



The cell danger response in fatigue

Guest: Dr. Veronique Mead

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Kirsty Cullen - [00:00:15]

Hi, I'm Kirstie Cullen, CEO at the Optimum Health Clinic, and welcome to the Fatigue Super Conference. I'm delighted to introduce our guest today, Dr. Veronique Mead, formerly both an assistant professor of family medicine and a practicing physician.

Veronique, then retrained as a somatic trauma therapist specializing in traumatic stress and body based psychotherapies. She is an author, speaker and blogger who integrates the current research with her own experiences of her gradual recovery from a debilitating chronic illness. Veronique, welcome.

Dr. Veronique Mead

Thanks, it's great to be here, Kristy.

Kirsty Cullen

So firstly, as with many specialist practitioners within this field, you have your own personal story of chronic illness and recovery. Would you be able to tell us a little bit about your own journey and how this has directed your work in this field?

Dr. Veronique Mead

Absolutely, you know, I have had chronic fatigue myself for about 20 years, little more than that at this point, and at my worst I was mostly or essentially bedridden. I had trouble sitting up for more than five minutes at a time without starting to have my heart start to pound or to start to feel more fatigued and then sort of have that payback where you would then be more fatigued. And I was able to have to pay someone to cook meals for me, but I would take a shower and need to rest after taking the shower. Things that are so common from what we hear from others in the chronic fatigue community.

And my own journey was, the more common onset is often after an infection, maybe 60 percent of people have an onset after infection, and for me, I was in that 40 percent. Dr. Peter Rowe at Johns Hopkins talks about how there is a 40 percent-ish group where we have a gradual onset. Mine was over a period of about 10 years of worsening. And then I've been getting better over the past 10 years and that seems awfully slow. But there are people out there, and I'm sure many who are at this summit are those who have also had trouble, who have been sick for decades, 20 or 30 or 40 years.

And so my own journey has been like so many, looking into how do I improve from this and recover from this? And that's part of why I want to be talking today about the cell danger response and things I've learned about that I never knew when I was a medical doctor, that have helped me gradually improve. I'm 80/85 percent improved, my day can look normal. I can be active in running errands and taking walks a few times a day and writing all day on my blog. So those are huge, and where I'm not yet is able to push through to exercise and build my own capacity. So that's where I'm still working on at this point.

Kirsty Cullen - 100:03:27

And as you mentioned just then, central to your work is really educating people about the cell danger response theory, and that will be a brand new concept for many. So I wonder if you could spend some time just explaining the theory that is the wonderful work of Dr. Robert Naviaux.

Dr. Veronique Mead

Yes. Dr. Naviaux is a professor of medicine, pediatrics and pathology at the University of California in San Diego. He's also a professor of genetics and a virologist. It's kind of amazing how many hats he wears. And I learned about his work about 4 years ago in a study published, looking at chronic fatigue specifically, and in this theory of the cell danger response, or for short we call it the CDR, he spent years pulling together research from 60 years of work from all these different fields. And that captivated me because it fit my own 15 now, 20 years of pulling it from different similar, and similar areas that he did.

And essentially the cell danger response looks at the concept that chronic illnesses, there's a table of over 100 diseases in one of his articles, from this perspective are actually a response to threat that's happening at a cellular level in a really natural way because our cells and our bodies are designed to overcome threat. But that they can get stuck or caught in a particular phase of a threat or survival response, such as fight, flight or freeze.

And in looking at chronic fatigue and the role of fatigue in all kinds of chronic illnesses, as well as symptoms for other diseases like autoimmune diseases like type 1 diabetes and lupus, what his sense has been is that it's really from a system that has gotten caught from past events and past exposures, into a perception that there's still an overwhelming threat that cannot be overcome, and so things get locked down. And that it's more our body's inability to overcome something, that's a perception of threat, than it is actually any particular specific cause or specific virus or infection or other trigger.

And that if you can help that shift happen, that can be part of why recovery can happen. And we see this in chronic fatigue, I'm sure you guys see it at the clinic as well, all the time, but the shifts, for some people some of the time, can be very quick. For most of the rest of us, it can be quite slow. But this kind of a sudden shift from a cell danger response perspective would include this sense that, oh, the nervous system or the cellular level got the message that that threat is gone, that they've overcome it, and that our system has actually recovered the way it's designed to do. And that's kind of the whole challenge, really. In a nutshell, how do we do that, support that?

Kirsty Cullen

And so, essentially what we're saying is that CDR can potentially provoke a state of a freeze, or in other words, sort of a low or hyper metabolic state, which actually serves to protect us by conserving the energy that is not required for survival. So fundamentally, that is going to impact on our energy provision, isn't it?

Dr. Veronique Mead

Yes. And I think there are probably going to be different ways that we look at how the CDR actually stimulates symptoms, but this key concept that it's a natural, intelligent response that's gotten caught is so different from what so many people are told, still today, that it's in their heads or that they're faking it or that they're looking for attention or whatever traumatizing perspective that they've gotten from one more health care professional. And so this concept that it's a system actually trying to protect us in every way possible, even if it means flattening us out.

And you mentioned something that, I think there may be a couple of perspectives about, from the cell danger perspective, it's that the mitochondria cannot fight an infection or a threat full time 100 percent and at the same time produce energy 100 percent. We can do that for a little while but at some point, if we go into the threat response, the mitochondria then have to let go of energy production. That's one of the big tenets of a CDR perspective.

There's another one that I propose that Naviaux talks about, too, and you mentioned this, is that that sense, it's not quite hibernation, as he says humans don't hibernate, but from what I've learned in my own research retraining as a somatic trauma therapist, our bodies can get caught in a freeze response. And that that's actually a survival response of last resort, when nothing else works, when the fight or flight system doesn't work, when you can't talk your way out of something. And that that's part of where the origins of getting caught in the CDR can happen.

Kirsty Cullen - 100:09:07

And there are two really important elements to talk about. Firstly, the triggers, which we'll find out actually aren't necessarily the most important thing, it's how we get stuck is the most important thing. But just to start that discussion Veronique, the triggers can be broad, can't they? We're not necessarily talking life threatening traumas. Can you talk us through some of the common triggers that we might expect to see?

Dr. Veronique Mead

This is one of the things I found the most exciting in a way about Naviaux research was in a small study that they did with a group of people with chronic fatigue and a control group. They looked at what had triggered the onset and they were able to boil it down into five categories and infections were the most common. But what they found is that a biological trigger like an infection, whether it's viral or bacterial or some other, was often paired with one of the other categories. So it could be chemical exposure, toxins, mold, but it could also be trauma, psychological or physical trauma. So a car accident, surgery, anesthesia, the loss of a loved one, all kinds of stressors fit into those two categories.

And in a way, from all the research I've been doing in the science of traumatic stress and in other chronic illnesses, this is a common pattern. Any of these so far four categories, are often common triggers of all kinds of chronic illnesses, not just chronic fatigue, autoimmune illnesses, asthma, Parkinson's, diabetes type 1 and type 2. And so what Naviaux is talking about is a really big context, a really big picture for chronic illness in general.

And the fifth was a category of actually an unknown category. There were people in this study who didn't know what triggered their chronic illness. And from looking at it from my own perspective, I wonder if any of those were people who had gradual onset like I did, where it really wasn't clear because it wasn't that you were fine one day and then you are sick days or weeks later. And that's where, for myself, I can look at 10 years of different stressors, rollover car accident where I was physically unharmed. But it actually, I could see as a somatic trauma therapist looking back on it, how my system froze and went into this place of very spacious, quiet, calm, everything slowed down. This was after I'd gotten out of the car, but it's actually a moment of freeze where your system is just, there's almost a bliss from being disconnected.

And this is actually one of the characteristics of a freeze response is to help us survive something that can be otherwise overwhelming. So we get disconnected, we can feel just like you're floating there and everything is slowed down. And in a trauma therapy session when I worked with that, there's a resource in that as well.

And so, there was that, there was also all my medical training, the years of medical training, of overwhelming hours and the time, but also witnessing trauma and witnessing suffering. And in a way, it was just a very slow buildup of things over time that kept leading my system to becoming more and more tired and less able to overcome or push through.

Kirsty Cullen

And so essentially what we're saying is CDR is kind of the, suppose a unified cellular response isn't it, it's the ultimate end result of sensing threats, whether that be a series of threats or whether that be a threat. But actually, what I find really interesting about this theory is with regard to the onset triggers, it's important to say it's not just the experience of the initial threat or the primary trigger itself, but how

our perception of that experience might imprint and trigger us in certain similar situations in the future, but where that response may become amplified. Can you just explain a little bit more about that part of the concept?

Dr. Veronique Mead - [00:13:54]

Yeah, the way Naviaux writes about it, that corresponds so well with all these other views, is that this onset trigger is the last event in a series of events that have been happening for most of us over our entire lifetimes, so for decades. And that, he talks about as a pathway, a cell danger response pathway, and that you may initiate a particular way of responding to threat very early in life, probably prenatally, labor and delivery or birth.

And I had an obstetrics practice when I was a family practice physician, and this began to fit into these pieces as well, from what else I was learning. So, let's say that the mother had a really stressful pregnancy. Maybe it was financial stress or conflict with dad or being a single parent unexpectedly, that that kind of event has an impact on mom, but it also has an impact on the baby and the developing nervous system, immune system and how they learn to orient to the world they're going to be entering.

And so events like that, we're designed to overcome that, if there's enough nurturing and support in the environment, our bodies are totally innately capable of handling that and overcoming that. But it's when things get stacked up over time, one thing after the other. So, it may be that that prenatal stress was followed by a really difficult or long birth or a premature birth and being in an incubator or that it actually interferes with the ability of a mom to bond, the natural innate capacity because of trauma the mom experiences.

And so what Naviaux looked at, and what I have been looking at as well is that these kinds of adverse babyhood experiences, adverse childhood experiences, it's really about the balance of what we've received. Enough nurturing can really help balance in our systems counteract these naturally. And none of it's conscious. It's all these perceptions you're talking about, these perceptions of threat or safety, are actually built into our nervous systems' at the big picture level.

But they can also happen at the cellular level and they can happen in very specific tissues or organ systems. And so, if the system gets hits and hits upon hits, it may be that they end up, it strengthens this nervous system pathway of a defense, self protective response. And then it's that final last straw that can just trigger a whole sudden shift in the system into all of a sudden being caught and stuck in a predominant perception of threat response.

Kirsty Cullen

It's fascinating, isn't it? And now we understand a little bit more about the mechanism and the triggers. Can you help us to understand why and how it is that the body gets stuck in the various stages of the healing cycle? Because that's the next most important piece of the jigsaw puzzle, isn't it?

Dr. Veronique Mead

Yeah, I. From what I learned about trauma, that I never learned when I was in medicine, is that the kinds of experiences we tend to think of as a society and as medical or healthcare professionals really, what I used to think about, was that it's just the big stuff. Going to war, sexual abuse, a very traumatic, physically damaging accident. But what we're learning from trauma is that it's unique for every person. It does not have to be actually life threatening.

It's really anything that is sufficiently overwhelming to your own system that you yourself, your own system is not able to overcome it. And so, one of the big examples that I think is perhaps the most under recognized risk factor is what is known as childhood emotional neglect. And that's something that fits in the category of something called ACEs or adverse childhood experiences. And a child who isn't seen or really heard, who is unable to actually speak their truth and have that be met. Or who's

with parents through their own trauma who aren't able to ever repair after they may have said something shaming or blaming or judgmental. A child that marinate in that for their entire 15, 18, 20 years of growing up. That's what their nervous system learns.

And it learns that it's not possible to overcome. It's not possible to protect themselves. Words are not enough, that's what's known as a social nervous system response when, we can use our own capacity to connect as a way to bring in and invite teamwork and nurturing and defense from others. When that isn't possible and we're not able to fight our way or flee, children can't really run away. There's a very clear understanding from the nervous system that we need our parents for our very survival.

And so, as just one other kind of trauma, if that's the experience someone has over a lifetime, their system eventually can default into freeze, which is a shutting down, hunkering down, it's like crawling under the porch to wait until the danger passes. And it's actually a brilliant strategy because it's aimed at conserving.

So, the example in the research that Naviaux compared when they looked at this group with chronic fatigue and the control group who did not have it, they found that in 20 metabolic pathways, the byproducts of those 20 pathways were abnormal and 80 percent of those were in that direction of freeze. And that freeze was the same as what you see, in his comparison it's looking at this worm that is often studied in the research literature, and what happens is that the threat response will shut down because there's no escape, there's not enough oxygen, it's too cold, it's too hot, there's no water. And so by shutting down and out waiting the threat. It can actually increase the chances of survival.

So this concept that our human mammalian systems can do the same thing is still really not commonly recognized or understood in medicine. But I watched in my own system every day, I can watch how day to day triggers, things that are reminders from a past event. So for me, for example, it might be having a phone conversation where there's conflict. It took me a year to look for, when I was first wondering whether adverse experiences could actually be a trigger for my chronic symptoms, and I had a big energy dip one day and I realized it was after a phone call that had just a little bit amount of conflict.

And so if you grew up in a home, for example, some kids will have grown up with parents with all kinds of conflict, from the range of just shaming and judgment and not being able to overcome, to domestic violence. And any one of those can be a trigger in the current state.

So I'm just going to check back in with you to see if you want to go in a different direction or what to fill out here?

Kirsty Cullen - [00:22:08]

No, I think that's so interesting because what it does, is it illustrates this cycle of incomplete recovery and then potentially, kind of, reinjury within that cycle. And it just feeds that whole cycle of inability to fully heal and get back to that position of health. So, not only are we potentially considering what those initial triggers are and how they imprint and how they impact on how we react to certain things, but we also need to consider how and why we're kind of stuck within that cycle and how we can unblock that process to get back to health.

So there are so many facets of it that need to be considered within, a practitioner and a client relationship and what elements we need to work on.

In terms of CDR being a biochemical impact, are you able to talk about maybe what some of the impacts are on the body? I mean, potentially here we have impacts on hormone production and inflammation and tissue damage. And so, this is where we really shift the paradigm from the psychological to the biochemical.

Dr. Veronique Mead - [00:23:19]

Absolutely. And I don't even know in many cases whether it's actually tissue damage, which can happen down the road from certain things that happen. You know, people with COVID infections and long haulers, for example, have tissue damage. But in chronic fatigue, a lot of the time, and in all kinds of chronic illnesses, it's not as obviously damaged as it is a directive from the nervous system that's guiding all the other ways our bodies work to actually do certain things.

So, we talk about adrenal exhaustion, for example, and I'm not convinced anymore that it's exhaustion. I suspect it's much more likely that the nervous system or the cellular function is actually directing certain tissues to stay in shutdown mode as a form of self protection, and that it's not exhaustion, it's on purpose as a perceived attempt to be saving our butts from the danger that may no longer be there, and often is no longer there.

And that, this can happen at all levels, whether it's in the thyroid function that's actually either directed, it can be direct, it's part of the fight, flight, freeze, normal threat response, what our thyroids do and what our sugar levels do and our blood pressure does. And so, an animal in the wild who is being chased by the cheetah who drops just before being caught is not faking it. And it's not actually, they have videos of this, it's not because they've been caught, it's because their system went very suddenly into shutdown. Yeah, just that movement you just did of collapsing. Heart rate goes down, blood pressure goes down, oxygen consumption goes down. It's actually a physiological blocking of the survival response. This wired, tired that we all are so familiar can be a phase where there's a fight, flight energy that's actually being suppressed.

And we see that with opossums, for example, as their threat response. It's not actually faking it. A fly can walk across the eye of an opossum in that state and it won't blink. I think this is the biggest piece that you're talking about. And that I see from people and I hear from all the time, is this is not psychological, it is not conscious, it is not faked, it is actually something outside of our conscious control that our bodies are doing.

Kirsty Cullen

And that's really the key defining point, isn't it? That chronic illness is caused by the biological reaction to the trigger, not the trigger itself?

Dr. Veronique Mead

Yes. Yeah. And, you know, even when it's happened after an infection, sometimes we can still detect the infection and sometimes we can't. And that it may really be if that system that's responding to threat and causing symptoms, that is what's going on. That's a huge piece. It's not the event. It's the response our bodies are having to the event or the events.

Kirsty Cullen

Veronique can you tell us a little bit more about the research around cell danger response theory and its connection to CFS and fatigue related syndrome specifically? Because, of course, it's important to say that these theories are backed by some compelling data.

Dr. Veronique Mead

Well, I think this study that Naviaux did with folks with chronic fatigue. This piece that you've just mentioned is really the big piece, that it's not the event that is the cause, it's not the infection that's the cause, it's not the vaccine that's the cause, because that can be a trigger for some people as well. And that's part of a big worry so many people have in our community right now. It's really the perceptions of safety and this concept that all of these different kinds of triggers, whether it's viral, bacterial, chemical, psychological or physical trauma, they all lead to the same pathway. And that's why I think our stories are all so different.

And I don't know of other specific research outside of Naviaux's study with chronic fatigue of this one particular one. But I still find that mind blowing that we could see 80 percent of all the pathways were in the direction of freeze and the metabolic byproducts and the pathways in this journal article, they're looking at very specific metabolic byproducts. A lot of them I don't even understand. That's how complex this is of what they're looking at.

Kirsty Cullen - [00:28:25]

So I think within the research, one of the moments where the penny really dropped for me, from a biochemical perspective, was that we are so used to talking to our clients about the role of ATP in energy production, you know, that's kind of its key role, but what this research really illustrated to me was that whilst ATP in the cell is absolutely involved with energy production, when it's outside of the cell, it's actually central to that danger signaling that alerts the body to go into protection mode, into the CDR response.

So, it's fascinating to me that ATP has this dual job, really. And so, we have to be very conscious of where it may be deployed within that second role, which is, of course, involved with signaling immune response and inflammation. And I think that's when the penny dropped for me, because we so often see CFS correlated with inflammatory status or immune activation. And of course, that makes complete sense now when we understand that ATP has that secondary role.

Dr. Veronique Mead

I think what I find so helpful about a perspective like this is, the big picture perspective it can give us to really begin to make sense of so many components that we see in chronic fatigue. You know, one research study may find the inflammation piece, another study may find something in the cerebrospinal fluid. And what we know, from my own interests, has been looking at the trauma research in particular and how this links, is that it's all about a threat response and overcoming threat and coming back down to safety and how do we work with that?

And so, one of my thoughts has been about pacing. We have, it's kind of gotten a dirty word because of the CBT, cognitive behavioral therapies, and pacing as the prescription for chronic fatigue. But the concept of pacing, I find, fits really well with an understanding of a threat response in that when we're trying to help our nervous systems come back or our cellular function come back to a perception where the signaling goes back into safety signaling, metabolic functioning, coming out of shutdown, pacing is huge because in a freeze state, anything you do to mobilize, anything you do to move towards action, movement, fighting or fleeing, is actually perceived as a threat to this hiding, looking dead, being deathlike response of survival.

And so we all have our own pacing, but the slower, more gently we can go, often the more our systems can actually take in these bits of what we're doing without having a bigger response, a bigger threat response or a greater perception that survival is being threatened.

Kirsty Cullen

And given those concepts, Veronique, it's a nice time to ask, what are the key approaches that you might employ in improving health within your field of work based on these concepts and theories?

Dr. Veronique Mead

I kind of begun to think of treatment in a set of categories, in a way. One is, how do we calm everything down as much as possible so that maybe our body's own ability to overcome and heal can do what it needs to do without us having to work so hard at it? And those kinds of things for me have been diet, nutrition, for example. I went ketogenic for four and a half years with a couple of different approaches, and my system needed me to keep limiting what I was eating. I had food intolerances that were very severe. And what changing my diet did was it calmed everything down. It calmed all my systems down, I had less triggers, less flares, that calmed my own fears and worries and freakouts. And then that gave me more capacity to add more tools to my toolkit as one example.

[00:32:52]

Another, this concept of exercise. One of my practitioners, my alternative practitioners, at one point told me to think about it as oxygenation. He recommended walking 30 minutes a day for oxygenation. And I just went out and did what so many of us do, the first time he told me, we trust our practitioners more than we trust ourselves. And I went out and I walked around the block, and this is when I was still mostly bedridden. And it took me three days to recover. You know, it was a small, short block and I was already not overdoing in any way. But I thought, oh, he must know more than I do.

And so, I readjusted and, he had talked about, it's not about how fast you go, you don't have to do 30 minutes in one time. And so I ended up breaking it, chunking it down, going very, very slowly and figuring out for myself what I could do where I could still recover within a day. And then that became my baseline as to how I started working with it. And so it was quite a slow process but at this point, I can do a very brisk 45 minute walk twice a day with no problem. And when I have little dips and flares, during COVID, there's a lot of stress and it's a traumatizing period for the world, really. So my fatigue levels are a bit higher and I look at it from this big context, so it doesn't freak me out. And some days if I've got a lot of phone stressors in my life, I will do a 20 minute walk twice a day instead because my system is dragging.

So some of these very clear, direct linear tools can be very helpful in that way. But another thing that I look at is how do you actively reduce the threat response? And that's where the trauma therapies come in as something that I think most people don't think about or aren't aware of or believe that it implies it's psychological. And here I'm talking about the somatically oriented trauma therapies. These are things like somatic experiencing, also known as SE, sensorimotor psychotherapy, EMDR, tapping, TRE, Trauma Release Exercises. All of these work in slightly different ways without us having to cognitively try to figure anything out because the threat responses to past adversity or overwhelming threat, even if it's infection as the threat, these are access to our body language, Sensations, images, impulses.

And I think this is probably one of the biggest things that I would recommend adding for anyone who's having a really difficult time overcoming chronic fatigue and related conditions and chronic illnesses, on top of these other really helpful linear things that we can do, nutrition or supplements or things that can kind of help support our systems, natural capacity for healing.

Kirsty Cullen

And overall, I suppose, given the context of the theory, fostering a sense of safety has got to be really important as part of that.

Dr. Veronique Mead

I think it's really a key and sometimes I think we can get caught thinking it has to be absolute safety, but really any moment that we can orient in this present moment, this is where the concept of mindfulness comes in and the present moment comes in. If I am taking my walk and it's a really snowy day or a beautiful sunny day and I notice something that appeals to me or makes me smile inside, even a little bit, if I allow that information or quality to settle in my system a little bit, if I consciously acknowledge that, that's one way of actually telling your nervous system, giving it information of safety. And that is one of the ways we can, moment to moment, day to day, feed in the counter information, the information that's not about threat, the information that's in the present moment where we are safe.

And so, the more of that we can incorporate into our lives in a conscious way, I think the more helpful it can be. But like other things, we actually have to pace it. You can't, our systems, as an example, people who experienced abuse in childhood. Getting too safe can actually trigger a fight, flight or freeze response, so it could actually trigger a flare.

So guided imagery, relaxation exercises, meditation, all of those can actually be a little tricky with chronic fatigue where you have to pace those as well. And again, we come back to once you have the big picture, you can understand why it is that our systems have to really work with nuance. And

something that I think some of your speakers in the video you have on the homepage for this summit talk about, is this concept of learning to listen to ourselves, wanting to listen to our bodies. I think this cannot be underestimated. And it was something I never knew I needed, but oftentimes people with a chronic illness, whether it's this one or some other one, have grown up in a family system where there wasn't room or support to actually listen to themselves, whether it wasn't reflected externally or whether it was actively negated.

And so, there's this whole process of learning, oh, I don't have to push through this or oh, I'm really tired and I kind of would like to go to sleep instead of doing one more hour of work, that these are, they're not frivolous, they're actually huge because our bodies have all these great clues and cues to inform us and guide us on this path, this path of healing.

Kirsty Cullen - [00:39:04]

It's rebuilding that trust, isn't it? I think for many in a body where, sorry, in a condition where many perceive that the body has let me down, it's actually re-establishing that connection and that trust to work with your own instincts, to what your body's telling you, that can be so safe.

Dr. Veronique Mead

I think so, and the amount of negative messaging those of us with chronic illness have gotten, I think is vast, and that it can start prenatally, it can happen in childhood. It's from family systems, but it's also from our societal systems that want a certain hypomanic, go, go, go productive person where having feelings is seen as weak, where actually that's how our bodies process and integrate. And so this process of learning to listen to ourselves, I think for a lot of people that may be the first time. It may not be relearning, it may be learning from scratch, brand new, what that message is, what it sounds like and looks like. And so that actually takes a fair amount of practice and learning, ongoing learning.

Kirsty Cullen

Especially those people that, as you say, maybe haven't made that connection, or maybe typical kind of helper types who always put other people's needs before their own.

Dr. Veronique Mead

Yes or, and I heard you guys in that video also categorizing things. And so, why do some of us go into healthcare? Why do we become healthcare professionals? And a lot of times it's wanting to help, but at an expense of our own self, in all kinds of different ways.

And then that concept of pushing through. I grew up with that. That's been one of the hardest things for me to learn. And I learned the hard way, as most of us do. If you push too hard, you actually have a flare up that can change your baseline so that you're worse, permanently seeming after that. Or it can take 3 months to recover from doing one, like I did once, I did a hike with a friend and we went too far. I didn't know where we were. I'd never been there before. And it did. It took me, that one, it was 3 weeks to recover.

I volunteered at a summer camp for kids with diabetes and it was like being back in my medical training where we were up until 1am every night and then getting up at 3am to do blood sugar checks. And it took me 3 months to recover and it was 1 week of volunteering at a camp.

And so, I started learning with my garden, I would look at the weeds growing and know that I couldn't weed it. And then it would be, OK, I'm going to give myself 10 minutes or 20 minutes and I will test that and experiment with that and see how that works. And if it's too much, I'll do less next time. And this process of pushing, I think there's a fight, flight energy within that and also a fear that we have of getting caught back into that freeze response. And so we just want to push when we feel better.

And over time, this all becomes easier because our nervous systems and our bodies, they're actually designed to help us go in and out, up and down, push a little, back off a bit, try a little harder, recover.

And so I have a lot more bounce back in my system. All of these things come back online. And it's the process that I think you guys, it sounds like you talk a lot about in your clinic of this, it's a process. And how do we really give it space and time?

Kirsty Cullen

Absolutely. Veronique, it's been so interesting if we want to direct people to read more about you and your work, where should we send them?

Dr. Veronique Mead

My blog, my website is chronicillnesstraumastudies.com. You'll find all kinds of articles there and the science as well.

Kirsty Cullen

Superb. Thank you so much for joining us today and sharing that with us. It's really important work and it's really important, I think, to a greater understanding of exactly what CFS and chronic disease is. So thank you very much.

Dr. Veronique Mead

It's been a pleasure. Thanks, Kirsty.