, but guess what, we'll never be able to do it. It's not possible. Mold is everywhere, it's everywhere, it's always been everywhere. Why is it a problem now as opposed to 200 years ago, or 50 years ago even? What has changed in the environment? What other things that have changed that have led to a dysregulation and a dis-symbiosis to form that we now call CIRS, or we now call autoimmune disease, or we now call, enter in the next disease label? We have to look at the relationships between microorganisms in each person, because we're never gonna figure out these complex problems by using the old model of medicine, which is single pathogen vector oriented, which was good in the 1800s, when you had acute illnesses caused by pneumococcus or whatever. Today, it's a different world, it's a completely different micro environment, we have completely different biomes, which are completely depleted of helminths virtually, and that's been studied and proven.

Christine Schaffner, N.D.
No, you make an excellent point. And I think, but I agree with you, I think I've just been thinking about this from a different angle, and I've been thinking of the increase in toxicity that we're all exposed to, and how that is weakening our terrain, and how that has been underlying. And of course, thinking about, okay, biodiversity of the garden, all of that, but, I guess maybe, how do you make sense of like the rise in toxicity and the absence of helminths in the body?

Michael McEvoy PhD, LCSW
That's a really good question. And I just wanna say that there is no question that the environment that we're living in is very toxic, and the interaction of various chemical toxins many of which are not even detectable, microplastics for example, that we're consuming on a regular basis for myriad number of sources, that all of that is going to directly affect our microbiome, it's going to. We do know from other research, that

microorganisms have the ability to sequester different toxins. I remember years ago, reading papers that showed that 50% of the dry weight of a bacteria can be a heavy metal, like mercury or iron. Well, that's not necessarily any different from helminths or worms or any other microorganism that they we're colonizing. I think we have to start to look at these complex interactions with the environmental toxic factors how that is affecting our biome, because it is, there's no question that it is. And when we talk about modulating the biome, most people think, oh, more probiotics, or more prebiotics. Well, that's fine, I'm not necessarily opposed to that, but we have to always remember that what we have missing in the Western world that is not missing in the third world, are helminths. Just talk for a moment about that article that I published in Holistic Primary Care, and I really think that it's a segue into this to kind of illustrate the significance of this. Consider that the ApoE4 type has a 24 risk of developing Alzheimer's dementia, before the age of 65, that is specific to the first world, to United States. If you have the ApoE4 genotype, you've got a very high risk of developing Alzheimer's dementia. If you live in Papa New Guinea, or if you live in Sub Saharan Africa have that ApoE4 genotype, or if you live in the Amazon Basin, you do not develop Alzheimer's disease.

Alzheimer's disease is negatively correlated to those regions, it is not correlated to that genotype in those regions. The reason for the difference of this disparity is helminths. And the literature on that is very, very clear. There was a study done an Amazonian horticulturalists, basically showing that the greater parasite diversity that ApoE 44 genotypes have, the better cognition they had with age. Not only did they not develop dementia, but their cognition actually improved with age in the presence of parasites. We know from other research that ApoE 44 carriers, have a greater stronger immune response, they have a more of a recoil, and their ability to combat different types of pathogens. We know that because we look at the mouse studies, and the human studies, and the metabolon studies on ApoE4, we know unequivocally that they have a very robust, innate immune response. That's good for one thing, but bad for something else. And that specifically means that that ApoE4 genotype, that many people in the Western world have, whatever it is, 15% or so, that genotype didn't evolve in the United States in the first world, that genotype evolved in pathogen rich regions of the world. And that's why those pathogen rich regions

don't have a prevalence of Alzheimer's disease. Transplant that ApoE4 genotype to New York City, and you're gonna have the appearance of a new disease in the gene pool, i.e. Alzheimer's disease, which for that genotype is relatively new. That is called maladaptation or maladaptive genetics. So just for that genotype alone, I proposed in this article that I wrote, the need to look at helminthic therapy as a viable treatment, as a necessary treatment, to attenuate the inflammatory tendencies of the ApoE 44 for genotype. But it doesn't stop there, because as you start to really go into this, you realize that so many other genotypes that we now look at, has specifically evolved because of parasites. The hFE hemochromatosis gene is another one. The LRRK2 gene that's associated with Parkinson's disease is also a result of pathogen diversity, genotype, genes that are even the RCCX cluster, genes that are copy number variations. Why did they copy because it was nature's way of saying, we need more of this gene to fight this kind of infection. And parasites are the modifying factor for these genotypes that are now associated with modern diseases. And what happens when you de-worm the third world? There's been a plethora of huge randomized trials studies, and cluster studies in the third world, showing that if you have patients with, if you de-worm patients with helminths, they then do their evaluation to show glycemic markers, huge increase in insulin resistance when you do long term de-worming protocols.

Same thing with vascular disease, inflammatory markers. So not only are helminths, are a modifying factor of our genotypes, but if you remove them in certain populations by de-worming them because we think we're doing the right thing, you wind up creating a new disease that didn't previously exist. Wonderful, if you're big pharma, right? And mind you, the World Health Organization is very much aware of this subject, because they have published these, they have published articles linking to these specific studies, and have funded some of these studies. So we know that these large organizations have the so called philanthropic, we wanna be doing good in the world by de-worming the third world, but what happens when you do that and the results of that are explicitly clear. So we have to really understand that what we think of as parasites as being pathogenic may be true in some people, may be true in certain cases, however, we have genes that we have clearly inherited that specifically evolved because of parasite interactions. And you remove the parasite,

eventually, you're going to see evolutionary mismatch in real time. And I believe that this is one of the more overlooked phenomenon in evolutionary biology and in modern medicine today.

Christine Schaffner, N.D.
Yeah, no, I mean, I'm definitely, my mind is open in a way that I haven't probably looked at this, and with all of your explanations, Michael. And, I mean, we kind of think of like, also endogenous retroviruses or the virome, or we vilify pathogen, and then forget all of the helminths, doing this to evolve and actually be more helpful than harmful in the end. And so I see your point, and I guess, walk us through helminthic therapy. Are you doing this, have you had experience with clients and collaborating with patients, and just maybe walk us through this so we can go deeper and understand how this works.

Michael McEvoy PhD, LCSW
Well, yes. So I'd like to just mention, you brought up viruses and retroviruses and I do wanna say that, there have been studies that have shown that helminthic therapy has the ability to attenuate the interferon response as well as the innate immune response, two viruses in particular. And this was also, this was done. There's human and some animal studies looking at this as well. So as you were mentioning the virome, supposedly, we have 380 trillion viruses, or some unfathomable number in our body and our biome that makes up who we are. I mean, we're literally comprised of more microorganisms and viruses and bacteria than we are human cells by an enormous order of magnitude. But there is a direct, helminths definitely have an inhibitory effect on viral activity and the innate immune response to viruses, which means that there are a potential benefit for various so called viral infections, and may also be a totally overlooked treatment in that regard. Getting into treatment, I wanna first give a real shout out to an organization that I think is doing tremendous work. And if you're on your browser right now, go to helminthicwiki.org, helminthic, helminthictherapywiki.org. This is an organization of a community of people that have aggregated thousands of patient testimonials from people that are self treating, using helminthic therapy. And if you go through their testimonials, you'll be astounded at what you read, as I was and as I continue to be. They've also done a

good job of aggregating about close to 1000 published studies on helminthic therapy in animals, in preclinical studies, as well as in human studies. So helminthictherapywiki.org, is an absolutely phenomenal resource for people to get familiar with this concept, and also, there's a Facebook group there of people that are sharing their own experiences doing it. Because I have to admit that, a lot of my patients don't wanna do helminthic therapy because it's still too much of a foreign concept. However, those that have done it, have gotten benefit. And it's simply because there's a huge potential to attenuate complex signaling in the body, using something very simple. The other limitation with helminthic therapy as it is today, is that the cost to do it is still relatively high. And because of the fact that there are certain FDA regulations on the culturing and the sale and distribution of helminths in United States, many people that are doing this kind of therapy have to source helminths from outside of the country, from labs coming from outside of the country, which is totally feasible. But the cost of all of this can get a little bit exorbitant. But if your health is at stake, if you have multiple sclerosis, of which there's been at least three or four clinical trials in humans, showing major benefit. And I just wanna tell a quick story on that. About 15 years ago, I was contacted by a 22 year old male who had been recently diagnosed with multiple sclerosis. And he told me that he was going to enroll in some clinical trial happening in a major university in United States using helminthic therapy. And at the time, I hadn't heard of it, I wasn't familiar with it. I said, well, good luck, I hope it works for you. Six months later, he calls me back and he tells me that, five of his six brain lesions were gone, and the sixth one had shrunk by 50%.

Christine Schaffner, N.D.
Wow.

Michael McEvoy PhD, LCSW
I said that's pretty dramatic. So that was my first experience with helminthic therapy. And ever since then, I've been very interested in this concept. But the ability to do that is, the ability for helminths to work on these levels, again, people out there are thinking, well, what kind of disease do I need to have to have worms? I can't wait, get me started right now. Well, I will say this, is that, we don't yet know who is not the

best candidate for helminthic therapy. Because as you go through the list of testimonials, anecdotal reports from individuals who are self treating, you see an enormous amount of categories here. It's not just type one autoimmune diseases, it's also pandas, it's also salicylate sensitivity, it's also neurological symptoms, but it's mostly autoimmune disease, because I believe that that is, that the genes that we've inherited that are the links to autoimmune disease are the immunological genes. And those are usually the ones that are associated with HLA II, or HLA I, or RCCX, or cytokine genes, etc. So I would just say this, is that for inflammatory bowel disease, if you're looking for a treatment, 'cause I would unequivocally say, give it a shot, because there is no question it could save your life. And as you read the testimonials on the helminthic therapy wiki pages, which I encourage you to do, I was just perplexed at how many people have gotten benefit. And why this therapy is not more widely used is really, really something that I wanna get behind and promote, because we need, just from a scientific perspective, we need more data, we need more clinical data, we can't move forward, unless we get more clinical data. And so I really encourage you to embrace, to just be open to this concept, because I think it could really save people's lives, and it already has.

Christine Schaffner, N.D.
Yeah, no, I think it's really important, especially as you said like, and if your life is on the line, if you're having one of these really grave diagnoses that doesn't have a lot of treatment, I think when you weigh the risk benefit, it absolutely should be considered. I mean, my brain is going and I'm sure you've gone there too, like, okay, very different, but let's say okay, how probiotics, we made a supplement out of them, right? Is there any kind of like forward thinking like some of the anti inflammatory agents of the helminths produced, like we can encapsulate, or peptides, or things so that we can have this, or is it like, that's too reductionistic?

Michael McEvoy PhD, LCSW
That's a really good question, and I'm glad that you asked that. So, obviously, there's been thousands, probably tens of thousands of studies, preclinical studies, animal studies using helminthic therapy, metabolomic studies investigating all of the, for example, one helminth that's commonly used, trichuris suis, is capable of secreting

250 or 300 different peptides into the host. That's 300 bioactive immunogenic immunomodulatory molecules into the host by a single colonizing helminth. So, of course, most of the funding for this research is coming from drug companies, or subsidiaries of that, so they're always looking for the patent, take the single thing that's the most effective protease inhibitor, and let's patent it, and let's put it in a supplement or a drug, of course, is where it's gonna end up. So this is going to eventually happen, eventually, it is, this is inevitable. We'll be talking in five years, oh, yeah, no, did you hear about this new drug that they got? Oh, yeah, it's derived from this world of this worm. But I honestly think . What's that? I honestly think that nature is prime best. And well, it may certainly be beneficial to have some drug in the future that is derived from a worm, there's many nonlinear interactions between the helminth and the host that are not even studied and understood, for example, the prostaglandins that certain worms can secrete have completely different effects, as our own prostaglandins.

We think of prostaglandins as mediating the cyclooxygenase pathways and all this, but is like, wait, this doesn't even seem to make sense from what I knew about prostaglandins in humans. So these worms are doing something completely different with their own prostaglandin secretion. So there's so much that we don't yet know about the complex nonlinear interactions of how worms have co evolved with humans for millions of years. And I'm not talking about just humans, but I'm talking about all life on this planet has microorganisms that have symbiotically co evolved with them, and that includes worms in different species. We're no exception to that, we're not separate from this earth or from the super biome that makes up all of life. We're not separate from it, and we have to realize that we've become separate from it in many ways, because of medical treatments, because of toxic that we've been exposed to that has led to dis-symbiosis, the inability to tolerate other microorganisms. It's not getting rid of them that I'm interested in, it's how can we increase tolerogenesis, how can we increase adaptation, and how can our bodies learn from the symbiotic relationship that all organisms that inhabit us, us?

Christine Schaffner, N.D.
Yeah, I have a very, this is just a new tool to think about, but that's my belief in health. The bio regulatory looking at, regulation, and resilience, and adaptation, and I think, there are many takeaways for people to take from this conversation today. But I think we have to give up the war, give up that kind of war idea on microbes, and we have to think about, also, like you said, like, we can't live in these bubbles, or these Faraday cages, or these sterile environments, if we have a mold issue, where it's like, how do we create a more resilient terrain, right, so that we can walk through whatever life brings, and respond, adapt and move forward. And I think this is, yeah, this is I mean, to be very honest too, Michael, I've always, 'cause I do treat parasites and I do get results with that, but I know it's not the same, but it gave me that kind of thought of like, is this something to think about, helminthic therapy, or are we just trading one problem in for another down the road? But I mean, I hear you. I mean, like we look at microorganisms all the time, and it's the balance of these microbes in our body that provide health. And I think just because helminths are a little bit more insightly, than lactobacillus or like these other microbes that are not our own, or human cells, I think it's probably, we need to be educated. So I appreciate you educating us today.

Michael McEvoy PhD, LCSW
Thank you for letting me speak on the subject, I appreciate very much.

Christine Schaffner, N.D.
Yeah, yeah, definitely, Michael, and you mentioned a few articles, and you have a phenomenal website. I always love reading your articles, and you've opened my mind up on many topics. And you have a really wonderful way with words and distilling really amazing, boiling down a lot of research into an article. And so I would love for people to learn again, how to find you and your work and anything else you'd like to share.

Michael McEvoy PhD, LCSW
My website, I have two websites, my main website is www.metabolichealing.com, that's metabolichealing.com, and my other website is true.report, that's

www.true.report, that's illness and analyzer software. So we actually have that going on as an ongoing research project to help to have basically patients or practitioners upload their patients genomics and or blood chemistry to get an analysis. And then the metabolic healing site is largely for practitioners. We do trainings, we have a number of different clinical training courses created over the last eight years and lots of free content, 13 or 14 years worth at this point. So there's three specific articles of helminthic therapy that are up there, and you can look for them just by going to all articles. There's the one on ApoE4, which just came out, I republish that from Holistic Primary Care, really interesting. And then there's , that was published a couple years ago, and then one on Evolutionary Mismatches, which was published just last summer.

Christine Schaffner, N.D.
Well, thank you, Michael, for being on this summit, and thank you for your passion, for diving so deep into these topics and educating us. I really appreciate that.

Michael McEvoy PhD, LCSW
Thank you very much, Christine.

Christine Schaffner, N.D.
Thank you.