

TRANSCRIPT 1033

Bringing Brain-Based Therapies into the Mainstream

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[00:00:00] Thank you guys so much for having me. Let me go ahead and, pop up **my screen** here. Okay. Thank you so much for having me here today. I'm really excited. I've actually never had anybody asked me about how I've been brought into the chronic pain space.

[00:00:29] So it's kind of a treat to kind of think of it. It took me a really long time to think about how to put these slides together because I'm so used to talking about other people's brains. I don't often talk about mine. As, as you mentioned, I am **a scientist** for both Interocept Labs, which is my practice that I use to help startups that are coming into the space of digital health and especially chronic pain make things that actually work in the real world.

[00:00:56] I'm also a **sensory scientist** for the **U. S. Army Aeromedical Research Laboratory**, where I help apply neuroscience concepts to therapies and technologies that help out Army pilots. So today I thought I would share with you a couple of things with my story, how I came to have **a pain story of my own**.

[00:01:13] The first one just being how I found chronic pain, which is sort of unique. probably not what's generally expected. I started on this journey as an **R and D scientist**

for United Health Group, and that's really brought me into this world. And then I also would really love to talk to you about some of the things that I've learned as an R and D scientist that help make some of these brain-based therapies for chronic pain really stick and help them to be as effective as possible for folks that are using them.

[00:01:38] I think it's important that when I start out, I clarify what it is exactly that I do. Because most people, when they think of **a pain scientist**, they're probably thinking something really serious and very cool and impressive with lots of lab equipment. In my case, it looks a little bit more like this, but I mean, if we're really being honest with ourselves, it looks like this.

[00:01:58] But the best way to describe it is that, you know, a clinical scientist's job is to make sure a therapy works in a lab, which is very, very important. It's sort of the first step. So making sure therapy has legs, but an **R and D scientist job is to make sure that the therapy works in the real world**. Sometimes I like to say that my clinical scientists, colleagues, their job is to build a therapy or to build a therapy or to build a product. And my job is to try and break it.

[00:02:24] So, how did I come into chronic pain? This story really kind of comes into play in four acts, but I promise they won't be very long. Spoiler alert, I didn't find chronic pain, **chronic pain found me**. So over the past 20 years, neuroscience has really been going through a **very huge shift in how we understand the brain to work**.

[00:02:45] In general, and no matter what the topic, we went from believing for many, many years that the brain was in this constant state of reaction, stimulus and response, you might have heard it called before. But over the last few years, there's been growing evidence that the brain is actually in **a constant state of prediction**.

[00:03:04] And so that really explains why our automatic reactions to things are so quick and so fast, because frankly, on a reaction-based model, we know that we should have been extinct. And you know, millennia ago, we would have been eaten by dinosaurs or saber-toothed tigers. So, this **predictive concept not only explains why our automatic reactions** are so fast, but it also has a very important fact for, you know, chronic pain and other things in our body.

[00:03:30] Our brain creates these perceptions that to us are very real. We're experiencing them in the exact same way we experience anything else that comes to us in the world. However, because it's predicting and it's trying to beat the real-world data to the punch, sometimes the things that we perceive **don't match the data that come in**.

[00:03:51] Now, to us, there is no difference, but to the outside world, there may be. So, When I realized this, I realized that in general, **working for UnitedHealth**, that it, my job really needed to be shifting our approach to healthcare to match this new realization, because it has a very serious impact for all kinds of conditions.

[00:04:14] So I had shifted UHG's mental health portfolio into this **predictive brain body medicine focus** and all of the things we could do with this. And the executives brought me a huge challenge. They said that **chronic pain was costing the company billions of dollars**. And no matter what we were doing to try and fix it, all of these things, surgeries, injections, all of these different interventions that should work, weren't working.

[00:04:37] And in some cases, they were making people's pain worse. They had no idea what to do. So, they brought me this issue. So, talking a little bit about this, just to give you guys a sense of how big this problem is, and how not alone any chronic pain patient is, **21 percent of the entire population will deal with chronic pain** in their life.

[00:04:56] That's a very large number. And on average, it costs about just over 8, 000 to treat a person who has chronic pain per year. And that adds up since chronic pain tends not to be cured or remedied, but managed over time, those costs balloon up to **553 billion annually** on total health care costs for chronic pain.

[00:05:19] So this is a huge and very expensive problem. And so, in the mainstream, in these commercial health care spaces, it's considered to be **a very serious problem**. It's one of those situations where we're seeing a lineup between people's needs and thankfully, the needs of these businesses, they need to save money, but we want to **just get people better** because chronic pain can be so debilitating.

[00:05:44] So, you know, executives and surgeons and physicians, they were very **resistant to the idea of mind-body medicine for pain**, even though, frankly, in the scientific literature, those were the kinds of things that we were seeing had the best results when I first started digging into what **actually does work for chronic pain**.

[00:06:02] I didn't see anything that told me that surgeries were the answer, injections or medications. I saw a lot of really great results from things like yoga and acupuncture, things of that nature, meditation. When I first started talking to people about this, you know, guys up there in the top brass, **they had a hard time with it**.

[00:06:18] However, luckily for me, even though they weren't open to traditional ways of talking about mind-body medicine, **they were open to neuroscience**. Now, chronic pain is a very perfect example of the predictive brain at work. You know, if our brain predicts

damage, it creates real pain in response. Even if that damage isn't there, it's trying to go as fast as it can.

[00:06:41] And just like anything else, when you rush things, sometimes you get them a little bit wrong. And the **brain will always err on the side of safety**. So, it can rush to this idea that there's damage and create the exact same pain response in your brain that you would feel if there was real damage. So, to the patient, there is no difference in how these things feel.

[00:07:00] And so when I was trying to teach this, to all of these guys who, you know, needed to learn a little bit more about what I called **brain-based therapies**, as opposed to mind-body, even though, realistically, they're pretty much the exact same thing. Here are some points that I pulled out that were very helpful in making this point clear to them.

[00:07:20] The first is that chronic pain is **not significantly correlated with bodily damage**. We've known that for a really long time. There's been MRI studies that go back as far as 1994, this one of the really big ones that showed up in the New England Journal of Medicine, that showed that just about the same number of people who have no back pain at all have the same number of things like, you know, herniations and disc issues, as people who do have pain.

[00:07:43] And a very recent study that came out by Dr. Howard Schubiner, who I think you've had on the show, and I think you're gonna play one of his recordings after this, his team just found recently that upwards of **80 to 90 percent of chronic pain has no clear structural cause**. So, we're not talking about a few people here, we're talking about the vast majority of people are dealing with something that is not as structural as we used to think.

[00:08:07] Now, **chronic pain is strongly correlated** with trauma and other phenomena that cause pain predictions. So, people who have PTSD are actually ten times more likely to have chronic pain. And brain scan research shows that there's a hyperactive connection between a part of our brain called the **amygdala**, which is sort of like our alarm system, that looks for threats and harm and damage and danger in our environment or in our bodies and the pain processing areas in chronic pain patients.

[00:08:33] So that alarm, and our pain processing centers share a really, really, really strong connection in chronic pain. So, we're seeing that that alarm is maybe getting a little too touchy. Sort of like a smoke alarm whose battery is about ready to die. It just goes off, right? And so, you have folks who, you know, at the, at the belief or the sensation of, of **what they fear to be damaging**, will have a very real pain response.

[00:08:59] And lastly, the big one that came up in my work is that **therapies that target that amygdala connection**, instead of trying to fix something in the body, are the therapies that result in huge effects. So, two thirds of long term chronic pain patients were pain free after the PRT randomized control trial that they did out in Boulder.

[00:09:20] And the **fMRI scans** they did on those patients showed that reduced activation in the amygdala and a weaker connection with the pain processing centers. And all those things I mentioned earlier. Things like yoga, meditation, acupuncture, all of those things are well known therapies that help calm down that amygdala part of our brain.

[00:09:38] So it helped to kind of get a sense and how to explain this to folks who weren't quite sure how to get on board with these brain-based therapies. And that was step one for me. So after many, many, many, many meetings with these folks, I finally got a green light to **start testing a neuroscience based approach**.

[00:09:57] And so my portfolio really shifted towards being very strongly aligned with chronic pain, and I set out on this journey to just change the status quo as best as I could. So we started what we called **the brain first pain clinic experiment** out of my work. We were at Las Vegas, Nevada, which had really high rates of chronic pain at the time.

[00:10:18] We were looking at an **adult medicine population**. These were totally just your everyday folks coming into their doctor, had any complaints about pain, they were sent our way. And the therapy we used was pain reprocessing therapy. However, there are lots of brain-first therapies out there. Howard Schubiner uses something called EAET, which is emotional awareness and expression therapy.

[00:10:40] There's a lot of really great brain-based, what are called **manual therapies**, like through chiropractors and massage therapists, where they're using sensation to help dull that hyperactivation in that amygdala part of our brain. So, this was the one we landed on, but there are others. So, what did we learn?

[00:10:57] Well, first and foremost, I should say **it worked**. And that was the biggest finding, PRT patients in the sample, even though we're in the real world where things were messy, things weren't perfect, like they were in the lab or an RCT. We saw reduction in both pain and costs in the people who got our PRT program.

[00:11:13] I should also mention that **my experiment kicked off in the month of March of 2020**, which you may recall was a, hectic time for everybody. And even though we had to do a lot of crazy pivots at the last minute for COVID and all of our therapy had to be done through **telehealth**. We actually still got really great results.

[00:11:34] So that was very exciting. Some of the things that we also learned is that **time in practice** was very important. So **newer docs** were way more open to PRT, whereas some of the docs who have been practicing longer were much more resistant to it. In fact, I had **one physician who abjectly refused** to send anybody to our PRT condition, and I ended up having to **use him as a control**, because he just didn't, he just could not be led to believe that pain, in any case could be brain based or top down. So that was an important thing for us to consider.

[00:12:09] The other thing, and again, probably one of the most important findings for us, was that it needed to be scaled out. We found this great therapy, and it worked, but one on one therapy was way **too small to meet that huge demand** I talked about earlier. So, at that point, there are a lot of other brain and body therapies that needed to scale out to work, and that was a big moment for me where I realized that there were all of these opportunities, and what we really needed were ways to turn them into something that could get to lots and lots of people at once.

[00:12:40] And so **that's become my mission**. And that's my story today is fueling this global paradigm shift. And that's what I do with my work at Intercept Labs and what I'm also trying to do with the army. So, I'm trying to get promising brain based therapies into the mainstream healthcare system. That is my absolute goal in life.

[00:12:59] And so how do you do that? Well, there's a lot of things out there that I have found to be very helpful in my studies that I, I think would be really helpful for folks listening in to hear about as well. So, when **I'm trying to make something go into the mainstream**, what is often referred to, I mean, usually my lab colleagues have made sure that the therapy works.

[00:13:21] We know that it's what's called efficacious. It has good efficacy, but we don't know if it has **good effectiveness**, which is when something works even when all of the conditions aren't there to make it work. When you're dealing with a therapy, it's important that it has all the **clinical elements**, but when you take it out into the real world, there are some things that are really common, no matter what the therapy or intervention or practice is that need to be there in order for it to work really well.

[00:13:49] That piece of what we talk about, that piece of effectiveness is often referred to as engagement. And in order to have **high engagement**, you need to have something that sticks and that somebody actually does the way that they're supposed to do it for as long as they need to, to make the change. So, one of the things that's tough with brain-based therapies is that it's **not always instantaneous**.

[00:14:10] You're trying to change neurons and their pathways and the way they talk to each other in your brain that have done something a certain way for sometimes, you 10 or 20 years, depending on how long you've been in chronic pain. So, we need to find a way to get in there and we need to make sure that you're **doing the therapy long enough** where it actually has time to start moving those pathways around and work.

[00:14:34] So some of the lessons I've taken away, there are three big ones that I like to stick to no matter what, when I'm putting a therapy into a scalable model to try and get people to do it. And my first and foremost, like. If I had a list of commandments on what to do when you're making a therapy that will do well in the mainstream, is that **it has to feel good to do all by itself**.

[00:14:59] So, this can mean that it's fun, it can be interesting to you, it can be entertaining, or it can also just feel really good physically. Whatever it may be, the details have to be that it has to just feel good all by itself. **You have to enjoy it no matter what**. Now some people will argue that this is a nice to have and not a need to have, and I would argue against that.

[00:15:25] Whenever you're trying to change something, and it's a **really big journey** to go through and change chronic pain, you **need to have something that brings a smile** to your face whenever you're doing it. It makes a massive difference, and it also really boosts how open your brain is to changing in regards to that thing.

[00:15:42] So when you're pairing those fun, good, happy feelings, you're releasing things in your brain, neurotransmitters, chemicals in your brain that help make that learning stick and make it more strong. It **has to be important to you**. It does not matter if it seems important or it seems like something you should be doing.

[00:16:02] It really needs to be important to you as an individual person. And so, in this busy world, you know, **you don't have free time**. Let's be realistic. People talk about that, you know, oh, you can just do this in your free time? I would love to meet a person who just sits around every day and has like an hour of free time.

[00:16:22] So what is realistically happening is that you're carving out time in your day in order to fit this new thing in. So, it needs to be more important than whatever it is you have to carve out in order to make time for it. And so, in order to do that, I always tell people you have to **define specific values** for each user.

[00:16:41] What that might mean for you as a patient or a user of a therapy is you need to find **that specific value for you**. So, it's not a matter of, I just want to feel better. What

are specific things that get you going? What is important to you during the day? Is it, you know, playing with a child? Is it being able to do a hobby that you love?

[00:17:01] Is it getting out into nature? Whatever it may be, it's important. And usually **writing that down and really reflecting on it** on a regular basis is very, very helpful. And lastly, you really need to find a way to blend it into your daily routine as seamlessly as you can. So, convenient things are just easier to try, and they're easier to maintain.

[00:17:21] So if you can just pick something up and go with it, you're much, much more likely to stick with it. And that's why so many therapies are **starting to be on your phone**. Because you have a phone, it's there, it's easy to pick up, it's very convenient, and to do things on it all in one place tends to be really easy for people.

[00:17:40] So accessing whatever therapy that we're trying to do, **it needs to be as fast and as simple as possible**. It should be built into something that people are already doing every day. There's some really great research that's been done on building new habits that I like to borrow from in this particular area.

[00:17:57] So for anybody who's interested in this one in particular, and I should have written this down, and I didn't, so I apologize, but, there's an author named **James Clear** who has a book called **Atomic Habits**. And it's one of my favorites and he has an entire book dedicated to how you can make things more convenient for yourself so that they're more likely to stick and it's very very reasonable. There's also a book called **Tiny Habits**.

[00:18:21] I believe that one's by BJ Fogg and it's a similar kind of concept, how do things **really convenient and sticky** so that you stay with them for a long period of time without feeling overwhelmed?

[00:18:32] Now, because I'm a neuroscientist, I feel compelled to tell you that the first thing I kind of talked about about **those brain chemicals** making things easier to move around is really very important.

[00:18:44] So, I wanted to give everybody some **bonus tips** around what is called **neuroplasticity**. So, if you pair something with something that helps you with plasticity, you're getting like a huge boost from that as well. And there are a few things in general that help anybody in any condition, in any age, in any shape to really help their brain boost the ability to form new pathways.

[00:19:11] I always like to say that when you're talking about neuroplasticity, think of it like this, you've got a **freeway**. That you've **built up in your brain**. And what you need to

do is go around that freeway through the woods. And the first time you do it, you're going to forge a little path and you're going to break some twigs and make some room and you're going to see those signs. And so, you're going to take that path again.

[00:19:32] And the more often, the more consistently and the more frequently you do, that freeway is going to start to degrade and fall apart, and you're not doing maintenance on that, but **that path you're making through the woods** is going to get stronger and stronger and easier to follow and more concrete every time and so neuroplasticity is the process of your brain making those new paths and of getting rid of the old ones. And so the number one thing that is generally shared in helping out with neuroplasticity is exercise. Exercise has actually been shown at all ages to help your brain **make new neurons**, new brain cells, which really help a lot with neuroplasticity and making new pathways.

[00:20:12] So, the more, the more workers you have on that new road, the faster it'll get built. So, **any kind of exercises**, does not have to be hardcore weightlifting or running a marathon, just going for a walk. Especially in the mornings, and outside if you can, are all really, really helpful and helps boost your brain cells.

[00:20:30] The next one of course is **meditation and mindfulness**, which everyone has probably heard by now. These things really can help **boost plasticity** and **reduce stress** so they have a nice two way punch. But the more you sit with your mind, and kind of accept it and understand it and see what its patterns are, the more you can work with it and come up with new ways of thinking and new belief systems that will help you on your way.

[00:20:55] And the last one, I think every doctor has probably told you. On every one of these interviews is sleep. **Sleep is super critical**. And I know it sometimes feels a little bit like a chicken or the egg thing, because if you're in chronic pain, sleep can be very difficult.

[00:21:11] And I just recommend that you **do the best you can** to work towards it. Do little things that help you get a little closer every night with the goal of trying to get to that eight or nine hours each night, because again, the more you do it, The easier it will become, not just because it becomes habit, but because your brain gets a little bit healthier every time and it'll get you where you need to go.

[00:21:32] So with that, I. I'm all finished with my science part of the presentation. I've got my information here. If anybody has anything that they want to reach out about or have **any other questions** about, my email address is just bethany@interoceptlabs.com. It looks like intercept, but it's actually got an 'O' in it, interocept.

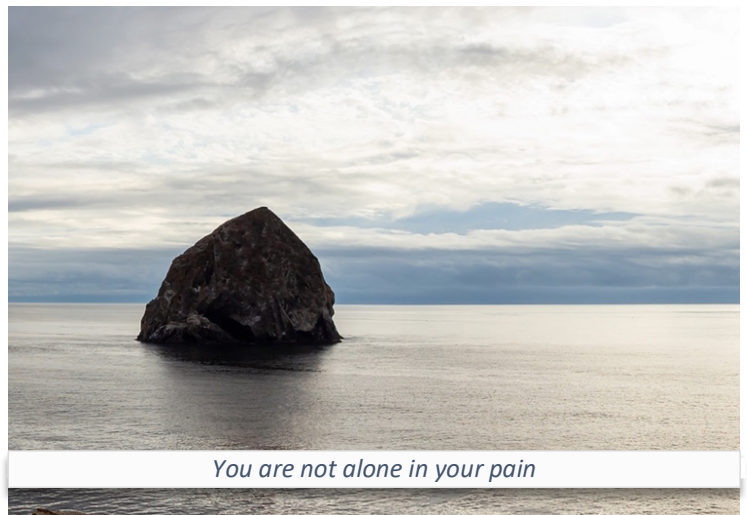
[00:21:54] It is related to the sense of how your brain can keep track of how your body is doing **Interoception**. And I also have a blog that I write in. Usually, I get an article out every week and it's just a **neuroscience blog** for folks that are interested in how their brains work and getting all of that technical information out there to an audience, as best as I can.

[00:22:15] So the blog is called '**Firing and Wiring**', and you can access it through 'Medium.com'. And I've got the site here listed on this slide for anyone that might be interested in checking that out. And so, with that, I will turn it back over to you guys.

About Pain Science Life Stories

Formed in 2018, the Oregon Pain Science Alliance (the Alliance) is an all-volunteer nonprofit 501(c)3 corporation. Our members come from the health care community, their patients, and others who follow pain science research.

We seek to share current information on how pain experiences are formed in the brain and influenced by biological, psychological, and/or social factors. Through community education events, health care workers describe how pain-science-based practices have changed their interaction with and care for patients, and patients tell stories about their experience with learned pain science tools used to help master chronic pain. We can now share these collected and curated stories, and other unique features, through the Alliance “story website” launched in early fall of 2022.



How to get involved?

Do new Pain Science insights and practices resonate with you?

We welcome anyone interested in collaborating to find or produce good stories and insights, then curating them to display on our website. Sharing in our discoveries and making them broadly available is both personally positive, and mutually satisfying.

The phone number or email address below will get you more information about us; then use the website link to the Member page for the steps to become an Alliance member, if that makes sense to you.

If you have a story using pain science tools and practices, and would like to share it with the larger community through our website, please send us an email. We would love to hear from you.

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