Dr. Jill

Your Functional Medicine Expert®

Jill Carnahan, MD ABIHM, ABoIM, IFMCP

#77: Dr Jill presents sneak peek of iNOS path with Bob Miller

Dr. Jill 00:17

Hey everybody! On this Friday afternoon, we're just popping in, not for a formal, long lecture like you usually get with Bob Miller and me. That's coming. So stay tuned. We decided this was such an important topic that we wanted to jump on it spontaneously this afternoon and just do an introduction because I think some of you may relate to it.

Dr. Jill 00:39

For sure, you will want to tune in for the full lecture and information on iNOS. Of course, I'll let Bob talk about that in a minute here. It will be coming on Friday, October 29th. We'll be live at 4 p.m. Mountain, 5 p.m. Central, 6 p.m. Eastern or if you're on the Pacific Coast, it'll be 3 p.m. Mark your calendars, because this will be a big breakthrough.

Dr. Jill 01:03

I was just telling Bob right before we got on that I've had so many aha moments with my own health. My job, I've learned, is to be the guinea pig. I learn through experience. Finally, after the cancer, Crohn's, and mold, I've just learned to accept that I'm going to be the guinea pig for all of you. I go through experiences and I learn some fascinating things.

Dr. Jill 01:28

This whole month, I've had some mold hits. A dear friend of mine is remediating, and she brought over some laundry and a few things. They didn't have any laundry access. I think the underlying route was Chaetomium, a nasty mold. I would have these mold hits pretty much all this month, two or three times a week. They will just knock me out. When I started checking my blood pressure, I realized I was running 80–85 over 50–55, which is not compatible with standing up. So it's no wonder what would happen after these.

Dr. Jill 02:06
We'll talk about a few details today but I'll frame it with my story. I would literally just fall asleep. And it's interesting because, for five years, I've known Chaetomium is a nasty mold, not only for many of you listening but also for me. I nicknamed it the narcoleptic mold because I would be like sleeping beauty, just down. If I got an exposure, I could be walking on the concrete sidewalk, I could be at work, I could be at home, and I'd be like, "I must lay down now. I cannot even keep my eyes open." Some of you [who are] listening can probably relate.

Dr. Jill 02:38
I joke because narcolepsy is when you fall asleep within seconds; you could be standing up. And that's how it felt to me. And for many, many years, I've been trying to figure out: What is the mechanism? Is it inducing low blood sugar or low blood pressure? There's got to be some mechanism here. And this most recent episode was one of the worst. It was last week on Tuesday. I had it in conjunction with IVIG, which made everything worse. And we'll talk about some of the other triggers.

Dr. Jill 03:03
For 24 hours, I was sleeping. I had gotten a great night's sleep. I woke up. I was kind of disoriented after the mold exposure. That whole day, I would wake up for five or ten minutes and then just lay back. It was like a deep, deep sleep. Then I'd wake up again. And the funny thing is, I was telling some of my friends that every time I'd wake up, I'd be like: "I wonder what's going on in my vascular system? I wonder what... " I would be thinking through the pathways and trying to figure out what was going on.

Dr. Jill 03:30
Bob and I had been talking. He really helped me put this together after that episode as we talked. We were back and forth texting frantically because we were like, "Ah, what about this?" "What about this?" And you'll hear some of those what-abouts today and you will hear [them] in-depth on the 29th of October because this pathway, as Bob will share, is probably underlying a lot of the complex chronic issues for people.

Dr. Jill 03:55

I'll just spill it in a nutshell and then I'm going to turn it over to Bob, and I'll pepper in some of my experiences with what made it better and what made it worse. The bottom line is that iNOS regulates nitric oxide production. Nitric oxide is a vasodilator. Many of my patients want to produce more of it because they feel better with exercise. There are a lot of people who don't produce enough of it. And this helps with, as you can imagine, lung capacity, oxygenation, tissues, cardiovascular [fitness], and workout potential. You feel better; you feel more blood flow to your periphery into your tissues. It even helps with erectile function and sexual performance.

Dr. Jill 04:31
So nitric oxide is a big deal. However, on the other side of the coin, as there are always two sides, there are people like me who produce too much. Again, I'm going to let Bob talk about this in just a moment. But the thing there, as you can imagine, is that all of a sudden, if I have other factors—I'll tell you some of the things I was doing that I found that were contributing—and a mold exposure, mold is one of the potent inducers of nitric oxide, then you have this vascular collapse.

Dr. Jill 04:59
I was almost like someone who would be septic or in septic shock. In fact, one of my doctor friends said: "Jill, 80 over 50—that's the criteria for sepsis. Are you sure you're okay?" I was in between falling asleep. I knew I was not okay, but I also knew enough to be [like]: "I'll figure this out and I'll be okay." After I figured it out and did some interventions, I'm back to normal. I still believe that if I got a mold hit, I'd probably feel similar. I have to be very careful. But this is a big aha and I am so excited to share it with you today because I think some of you listening will feel the aha as well.

Dr. Jill 05:32
So with that introduction, Bob, let's turn it over to you to share a little bit about this pathway that you're looking into and how it affects so many other things in our body.

Bob Miller 05:41
Absolutely. I'm so excited about this. Of all the things that I've looked at over the

years, this might be the most exciting. And let's make it a goal and intention that the next time you get a mold hit, you don't even notice.

Dr. Jill 05:52
Yes! And I promise, guys, if I figure this out, I will share everything I've learned with you because I know a lot of you who struggle with POTS, postural orthostatic tachycardia, and some of these vascular issues. I think it may be related to this pathway.

Bob Miller 06:07
I do believe so. I'm going to do a quick screen share here.

Dr. Jill 06:10
Perfect. And let me get you to do a screen share.

Bob Miller 06:20
You should see the slides now, I believe. Let's look at the title here. The title is 'The Carnahan Reaction'. This is the official launch of the 'Carnahan reaction'. The reason we're calling it that is because this is what the pattern is that we saw here in Dr. Jill. Let's give you the cliff notes here. And in October, I can imagine, Dr. Jill, we're probably going to go two hours on that one.

Dr. Jill 06:49
I can't wait! You guys must tune in or tune into the recording. And thank you, Bob. I just think it's hilarious that we're calling it this. And yet, gosh, if I have to suffer for science, then at least we get something named after... [laughter]

Bob Miller 07:00
Absolutely! A hundred years from now, people will be studying this, Dr. Jill. I've used this slide before: 'The Three-D Chess Game Played Underwater'. It's very complex. You did an excellent review there, and that is that nitric oxide is very much needed. I don't want to make this sound all bad. It is considered the miracle molecule. It's just two atoms: Nitrogen and oxygen. It's very significant; it's crucial to your well-being. It's a vasodilator, as you mentioned. It stimulates the brain. It helps men with erectile function and impotence, as you talked about. It's a powerful signaling molecule. We could probably do several webinars on just the benefits of nitric oxide. I don't want to make this sound like it's bad.

Dr. Jill 07:45
Bob, I want to mention that that's why, to me, this was such a big deal because I have been touting the benefits of nitric oxide to my patients for years. We use it in clinical practice. We use precursors, we use beets, and we use arginine. We'll talk about those. But what I didn't know was: "Whoa! Could too much of a good thing go the other way?" I never had the concept that this could go the other way. But as we were talking about some of the SNPs, the first question was: "Does this upregulate function or downregulate?" And I'll let you describe all that but it was fascinating to me to think, "Something that's good for me and everyone else can be too much of a good thing." And in hindsight, I never do well with beets or beet juice. I don't do well with arginine. It's interesting; we'll talk about that but I intuitively knew that something here was not right for me.

Bob Miller 08:32
Absolutely. That's why I often talk about Goldilocks and the Three Bears. It can be too hot, too cold, too little, or too much. The 1998 Nobel Prize. If you google that, you'll see the pictures. And if you google nitric oxide and Nobel Prize, you'll see all kinds of websites. You'll see probably dozens of formulas to boost your nitric oxide, [each] telling you all the benefits of it. And clearly, that's true. I'm not going to read these but these are all the beneficial effects of nitric oxide. They're absolutely all true. However, as you said, sometimes there can be too much of a good thing.

Bob Miller 09:14
What I'd like to show everybody here is an interesting chart that we made up that shows how this nitric oxide works. Good nitric oxide is your eNOS, your endothelial nitric oxide. The way it's made is that there's a substance called BH4, tetrahydrobiopterin—we're going to keep coming back to this—and it combines with an amino acid called L-arginine, oxygen, heme, and NADPH. And by the way, I would encourage people to watch the video we did some time ago on NADPH and the NADPH steal because that probably plays into this as well. Then we make our good nitric oxide. However, after BH4 donates what it needs to make the nitric oxide, it turns into BH2, dihydrobiopterin.

Bob Miller 10:07
We then need to take BH2 and turn it back into BH4. These purple ovals here are enzymes that do that. If we don't convert this BH2 back to BH4, something very

strange happens—the eNOS enzyme that's supposed to make the nitric oxide makes a nasty free radical called superoxide. It's a nasty, nasty free radical. That superoxide will combine with nitric oxide, chew it up, and make something called peroxynitrite. And by the way, we did a whole video on peroxynitrite. And that peroxynitrite—by the way, the chemical symbol really is ONOO—suppresses BH4. And we're on one little merry-go-round here. That's what happens with the eNOS.

Bob Miller 11:01
What a miracle the body is! I never cease to be astonished. There's an enzyme called NOS2, or inducible nitric oxide. NOS3 makes little amounts of nitric oxide for vasodilation. NOS2 is like the army. It says: We've got a foreign invader here and we've got to take care of this foreign invader. It makes massive amounts of nitric oxide. Mackay Rippey, who you had on before, talks about nitric oxide. He calls this the Gatling gun of nitric oxide. It makes a boatload of it. It kills bacteria, viruses, fungi, and parasites. Is this a good thing? Absolutely—unless it's excessive. Then we have tissue damage and organ dysfunction, and it hurts us.

Bob Miller 11:56
What happens if we are continually making massive amounts of nitric oxide? We deplete our BH4, tetrahydrobiopterin. Now this guy runs, but rather than making the nitric oxide, or maybe in addition to it, we make more superoxide. This is a bad boy. It makes the peroxynitrite. If we don't have enough superoxide dismutase, the antioxidant, then we have more of this. And even if we do, we make hydrogen peroxide, and if we don't have enough glutathione, thyroxine, and catalase, we make what are called hydroxyl radicals that are inflammatory. So there's a lot that can go wrong here.

Bob Miller 12:40
Clearly, this is a good thing. In animal studies, if they knock this out, the animal dies of infection. But I know you and I are both on the same page on this: We have done a lot of things in the environment that are throwing a monkey wrench into things. When we do our long version, we're going to talk about aluminum, mercury, BPA (plastics that are now polluting the entire world), electromagnetic fields (by the way, we did a video on EMF), and high fructose corn syrup (I am stunned at how bad this is). We knew it wasn't good, but I'm going to show you a moment why it's worse than we thought.

Dr. Jill 13:18
Bob, most of that is contaminated with glyphosate, which is on this list too, right?

Bob Miller 13:23
Yes. Also, some processing gets some mercury in it. Gluten and then, of course—I don't have the glyphosate on here, but it's on another map—chlorine and iron overload. I believe we did a video on iron overload.

Dr. Jill 13:42
Yes. We did. And I'll be sure to include links. I didn't mention this at the beginning: If you guys want to find all the videos, they are now on iTunes. Dr. Jill Live is on iTunes podcasts. Listen, subscribe, and please leave your reviews. And also YouTube. So you can find them all. They're all free. If you want to listen to more with Bob, he is the most popular guest. He has the most views. So go back. We have four or five already done.

Dr. Jill 14:09
And, Bob, I want to comment on that because years ago I was a swimmer. I almost did college-level swimming. After I started getting mold exposure, I had to stop swimming because the chlorine would bother me so much. Once again, that probably played into it. And as you'll probably mention, I'm a carrier for hemochromatosis, which means I have iron overload. It's like the perfect storm.

Bob Miller 14:30
Absolutely.

Here we have this iNOS enzyme that's supposed to be our friend, [but it's] being our enemy. Now I'm going to pull in another map here. Very similar. But it just shows some of those other things. And it just focuses on the NOS2. And here you see the glyphosate and lipopolysaccharides. Also, you'll note that interleukin-6—and by the way, I encourage everybody to watch our video on interleukin-6; I think like 5,000 people have listened to that so far—stimulates NOX and makes more mast cells and histamine. We have a video on histamine. And guess what histamine does? It stimulates iNOS.

Bob Miller 15:20

Just a quick note on high-fructose corn syrup. There's a very important enzyme called SIRT1 that supports iNOS, supports superoxide dismutase, inhibits NADPH oxidase (we have a video on that), and inhibits NF-κB, which stimulates iNOS. When anyone has mutations in SIRT1, there are two disadvantages. But if you're eating high fructose corn syrup, which is everywhere, you'll also inhibit SIRT1. Those are the cliff notes.

Bob Miller 15:54
And just one little thing here yet, and that is that aluminum inhibits the enzyme that takes the BH2 to the BH4, and there's something called the urea cycle that clears ammonia. Ammonia inhibits BH4.

Dr. Jill 16:10
Yes. And we have patients who have high ammonia [levels] as well.

Bob Miller 16:13
Many of these people are inflamed. This was a new piece of news. I don't think I had a chance to pass it on to you. Ammonia stimulates arginine transport. Then that makes more arginine, more iNOS, and more inflammation. We'll just briefly mention that we'll go into this in the next webinar, but L-arginine is important—it's a non-essential amino acid—and if we get too much of it, it feeds the iNOS. And then you can tell us later about how taking lysine helped with your situation because you cut back on the L-arginine.

Bob Miller 16:54
I believe what's happening is that there are multiple environmental factors that we weren't exposed to 30–50 years ago. High-fructose corn syrup only came around in the '70s and '80s. Glyphosate is relatively new. EMF is relatively new. Using glyphosate on wheat is relatively new. I believe this is possibly why we're seeing so many conditions. We're not going to get into them today, but it's like the who's who list of conditions related to the upregulation of iNOS. We're still researching. We'll have that whole list by October. But it is an extensive list of problems created by excess iNOS.

Bob Miller 17:38

Now, here is—drum roll please—the 'Carnahan reaction'. We may play around with this language a little bit, but for the most part, there are gain of function mutations in NOS2. Let me explain what that is. We have our genetics. We inherit our genes from our parents, mother and father, at the moment of conception. We can have what are called genetic mutations. Most of the time, mutations make the enzyme less active. People have heard of MTHFR, where you don't put enough methyl groups on your folate. Most mutations lack function. The enzyme does less. There are a couple of them that are gain of function, meaning that the enzyme works more aggressively when it's mutated. A gain of function means that the enzyme works even faster than normal. Gain of function mutations in iNOS, along with environmental and endogenous—in other words, internal things—that stimulate NOS2, create inflammation from the excess nitric oxide, inflammation from superoxide when we get that NOS uncoupling, and the depletion of BH4. By the way, BH4 is also needed to make serotonin and dopamine.

Dr. Jill 18:59
Yes, I was going to mention that because I love those neurotransmitters. And you can really cycle through. And if you're out of that, you're not going to create those neurotransmitters. It can affect all kinds of things that we need for mood, sleep, drive, ambition, etc. Bob, I just want to let people know. Just a few months ago, when we first started talking about this, the question was: Is this increased or decreased production? And with his work, it's kind of confirming. And I remember our very first conversation. We had looked at my genetics specifically and I thought, "I remember I don't do well on beets and I don't do well on… " So I had the suspicion that it was a gain in function. But kudos to you for kind of solving the riddle here and putting it all together. And what's great is that, by October, you'll know even more about this cycle.

Bob Miller 19:47
Oh, absolutely. This is going to be our focus. And we'll have more information by October. I'm planning a spring conference for doctors or anyone who wants to attend, probably a three-day conference, and this is all we're going to talk about. We're going to talk about this for three days because I think it's that significant. Here it is. This is the RS number. If somebody's done 23andMe or any other genetic testing, this is it. It's mind-blowing—4.73 times increased iNOS expression. Whoa!

That's a big deal. Then this other one, which ends in 18, increased iNOS activity. It's involved with Crohn's disease, ulcerative colitis—

Dr. Jill 20:30
Bob, for anyone on audio, click the slide back once. I'm just going to read those if you're hearing this. On this slide, there is the RS2779249. And then go to your next slide. The RS2297518. If, for some reason, you don't have the video here, I want you to be sure to have access to those RS numbers.

Bob Miller 20:50
Sure. And if they just look up those RS numbers, it's the A allele that's the one that's increased on the 18, and it's the A allele on both of them. If you've got A as one or A as both, you've got a heterozygous or homozygous mutation on there.

Bob Miller 21:08
What I've done here is list the environmental factors. And then internally: Histamine, mast cells, ammonia, and lipopolysaccharides.

Dr. Jill 21:20
Bob, go back one slide on that last RS. Yes, right there. You said: Very early-onset Crohn's disease, ulcerative colitis, and IBD. We were talking about this earlier, but as you may or may not know from my history, 20 years ago, after breast cancer, I was diagnosed with Crohn's disease. I also have a gene called NOD2, which is a high risk of Crohn's. So other things play into this, but I believe this iNOS was also playing into my diagnosis of Crohn's disease.

Bob Miller 21:48
I'm sure it was a factor, yes. So I think we mentioned everything except the mold. And we mentioned glyphosate. Then, if you've got high histamine, mast cells, ammonia, or lipopolysaccharide... It's guaranteed that in October there's probably going to be three columns here as we continue the research.

Bob Miller 22:07
Now, you're very brave to put your mutations out there on the internet. Dr. Jill has carrier status on the HFE H63D. I'm sure people have heard of hemochromatosis. That's usually when people have a homozygous [mutation] or two on here. But the

literature shows that this causes you to absorb a little bit more iron. It's incredibly common in people with English, Irish, and Ashkenazi Jewish backgrounds. It's very, very common.

Dr. Jill 22:35
Yes, and it's interesting, Bob, that a lot of doctors aren't checking this routinely. I always check iron, ferritin, and transferrin in all of the labs on every new patient. Then, if there's some concern about iron being borderline or if I find some funny things happening that I don't quite understand, I will check the hemochromatosis gene. If you're wondering about this, even though these are genetics—you'd need to go with Bob or 23andMe or one of those companies—you can have your doctor check your iron and check your hemochromatosis status on a regular lab.

Bob Miller 23:03
And particularly if you're of English, Irish, or Ashkenazi Jewish background. And interestingly—I think we spoke about this—this was actually beneficial during times of famine. During times of famine, people who had this did better.

Bob Miller 23:19
Then heme oxygenase. We didn't talk about this whole lot, but heme oxygenase makes something called bilirubin and biliverdin. The biliverdin inhibits the iNOS. If you've got mutations on here, your creation of that biliverdin may not be as robust. Here's what makes the Carnahan reaction the 'Carnahan reaction'. Those ones we talked about, mother and father, mother and father. And you can see that this number over here is how many times this happens out of 49,000 people. My software has 49,000 people. They're generally doing this because they're not doing too well, so I would suspect this is lower among the general population. Even among not-well people, 3.9% have this. And 9.9% have this. The odds of both? They're pretty low. So this is why we're calling this the 'Carnahan reaction'. I've only seen one other person with both of them homozygous. Of course, we've only been looking at it for maybe six to eight weeks, but I'm sure more will come up.

Bob Miller 24:30
We talked about how you need to recycle your BH2 into your BH4. And there's an enzyme [called] dihydrofolate reductase, and that is what does that. By the way, when we speak in October, we're going to have the entire pathway of BH4

production made, and then we are going to be looking at all of the SNPs that may further impede the DHFR.

Bob Miller 25:01
You were kind of set up here with the perfect storm, my friend. You had all this upregulation of iNOS, then you had some iron pushing in a little bit, maybe not recycling the BH2 to BH4 very well, and then all those other environmental things that you did. So all of those are moving together.

Bob Miller 25:23
I'm not going to go through this, but these are all the mutations that could be related to excess iNOS. It's quite the list. This is your nitric oxide, your superoxide dismutase. This is superoxide dismutase. Nrf2 and Keap1—I think we spoke about how this makes your antioxidants in one of our talks. KIT and NOX can make more mast cells. These are the genes that clear the histamine that we spoke about in one of our talks. SIRT1 is huge. As we said, it supports SOD and NOS3. Here's the urea cycle for ammonia. And all of these genes are related to BH4 production and recycling.

Bob Miller 26:07
I believe you need to look at all of these to get a good look at what's going on. In October, we're going to delve into each of these just a little bit so people can understand. Now you can see why it's the three-D chess game played underwater. There isn't just one SNP here that's the problem.

Dr. Jill 26:29
As we talked, I was like, "Let me do some interventions and see if this works." And it really did. Because of that mold exposure, I've always known I don't do great with recycling glutathione. I have a GSTP1 and maybe another one. And there are other things. We won't go into that today. But the bottom line is that it's the Goldilocks [balance] with the glutathione: A little bit's okay; too much does not do well. But I had been resilient in doing well, so with these new mold hits, I took a lot more glutathione. That was actually contributing to oxidized glutathione and making, as Bob showed earlier, that pathway worse. I've known for probably 20 years that I do really well on lysine. I do know that that will inhibit viral replication like Epstein-Barr, so that's the reason I was taking it. But when we realized this would

inhibit arginine in this pathway, I took triple the dose and pretty quickly noticed some improvement on that.

Dr. Jill 27:16
VIP—for any of you who know the Shoemaker protocol or are working with VIP at all—I learned [about it] five years ago from my bad mold exposure. I had recovered fairly well and I was like, "It's time to try some VIP." This was maybe a year into my mold exposure. I didn't know why, but I did not do well. Now I know why; it's because VIP upregulates arginine in the same pathway. Unbeknownst to me, I had been on VIP off and on again because I'd been doing better after the mold exposures, and I think that VIP made my hypotension even worse. It's known to be a vasodilator. So lysine, VIP, and glutathione were too much. And again, these things are all good things.

Dr. Jill 27:53
One of the other things that was interesting was that I went about a week after my exposure and got a huge blood draw, which was 40 tubes of blood. It was kind of like a therapeutic phlebotomy, and I felt so good. Most people, [with] 40 tubes of blood [drawn], would be like, "Ooh, I'm depleted." Me? No. And I've noticed that too, Bob. No surprise. After years and years and years of getting blood drawn, I always feel better. And I get a lot of tubes sometimes because I'm looking at all these pathways. That could be a clue that you have iron overload: You feel better after you give blood—even 40 tubes of blood. So those were a few of the things. For me personally, this is not medical advice, but it really helped me. And I feel like this pathway was a big aha.

Dr. Jill 28:35
Bob, thank you for sharing. I am so excited because I know that in the next month or so, you're going to have even more information. Please comment and share this with your friends because we'd love to have a big group live on the 29th with us with your questions and we'll hopefully have answers. Any last comments, Bob?—because this is big!

Bob Miller 28:56
I think I'll just echo what you said: This is big! Everyone talks about the benefits of nitric oxide. All true. And I want to emphasize that the nitric oxide is not bad. It's

our friend. But when it's upregulated by the iNOS, environmental factors, and genetic factors, it can turn on us, deplete our BH4, and be rather disastrous.

Bob Miller 29:17
And as I'm doing my health coaching here at Tree of Life, I'm noticing that so many people that I was stuck with before—we made marginal little improvements here and there—I'll go back and look and it's like: "Wow! This is their issue." It could be behind many, many things that no one is noticing. And our goal here at the Research Institute is to make a contribution to humanity. That's what we want to do. If getting the word out about the 'Carnahan reaction' is helpful to a lot of people, it makes us happy that people are getting well because of this. And again, it all goes back to environmental toxins.

Bob Miller 29:52
One final note. I have a suspicion that this upregulation at one point in mankind's history may have been beneficial. If someone was living with parasites, viruses, or something, that upregulation probably gave them the immune strength they needed to fight off the pathogen. But like many things, today, with all these environmental factors pushing it even harder, it's now to our detriment. I hope somebody found this helpful. Maybe somebody is listening who says, "I need to take a look at this and see if that's what's going on with me."

Dr. Jill 30:24
Yes. So stay tuned. We'll be back. And, Bob, just publicly thank you because this is one of those things for months and years where I'd have these crashes. Like we said, narcolepsy. I'm like, "What is happening?" I've been studying, trying to figure it out. And I really think this is at the root. So, stay tuned.

Dr. Jill 30:40
Bob, thank you for your gift to humanity. We will have all kinds of information about your conference and about where to find you. But before we go, where can people find you and find more information?

Bob Miller 30:50
My clinic, where we do the health coaching, is Tree of Life Health [at] www.tolhealth.com. If any practitioners would like to do any of our work, [visit]

DNASupplementation.com. Tell us that you saw this on Dr. Jill. In October, we're going to have a special announcement so that when doctors take a class from us, they'll get a discount because you referred them. We'll have that coupon code and everything in place in October for people who want to take our certification course. If anyone feels like they'd like to look at this, we'll be glad to help them out.

Dr. Jill 31:25
Awesome. Bob, thank you. I look forward to talking more on October 29. Take care.

Bob Miller 31:30
Likewise. And by then, I'm hoping you just laugh at mold.

Dr. Jill 31:33
I know, right? [inaudible]. All right, take care, my friend.

Bob Miller 31:37
Take care, my friend.