183: Resiliency Radio with Dr. Jill: Dr. Richard Semelka on Gadolinium Toxicity

Dr. Jill 00:13
Welcome to *Resiliency Radio* with Dr. Jill, your go-to Podcast for the most cutting-edge insights in functional and integrative medicine. I'm Dr. Jill, your host, and with each episode, we delve into the heart of healing and personal transformation. Today we're here to explore the frontiers of health and the intricate workings of microbiology. And today, especially, we're going to talk about radiology, gadolinium, and heavy metal toxicity.

Dr. Jill 00:38
If you like this video, be sure to hit the like icon and share it. If you're listening on Stitcher, Spotify, or anywhere you listen to podcasts, leave a review. It helps us reach more people.

Dr. Jill 00:49
Without further ado, let me introduce my guest today. Dr. Semelka has been one of the major forces in radiology for three decades. He has been a leading researcher and practitioner in MRI, has pioneered and is a leading author worldwide on abdominal MRI, and is a radiologist with the broadest research and publication record on safety in radiology, having authored major works on informed consent, overuse of imaging, risk of cancer from CT and x-rays, nephrogenic system fibrosis, gadolinium deposition in the brain on MRI, and most recently has pioneered in the medical literature on the subject of gadolinium deposition disease or GDD. Today we're going to talk about that, so stay tuned. And he's presently the leading author on the subject.

Dr. Jill 01:35
GDD is essentially a severe, persistent disease secondary to the use of gadolinium-based contrast agents in individuals who have normal kidney function. Dr. Semelka has written over 350 peer-reviewed articles in radiology and 17 textbooks, including *Healthcare Reform in Radiology*. He's been one of the most accomplished authors on safety, especially regarding medical radiation, patient information, and overuse, as we mentioned.

I am so delighted to be here with you as an expert and author on this topic that just doesn't get enough attention. Welcome, welcome to the show!

Dr. Richard Semelka 02:11
Thank you for having me on your program. I'm delighted to be here.

Dr. Jill 02:15
You are welcome. And this is such an area of interest, as I could tell from your writings and your paper. You sent me one of the most recent papers. We'll be sure to [provide a] link for anyone listening to some of Dr. Semelka's papers and research. So stay tuned wherever you're listening to or watching this in the notes. You'll have access to all the information we're talking about.

Dr. Jill 02:33
Before we dive into gadolinium and heavy metals and maybe the overuse and some of the practices, I would like to hear a little bit about your story. How did you get into the practice of medicine? How did you choose radiology? And tell me just a little bit about your journey to where you've been.

Dr. Richard Semelka 02:50
Okay, I'll try to make it as quick as possible. I'm from Winnipeg, Canada. Both of my parents were physicians, so being a medical doctor was the thing that was most apparent to me. I had originally intended to do plastic surgery when I was going into medicine. It's a funny way to say this, but my mother was a radiologist, so I was familiar with radiology. And just at the time I was in medical school, trying to decide what I would do with my career, new things like CT had come out, and radiology was changing and getting exciting. So it was no longer reading plain X-rays or doing ultrasounds. It had just come out. CT was on the horizon. MRI also came onto the horizon, and that convinced me to go into radiology.

Dr. Richard Semelka 03:46
I did my original training in radiology in Winnipeg, Canada. Through the course of my training, I became intrigued with the new thing, the new imaging kid in town, which was MRI. My chief professor, who I worked with in Winnipeg, said: "You know what? I went to UCSF in California. It was a fabulous time. Why don't you go there?" So I ended up going to UCSF for specialized training in MRI of the body. From there, I went to Germany for six months to work with the research team at Siemens in MR.

Dr. Richard Semelka 04:30
Then, as a Canadian, I went back to Canada for two years. But the problem is that once you leave a very cold place... Once you've left Siberia and gone to the Mediterranean, it's difficult to still live in Siberia. And I hate to say that to all the Canadians out there, but it was just too cold. And it's funny how you just need a brief experience, like two years in San Francisco and I was ruined for minus 30 degrees in February in the wintertime. So I came to Chapel Hill, North Carolina. I've been here essentially since then for 24 years, working at UNC as a director of MR services for all of that time, vice chair of quality and safety for part of that time, and vice chair of research for part of that time.

Dr. Richard Semelka 05:28
Now I'm doing some radiology, still focusing on body MR. But I've happened upon looking after people with gadolinium deposition disease. And I'll tell you, and I'll try to be brief about this as well, how that happened as a director of MR services at UNC. It turned out that a patient who has become one of my favorite people—I work with her—and her husband came to my house on a Sunday during the day. She said: "I had an MRI at your facility. After that, I had a feeling of burning, like my entire body was on fire for months. Nobody knew what it was. I think it was the gadolinium that I received." I listened to this, and I said to her, "You've come to the right person." It turns out that a senior female physician at UNC also approached me not too long after that and said that she also had this disease.

Dr. Richard Semelka 06:42
Based on that and the fact that I was maybe at the time the leading author worldwide on the value of gadolinium, I thought, "Who better to write on limitations than me?" Now, some of it you could argue, "Maybe it's a feeling of penance," and that's maybe true. But I think one of the things that's characterized me in my career is that I care about the welfare of people, and I can put myself in their position. I can feel what it must be like to go in, get an MR study with gadolinium and be told: "Everything is safe. Not to worry, it's the safest thing. Your kidneys are fine. Don't worry about it. Everything will be wonderful." And then you end up with a horrific set of feelings that you feel you're going to die. I can appreciate what that would feel like. So I've taken this on as my cause.

Dr. Richard Semelka 07:42
The good news is that it's easy to diagnose. And if caught early, it's also quite readily treatable, looking at all comparable diseases. And I don't know, Jill, if at this point you want me to continue and talk about the diagnosis of GDD, or if you have a question you'd like to add in at this point.

Dr. Jill 08:07
I just want to comment. If you're listening, stay tuned; we're going to talk about diagnosis and treatment. We're literally talking with a world expert. I am so honored to be here with you, Dr. Semelka. And I just want to say that on a human-to-human level, I already have such deep respect [for you by] getting to know you and what you've told me. So often we go to medical school, and then after medical school, we think we've learned everything we need to know. And many doctors don't continue learning or being curious. The first thing that I hear is that you were curious about "What if there was some problem here?"

Dr. Jill 08:40
I think way back to the times when they were delivering babies after doing an autopsy and not washing their hands. That started a sepsis and the maternal mortality rate was so high because they were taking this bacteria from the cadavers and then delivering babies. It was literally doctors causing harm. And you and I took the Hippocratic oath and said, first, do no harm. Part of that, I think, is remaining curious to "Could there be some things, whether it's a drug we're prescribing or procedure we're doing?" and just remaining open.

Dr. Jill 09:07
I loved hearing your story because what it shows is the deeply compassionate human being that you are. And you were open. That takes a lot of humility because here you are the world's expert on gadolinium. And then to say, "What if there could also be some harm?" I want to just publicly honor you for that heart that you have because there are people on all kinds of procedures and things that we do that can have harm, because there's a spectrum of people. So let's dive in with that. But I just want to honor you publicly for your work and for your humility, your compassion, and your curiosity, because it takes a huge heart to do that and to say, "Well, what if?" So then you, with these two patients, started to question and say, "What if?" Tell

us, then, how did you determine that there could be possible toxicity? And then we'll talk about: How do you diagnose it in a patient who's having symptoms?

Dr. Richard Semelka 10:03
A lot of this also comes with some sadness on many levels—sadness over the illness of the patients, but also sadness over the unwillingness of many physicians to see what should be very obvious. The way I like to think of it is that if you were an eight-year-old child and somebody told you: "I just had an imaging study and they injected some fluid in me, and right afterward, I felt very sick. What could it be? Do you think it's maybe the presentation of lupus suddenly or ALS suddenly?" Or is it what just got put into your body? To me, it's so obvious that if you suddenly developed symptoms that you didn't have before and they came right on after the gadolinium injection, why wouldn't it be this?

Dr. Richard Semelka 11:15
The next thing is to figure out the features of the disease. It's one of the things that I think is very important, and maybe it's worth repeating to your audience a couple of times. And the thing that you have to remember is that gadolinium goes everywhere in your body. With the COVID virus, we thought, "It's just a lung thing," but we're learning it's going everywhere. So gadolinium is going everywhere. The symptoms can involve everywhere because it's going everywhere.

Dr. Richard Semelka 11:55
I think because it's given intravenously, one of the more distinctive symptoms that makes it different than what I would call part of the group of immune-mediated inflammatory diseases is the extreme burning that people can experience. For me, the five classic symptoms are skin burning, bone pain… And it's not like, "Uh, what is that pain?" It's like a screwdriver being rammed into your bone. What's distinctive are rib bone pains. A lot of people have knee pain and so on. If you get knee pain, [you might ask], "Is that just knee pain I have, or is it from gadolinium?" Any of the bones and joints can get very painful. The other feature is brain fog. I know, Dr. Jill, that in dealing with the range of diseases that you deal with, brain fog is a feature of them as well. So you also know how individuals will tell you, "I can't remember anything." Or, "I entered a room, and I have no idea why I'm in this room." There are all sorts of cognitive impairments beyond just forgetfulness and confusion. The other feature is pins and needles sensations that can be anywhere. The pins and

needles [feeling] is a symptom that's classic for small fiber nerve disease. The other feature that I like to focus on is fasciculations—so muscle twitching—that could be anywhere.

Dr. Richard Semelka 13:33
Those are the five classic symptoms. Beyond that, we could talk about all the different symptoms. But the other second grouping that's very common is that people will describe a head pain that they don't call a headache. It's a head pain. I think the best description of it is that it's like having a swimming cap put on your head, which is three times too small. It's like a constrictive pain. [An issue with] vision is quite common. [An issue with] hearing is very common. Cardiac arrhythmias [may occur]. Bowel/abdominal [discomfort] is usually stasis, so ileus-type patterns. And then imbalance—patients can experience incredible imbalance. Those are, I think, the most important symptoms that people should know that they may have.

Dr. Richard Semelka 14:22
Unfortunately, at this point, most of the patients with this disease have made their own diagnosis. They've gone in to see their doctors and their doctors will say: "It can't be gadolinium because you have normal kidney function. The only people who have problems with gadolinium are patients with poor kidneys who get nephrogenic systemic fibrosis." It's tragic that most of the time, the people who come to me have made their own diagnosis.

Dr. Jill (pre-recording) 14:52
Hey, everybody. I just stopped by to let you know that my new book, *Unexpected: Finding Resilience through Functional Medicine, Science, and Faith*, is now available for order wherever you purchase books. In this book, I share my own journey of overcoming a life-threatening illness and the tools, tips, tricks, hope, and resilience I found along the way. This book includes practical advice for things like cancer and Crohn's disease and other autoimmune conditions, infections like Lyme or Epstein-Barr, and mold- and biotoxin-related illnesses. What I really hope is that as you read this book, you find transformational wisdom for health and healing. If you want to get your own copy, stop by ReadUnexpected.com. There, you can also collect your free bonuses. So grab your copy today and begin your own transformational journey through functional medicine and finding resilience.

Dr. Jill 15:53
Most physicians are worried about abnormal kidney function. If you're listening and you don't know all the medical technology here, our kidneys are filtering these dyes and things that we put into our body. That's our natural way between the liver and kidney, and that's one of the organs. So if your kidneys aren't functioning as a healthy filter, of course, you could have more toxicity from something you put in intravenously. But what you're saying in your article and today is that many people are complaining of symptoms with totally normal kidney function, which, for us medical professionals, if you're listening, you should be aware of as well.

Dr. Jill 16:27
And interestingly, I just want to give a little backstory: I wrote an article and I think that's how we connected. And I am not the expert [on this]. But just like you, I saw a handful of people who came back and said, "The day of my MRI, this is what happened." And it sounded just like what you described—the burning, the brain fog, the neuropathy, the numbness, the tingling—a lot of those symptoms. The same as you, I said, "Huh, could it be connected?" And I didn't assume anything. I was just open. Then I started reading more about some of your articles and the stuff you've published. It was the same way that you came to this for me as well—when I heard patients complaining. So now that you've been writing, I'm sure you get contacted a lot. But say you have 1,000 or 10,000 patients who get a gadolinium MRI. What percentage might have GDD? Do you have any statistics on this?

Dr. Richard Semelka 17:15
Yes. I'm glad you asked that because I think the next question is: Who gets it and how frequent is it?

Dr. Jill 17:23
Who's at risk? Yes.

Dr. Richard Semelka 17:24
I think one of the reasons why radiologists don't want to accept the diagnosis is because they fear it will create a sense in the public that it's extremely toxic and nobody should get it. "We don't want the gadolinium and we don't want to get MRIs," and so on. I think they have that Chicken Little fear of running around and

worrying that the sky is falling. But one of the first things I also tell people who are going to get an MR and email me and are in a panic about it is that it's relatively uncommon in the general public. About 1 in 10,000 people will get this disease. So that's one of the excuses that I have—radiologists and other physicians may not want to accept it because they may not have seen it. The other big problem for radiologists, which includes me in my former life, is that we never see patients. We never see patients.

Dr. Jill 18:34
You're in the dark room, right?—in the basement of the hospital.
Dr. Richard Semelka 18:37
Right. If you never see patients, guess what? You don't know if there's some lasting problem that they get. It is just that simple. About 1 in 10,000 people can get it, so it's not that common. The people most likely to get it, Dr. Jill, as I look at you, are people like yourself: White women, first off. But then you add to it the areas that you have done a lot of work in. Anything that sets off your immune system, anything that I consider in the cluster of entities of T-cell dysregulations, which includes regular autoimmune diseases like rheumatoid arthritis. But the whole grouping of conditions like chronic inflammatory syndrome, chronic fatigue syndrome, even mold toxicity, fibromyalgia, chronic Lyme disease, or chronic viral disease—these are all conditions that have set your immune system off. So it has T-cell dysregulation [associated with it]. And I'll give you a Latin quote that I'm very fond of that makes me think of all of these. And that is: "Abyssus abyssum invocat"—one hell calls forth another.

Dr. Jill 19:58
It's so true. That's what I was thinking—it's primed, right? Your immune system is primed when you have a lot of these infectious, toxic things that have triggered an immune response. So no wonder a chemical can add to that load.

Dr. Richard Semelka 20:12
Right. Many of the people who come in will have a history of what you could call multiple chemical sensitivity syndrome or the other things that I mentioned in that cluster of unusual immune-mediated diseases. And once you have one of them, you're set up for getting another. One of the things that I worry about, for instance, with the COVID long haul and the COVID vaccine long haul is that once you have one of these conditions—and what we do nowadays with everybody who has some

weird neural thing—they get an MR with gadolinium. Once you get that in a number of people, particularly if they get repeat gadolinium injections, then you have gadolinium deposition disease, and that then becomes your dominant inflammatory condition. The good news is that we can treat it.

Dr. Richard Semelka 21:07
But one of the things that I do want to emphasize, and this is a good point to do this, Dr. Jill, is that if somebody is sick from gadolinium the first time through… Before an MR, we have a check sheet that we give patients about things [such as]: Do you have a cardiac pacemaker or clips in your brain? And so on. You have to ask people, have you had a previous gadolinium injection? And did you have persistent symptoms afterward?

Dr. Richard Semelka 21:39
Quite often, the first onset of GDD may go away in a few months. So they will get a burning [sensation] and brain fog. Then it goes away, and then they're better. But with each successive MR scan, the disease becomes more ingrained and more difficult to remove, and you get progressively sicker and sicker. A number of my individuals have this and they get neural symptoms and then: "How are we going to investigate neural symptoms? We'll do another MR with gadolinium." Then, months later, they're worse. "Oh, maybe it's a progressive and neural condition like MS. Let's do another MR with gadolinium." I have patients who have had maybe 15 gadolinium injections in a row, all of them to investigate what was [diagnosed as] gadolinium deposition.

Dr. Jill 22:36
Wow.

Dr. Richard Semelka 22:44
I was just going to say that if you are a white female… But everybody can get it. White men are probably the next most common group. But the combination of having a pre-existent something—which you describe as the entities that I mentioned and the ones that you specialize in—you're set up for getting this.

Dr. Jill 23:03
It's so fascinating because women, we know, have four or more times the autoimmune risk, which is in this realm. And that makes a lot of sense. One thought

personally that I think a lot of women may be facing. I'm a breast cancer survivor. I had breast cancer at 25. So, of course, my follow-up could involve MRIs as a young woman with dense breast tissue. And I've had multiple [MRIs] with gadolinium. And as a radiologist, for breast cancer screening or post-treatment, it's pretty hard to do a non-gadolinium MRI for the breast. Is that correct? Is that what I've been told?

Dr. Richard Semelka 23:37
They would not want to do that. Not to say that it can't be done. But in part, I think for a number of reasons, we want to have the least likelihood of making a mistake. There are good reasons, such as that it's the best thing for the patient. And there are other reasons that radiologists and physicians don't [inaudible] and that's why we overuse imaging.

Dr. Jill 24:01
Absolutely. I remember in my early 40s, in some of the screenings, I found a lump and it turned out to be nothing. But I had, I think, two MRIs in the same year. Then they were recommending a third—it was like every six months—and they were all with gadolinium. I have not had any side effects or symptoms, thank goodness, from gadolinium. But intuitively, on that third one, I thought: "You know what? I'm not going to take the risk of one more gadolinium MRI." And again, I had multiple and I've had other ones as well. So this isn't something that I totally avoided. But it was interesting because, even personally, I thought, "You know what? I don't think that's worth the extra risk of getting a third MRI within 18 months with gadolinium," so I chose not to. And it turned out to be all benign and everything was okay.

Dr. Jill 24:42
Maybe talk about this because, as a radiologist, you're trying to diagnose disease and help patients identify cancer, brain tumors, and multiple sclerosis. With some of these things, gadolinium is important because it enhances certain tissues. I'm an MD, but I'm not a radiologist, so sometimes I'll call someone like you and say, "For this condition, do I want contrast or no contrast?" Maybe first mention to the public and the doctors, why would we do a gadolinium-enhanced MRI versus a non-enhanced MRI? What are the kinds of things we'd see differently?

Dr. Richard Semelka 25:21
As a general rule, if you think of the broadest range of all organ systems, gadolinium allows you to see the presence of enhancement and the absence of enhancement

better than anything else. My particular area of expertise is the liver, pancreas, and, I guess, the other organs in the upper abdomen. If you're looking for a small hepatocellular carcinoma to look for the pattern of enhancement that cancers have, you don't want to miss them.

Dr. Richard Semelka 26:03
The question is: How often should you do these studies and can you interleave other MRs without contrast? I think a lot more thought has to be put into minimizing the number of times you may do the optimal study. So yes, it's by and large extremely helpful for looking for cancer, but can you use that enhancement template on a new study without contrast and then just transfer where you saw the enhancement and look at the morphology of that now? And this may be something that artificial intelligence would readily be able to do. In my earlier years, we thought that gadolinium was as safe as water, so I would think with patients with chronic liver disease, "Let's do another MR in three months." Now I spend a lot of time thinking about how soon I want to do it.

Dr. Jill 27:08
You weigh [the benefit versus the risk], right?

Dr. Richard Semelka 27:11
Right. So there's that. Maybe, Dr. Jill, we'll have different discussions on different aspects of imaging in the future. But for instance, the reliance on other imaging technology where we don't inform patients of the risk—to me, I hate to say it, but it's shameful. There's a great enamor of PET and PET-CT, but the radiation doses in PET-CT are enormous. And the new radiotracers that are coming out sound great, and some of them do wonderful things, but what is the dose and what is the risk to the patient? And I tell you, a nuclear medicine PET—and I hate to say that—it's the one group that seems to avoid talking about safety, and to me, it's unconscionable.

Dr. Jill 28:07
Yes. For those listening, you and I know about radiation and doses, but do you want to just briefly talk about a regular chest X-ray versus a CT versus a nuclear medicine test and—for the consumer who maybe doesn't know what they're getting—the numbers of how much more radiation they're getting with some of these studies compared to a regular chest x-ray?

Dr. Richard Semelka 28:27
Okay. It's interesting that before I got into MR and gadolinium safety, I was focused on CT and radiation. I would say that it was one of the first, maybe the first, university of radiologists to write about this subject. There was a cardiologist, Eugenio Picano from Italy, who wrote—it was funny that I wasn't aware of his work—some months earlier on the same subject of radiation doses. But at the time, most body CTs involved—and I'll just have to use these units, okay—10 millisieverts of radiation. If you look at the FDA website on radiation risk, 10 millisieverts in a 40-year-old male is associated with a one in a thousand chance of cancer.

Dr. Richard Semelka 29:21
A lot of people will use that number and translate it to everybody else, but that's not the case. You think you know about medical radiation and you think, "10 millisieverts is 1 in a thousand [chance] of cancer." In a one-year-old female, 10 millisieverts of radiation is associated with something like a 1 in 100 or 1 in 200 chance of cancer. So it's an entirely different ballgame. Great things do happen in medicine. It was 10 millisieverts—[tests] were done on many children, adults, things and so on. But through the course from about 2005 to 2010, CT scanners were designed to deliver less radiation doses, and protocols were also designed to have less scanning. Whereas a typical abdomen CT was 10 millisieverts maybe 15 years ago, now it's maybe 3 millisieverts.

Dr. Richard Semelka 30:31
It's difficult [to determine] when to tell people when there's a risk. There was a study that was done by the VA system maybe 20 years ago and published in the New England Journal that described that if the risk is something like one in 40,000, you should probably inform patients that there's that risk. I think with a lower risk, patients should be aware of it, but aware that the risk is relatively low. And even though the radiation biology literature describes that there's no lower limit of risk, the lower limit I use is 1 millisievert. Right now, 1 millisievert would be a brain CT. To suggest that one brain CT [has been] done is probably not a huge thing. In contrast, when you talked about chest X-rays, that's about 0.01 millisieverts, or about 1/1000th the amount of radiation. PET-CT combines both PET and CT. Traditionally, that radiation dose is 20 millisieverts. We'd have to go to the books and then calculate what the risk is.

Dr. Richard Semelka 31:56

As a female physician, you also know that most of the risks and so on have been determined for males, but it's different for females. And not enough research has been done on females. But the risks are much higher. And you can't just simply do them every three months and say, "There's going to be no problems." I particularly think about how, if you're doing this every three months for a cancer patient, 10 millisieverts is a 1 in 1,000 chance of cancer and 25 millisieverts is maybe a 1 in 300 chance of cancer. You're giving something that can cause cancer to people who have already shown you that they can develop cancer. So it seems, on the surface, a little bit crazy. That's why I recommend that you interleave them. Interleaving PET CT, which for many things is the gold standard, with regular CT. Some things could be interleaved with ultrasound and some things could be interleaved with MR. And if it's not [done] with gadolinium, MR is extremely safe.

Dr. Richard Semelka 33:06
I think that there has to be a lot more thought placed into these things, but it needs to be people like myself who are interested in safety. And right now, my time is focused on this one area of gadolinium toxicity. And by extension, heavy metals and general toxicity.

Dr. Jill 33:26
Yes. So hang on if you're listening; we are going to get to treatment in just a moment. But this is so important because the other thing I see in clinical practice is someone saying, "I really need a PET scan," and patients are starting to demand [certain tests]. A lot of times, as physicians, we're trying to please the insurance [company] and the patients and trying to balance all these needs. And sometimes, when a patient comes and requests an imaging [test], we just order it. But I think that if you're a patient out there listening, it's your responsibility as well to know the risk and not overask for things. And again, as physicians, number one, it's our responsibility. Informed consent. But I want patients to know too that there's nothing without a risk that you ask for, whether it's a drug, a treatment, or an image. And just knowing and starting to understand that is important. So I want to be the first to say that I want to educate physicians and patients about the benefits and the risks. So thank you for being at the forefront.

Dr. Jill 34:25

Let's turn to treatment because you have studied GDD and it sounds like you've given us the set of symptoms. Is there a diagnostic criteria? Is it mostly a clinical diagnosis? So what does a diagnosis look like? And then what do we do for treatment?

Dr. Richard Semelka 34:42
Generally, most people develop symptoms within 24 to 48 hours but they can extend beyond that to at least a month. So I accept that these new symptoms [appearing] within a month, like I described, [indicate that] GDD is a likely entity and maybe the obvious entity. At this point in time, our first treatment is the best diagnostic tool to confirm that the patient has GDD. So I'll sort of interleave into treatment as we talk about diagnosis.

Dr. Richard Semelka 35:30
The best treatment... Actually, this applies to all heavy metals. To me, it's obvious, but people don't necessarily understand the obvious. If you're trying to remove a metal from the body, you want to use a chelator, which has the strongest adherence to whatever metal you're looking at. One of the analogies I've used is the magnet crane game that used to be present in grocery stores, where you have a crane with a magnet on it and all these little stuffed mascots or animals. It had plastic rings and so on. And then it sticks on that and it transports sometimes all the way through, but oftentimes it re-releases it—which, with metal terms, we call redistribution—and then it will take it over and drop it into the chute sometimes. So you want to have something powerful that hangs on, stays hanging on, and doesn't re-release it. We call that the stability constant.

Dr. Richard Semelka 36:46
You have to know the stability constant if you're going to use a chelator. A number of people just randomly use chelators, but you have to know the stability constant of the metal that you're interested in. And it's knowable. It's a lab measurement, but it is knowable. And if the manufacturer hasn't determined it yet for that metal, then maybe you shouldn't do it because there are others where the stability constant is known.

Dr. Richard Semelka 37:14

For instance, with gadolinium, the most stable chelator currently on the market is DTPA. I'm just using numbers by memory, so these aren't the exact numbers. The chelator that's oftentimes used is EDTA. The log stability constant is 17 for gadolinium with EDTA. For DTPA and gadolinium, the stability constant is about 22. So 17 versus 22. So by log scale, that is something like 300,000 times—those are the right numbers; I'm not making a mistake—more stable. You would think, "If the whole basis of this is to hang on to the metal, shouldn't I use a thing that's most likely to hang on to it?" If you don't hang on to it, what happens is that you re-release it back into the body, and then it goes somewhere else.

Dr. Richard Semelka 38:32
The other critical thing about the diagnosis was when I talked about chelation. We will chelate with DTPA. And the things that I look for to confirm the diagnosis are: If you were sick from the gadolinium when it went in and you're still sick from the gadolinium when we remobilize it in your body and it goes into the circulation, it should make you sick again. We call that a gadolinium removal flare. You have to have a gadolinium removal flare if you have gadolinium deposition disease. Otherwise, you have something else. The other flare that's very interesting that you also have to have is what I call a gadolinium equilibration flare. That comes on about three weeks later. What happens with heavy metals, in general, is that they're distributed in the body in various tissues at various strengths of adherence. In some repositories, it's very durable. Lead is very similar in this regard. The two largest areas that gadolinium goes to are the skin, where it's easy for us to remove it, and the bone, where it's difficult. DTPA can remove gadolinium directly from bone but doesn't do it that well.

Dr. Richard Semelka 39:58
What we then rely on is what's called Le Chatelier's principle, which is that everything strives to be in equilibrium. So the gadolinium removal flare occurs immediately. At the same time, if you've used a poor chelator, you will get a gadolinium redistribution flare. They both occur immediately. About three weeks later, it becomes most noticeable as a gadolinium re-equilibration flare. And what that reflects is that since a lot of the gadolinium you've removed has come from the skin, some of it from the brain and other soft organs, and very little from bone, what happens—if your bone was here, your skin was here—is that you've pulled it out from the skin and now the difference is huge. So re-equilibration is now [where]

bone moves back to bring in gadolinium to the skin. That happens in force at about three weeks. You will get a re-equilibration flare in three weeks.

Dr. Richard Semelka 41:02
That has to occur as well. And that's very distinctive. People will panic and think: "Oh my God, now I'm getting worse again. The chelation didn't work." No, this is what has to happen. And what's important for me to tell all patients—they want to know what they're going to feel and they don't want it to be a mystery—[is that] you have to have a removal flare and a re-equilibration flare. If you don't, then you don't have the disease.

Dr. Richard Semelka 41:31
With time, I've learned to manage that more. We start by giving people lesser amounts of chelators to begin with and we give them IV steroids. Generally, we then try to increase the amount of chelation with time and decrease the steroids to have a balance. We basically treat the chelation process like an acute hypersensitivity reaction, because if you're sick from gadolinium and you remobilize it, you're going to get sick again. So we use the steroids as we use acute hypersensitivity reaction management. And we also use a steroid taper, as you would with any severe allergy.

Dr. Jill 42:15
This makes so much sense, because I've done stuff with lead, metals, and chelation. I know that EDT is better for lead, DMSA is better for mercury, and we don't mix those two. The crane analogy—I love that. It's so applicable. I also deal with toxic mold in the environment and its accumulation in fatty tissues, so I know that as I'm detoxing a patient—the same thing—they're mobilizing that from their tissues into the bloodstream where the liver and the kidneys are filtering. But if they're mobilizing [heavy metals] quicker than they can excrete—which is exactly what you're talking about—then their blood is almost toxic from metals, or, in my case, the mycotoxins and they get sick. As a doctor, I always have to check carefully because I know I can mobilize [their heavy metals] very quickly and make them very, very ill. But I don't want to because I have to make sure they're excreting that load.

Dr. Jill 43:09

I love how you described it and can relate to the patients that I've treated on a different level, even, like you said, framing the expectations. Often, I say: "This is what you should expect. If this"—XYZ—"happens, that's okay. But if it goes on to be this thing, you need to call me right away." So it's really brilliant that you have discovered [that]. Also understand that there's going to be [what] we sometimes call the Jarisch–Herxheimer reaction, which isn't very specific. But in a way, it's this [balancing act of] mobilizing, excreting, and getting stuck in between.

Dr. Jill 43:44
One thought from my experience with metals is that we do a lot of our metal detox through the urinary tract and the kidneys. Have you seen elevations in creatine or kidney function disturbances during the process? And do you do anything specific besides hydration to support the kidneys?

Dr. Richard Semelka 44:03
That's a very interesting point as well. I think after this, I'd like to circle back to talk about how to manage toxicities. I'm telling you that so I don't forget myself. But gadolinium is going everywhere, so it's also going to the kidneys. Since we're removing gadolinium from soft tissues, including the kidneys, my empirical thinking—and it's borne out the times that we've looked at it—is that kidney function improves because you're pulling out the gadolinium of the parenchyma of the kidneys to put it into the urinary system to have it removed. So if anything, the renal function improves. And that's why, although I'll get a measure of the renal function to begin with, I don't use that too much to prevent me from doing treatment. Really, in this disease, the only treatment is to get rid of metal.

Dr. Jill 45:07
Yes. You have to go through that process, don't you?

Dr. Richard Semelka 45:11
Yes. And it's interesting how, with different toxins, the emphasis is slightly different based on the nature of how treatment and recovery go. I think for all toxins, the first step is to never get them again.

Dr. Jill 45:36
Right. The prevention is way more important, if we could just remember that.

Dr. Richard Semelka 45:39
That's right. So the first treatment I tell people with gadolinium deposition disease is: "Don't ever get a gadolinium injection again. If your doctor tells you to get it, don't get it." And I said: "Even if I tell you to get it, don't get it, because you have T cell dysregulation and you will react to gadolinium." That works for everything: If you're in a very unhealthy environment, get out of that environment. It's the first rule of treatment.

Dr. Jill 46:013
There's a whole big, popular community out there for mold avoidance. It's a very real thing. But it's the same idea. If everybody thought about it that way, why don't we just avoid it?

Dr. Richard Semelka 46:27
Right. The next two forms of treatment are detoxification and removal. Now, I have found... And this is not an area that I'm an expert in. In the future, I think I'd be interested in picking your brains on different aspects of detoxification because I know that you're a great expert in this. But for me, the most important thing about getting people healthy is to get their general diet healthy. And if you think about it, that probably works for everyone in the population. That's why we're in such bad condition as a public, because we eat all these foods that are highly processed. [Eat] natural foods. Limit the amount of sugar as much as you can. Probably limit the amount of gluten you get. Limit some dairy, do physical activity, and try to get fresh, clean air. And that kind of works for everything.

Dr. Richard Semelka 47:37
Now, there are nuances in different food groups. For instance, the food that I like to focus on from a heavy metal point of view is kale, which should be fundamentally the healthiest of vegetables. But in the modern era—and that's what we have to always update our learning on—because of the nature of it being a cruciferous vegetable, it's very good at concentrating sulfur. It also concentrates thallium and cesium.

Dr. Richard Semelka 48:10
Critical for evaluation is that we get 24-hour urine [samples]. I always want to get them before and after chelation because I want to know what their baseline is. I want to know how much I pull out of various metals. And I don't just look at

gadolinium. So I use the Doctor's Data panel. Genova, I think, does the same. I get the panel of metals. And it makes common sense that they also interact. It turns out that DTPA does a great job of removing both lead and gadolinium. And you have to see to what extent it removes other metals. Mercury is very variable, as you know, because there are inorganic and organic varieties of mercury. I've been forced into the phase of not only dealing with gadolinium where I started, but now I have to think about all these other heavy metals. I also have to pay attention to what else they may have, which is mold, chronic Lyme, and so on.

Dr. Jill 49:10
It's one of those things, right?

Dr. Richard Semelka 49:11
Yes, I had to learn all this stuff.

Dr. Jill 49:13
The same way. I was always like: "I'm never going to do Lyme or mold. It's complex. I don't understand it." And then you have to [do it] if you want to help people, because it's inevitable. These tick-borne infections are creeping into suburban environments and are more and more common.

Dr. Jill 49:27
I loved what you said about food, because one of the things I always say is: Clean air, clean water, clean food. We start with those very, very basic principles, and that's like half of detox. And it sounds so simple. It's not always easy to do, but it's such a foundational principle, just like you said, to start.

Dr. Jill 49:43
You mentioned toxicity. When you're treating a patient, what do you do to help them deal with their reactions? In our last few minutes or so, let's talk just a little bit about that.

Dr. Richard Semelka 49:54
Okay. I treat it like they're going to have an acute hypersensitivity reaction. I prefer methylprednisolone, which is Solu-Medrol in IV form and then in pill form, because it's already methylated. And a number of individuals, maybe a quarter or a third, have an MTHFR gene variant. I take that out of the equation, assuming everybody

has it. I use it methylated. I used to use methylated Claritin—Clarinex is methylated Claritin—and Singulare, which is a very nice combination. Dermatologists use it all the time.

Dr. Richard Semelka 50:36
I now generally use Atarax, which is also an anti-histamine, but it's been used in PTSD patients. One of the things I find with all of my patients, and, Jill, I'm sure you do with your patients, is that they're very anxious and very nervous. One of the first things I tell them is that you've got to calm down. Maybe do exercises—maybe Tai Chi or yoga or something—to help you calm down because the cytokines involved in GDD are similar to the cytokines in stress, so they compound. So try to minimize the additional—

Dr. Jill 51:13
It's like IL-6, which is a huge cytokine. We see it in depression and anxiety. It's no wonder, because we're seeing the cytokine response in the brain and nervous system. If you're out there listening and you're like, "Yes, but I can't help it," in a way you can't because your nervous system is creating anxiety from the cytokines. But the truth is, like you said, we still have to deal with it. We still have to do whatever we can to calm that system down.

Dr. Richard Semelka 51:36
Yes. One of the works that I'm most proud of in all of my career is when we did a small study looking at the serial dynamic cytokine response to chelation. I was an example of a normal [case]. Like you, Dr. Jill, I have received a number of gadolinium injections. I've had 13 injections. For many of them, I was getting gadolinium in a Louis Pasteur way, testing me for reactions. I didn't want to subject patients to it. I, of course, did all this before realizing about gadolinium deposition disease. I wouldn't have done that had I known about GDD at the time. But now the good news is that I'm now the perfect example of somebody who has a lot of gadolinium in them.

Dr. Richard Semelka 52:34
The other thing is that physicians [inaudible] that gadolinium stays in there. What I find is that many people have that medieval thinking of the four humors but don't look into it. It's very easy. If you don't think that gadolinium is still there, and I know you're wrong, the way that you can look at it is by doing chelation with DTPA. You

can get gadolinium out of anybody who's received [an injection of it], even if it's many years in the past, particularly if they've had a number [of them]. We did very short durations, like one minute, five minutes, 10 minutes, 20 minutes, 30 minutes, an hour and 24 hours.

Dr. Richard Semelka 53:40
I did this work with the Stanford Immunology Center. I wanted to work with a group whose ability you could not question. I didn't want to use just some local group of characters. We came up with a cytokine response that they'd never seen before, because they had never done dynamic cytokines. Chelation—it would be the same with vaccines as the ideal setting because you're suddenly having an impact on your immune system. So you can test exactly. We saw patterns of cytokines peaking at different times. The problem is that there were four normals and 10 patients.

Dr. Richard Semelka 54:05
As a physician who has done a lot of research, you realize that to get truly meaningful data to separate, you need [subjects] in the neighborhood of hundreds or thousands. If you look at the research that's done on asthma, where they have all these different panels of cytokines that they've shown with the different types of asthma, there are probably thousands of patients in each of these groups. And guess what? Studies of that nature are millions of dollars. So we self-funded it. I wanted to fund it because I wanted to get the work going. For the sake of patients, I didn't want to wait. You know, "I'm going to apply for a grant," and in a year, they'll say, "You could get it, but you need to do this." And the next thing, it's three years down the road and you haven't treated people. I wanted to treat people right away, as soon as I could.

Dr. Richard Semelka 54:52
It's very interesting stuff. I'd love to do larger studies, but it's a lot of money. I think the answer would be with cytokines. But what I was struck by is that I've had 13 GPCAs; we did a number of people who had pretty bad GDD with just one injection. We studied them at three months. They would get tremendous flares from doing chelation. At the time, because I wanted to see a pure flare, we didn't give steroids to them. We just did steroids after the fact a day later, but not at the time. So they had tremendous flares. But this is the thing that I found fascinating at the time:

Their overall cytokine amounts being released were not that high. In all of the people, the highest was me by far. The next highest was a patient with the disease who had four GBCAs. And this is one of the things that I tell people: Maybe you don't like the diagnosis of GDD and you're thinking, "Whatever; it's ruining everybody's lives by talking about it." But looking at the normals like myself, to figure out what we are doing that is not causing a reaction to gadolinium, maybe the answer to many autoimmune diseases is, "What cytokines am I releasing to prevent me from getting sick?"—because my cytokines were like 10 times anybody else's and yet [I had] no symptoms. The thing is that most of the cytokines are regulatory cytokines—suppressing cytokines.

Dr. Jill 56:39
Like IL-10, we know, right? IL-10 is suppressive. I have an epigenetic deficiency in that and I've had a lot of inflammatory issues because I have maybe half a quarter production of IL-10. And IL-10 is a cytokine, but what it does is calm that response. So it's fascinating with your study. You're putting yourself out there for science, like you said. That's amazing!

Dr. Jill 57:01
If you're listening, if you're a doctor, if you're anyone who wants to know the research, wherever the notes are for where you're listening, I will be sure to include Dr. Semeleka's research. I could talk to you for hours. This is so fascinating. And I want to go back to thank you for being the person that you are and the doctor that you are with curiosity and compassion. That combination, I think, makes the greatest people who discover... This is a discovery that's going to change the way we practice medicine in a good way because there is a place and there have been a lot of lives saved with gadolinium, MRIs, and imaging. But now that we know—it's always like I say, once we know what we know, we can't go back. Now that we know this and you've brought it to the forefront, we have to be stewards of this wonderful technology.

Dr. Jill 57:01
You were telling us about [your time] in Canada and then realizing this new technology and the power there. Obviously, you've done an amazing thing with your career. But what would you go back to tell your younger self, knowing what

you know now? Is there any advice you'd give, encouragement, or things that you would say to your younger self?

Dr. Richard Semelka 58:18
Do you know what? Jill, you're asking me something that I was hoping I would have time to mention, but in a different way. But I would tell my younger self the words of Sir William Osler: Doctors, listen to your patients. They're telling you the diagnosis. I would tell my younger self: "Listen to what patients are telling you at all times."

Dr. Jill 58:48
Brilliant! Oh my goodness, that's where the mic dropped. But the truth is, that is where we, as healers, need to go. I've often said that, heard that, and continue to need to be reminded: If we can just be present with our patients and listen, we have everything that we need there in that encounter—if we just listen and remain curious.

Dr. Jill 59:11
Dr. Semelka, I am truly honored to have this time with you and to learn more about you and your work. I hope we have another chance to talk. And I'm just so grateful for you going to that deep level, making the discoveries, and then bringing this information because I, as a physician, need it to help my patients and you've laid the foundation. So a huge thank you from me and all the other doctors out there and the patients for all of your work!