

[00:00:00]

**John Moe:** It's *Depresh Mode*. I'm John Moe. I'm glad you're here.

**Music:** “She Blinded Me With Science” from the album *The Golden Age of Wireless* by Thomas Dolby.

*Science!*

*(Music fades out.)*

**John Moe:** That's right, guy in that Thomas Dolby song—science! We have some science information on the show today that might help you. A bit later, you may have heard the term TMS on this podcast or other mental health circles in the past. Maybe you even know the basics of it. But we have a deep explainer on what transcranial magnetic stimulation is, what it does, how effective it is, everything you need to know.

First though: your guts—specifically, how your gut microbiome is connected to your mental health. There's a new study that indicates a very clear link between the gut microbiome, the assembly of tiny bacteria in your gut, and how well you handle stress. According to the research, there are distinct signatures in the gut microbiomes of people who are especially resilient to stress, people who roll with stress more easily, have gut microbiome traits in common. These people, these resilient stress managers, had better gut barrier integrity. That barrier is a membrane that blocks harmful toxins and bad microorganisms from getting into your system and messing you up. These people had a stronger fence, a thicker force field—meaning fewer harmful things get in there, which led to less inflammation. And inflammation activates stress signals to the brain. And you feel that. And I think you know how that feels.

All this is important, because it shows a clearer path between the gut and the mind, which scientists have been establishing a lot in recent years. Those two things talk together a lot more than we ever thought they did. And this research could mean better treatments and therapies for managing stress and for other mental health issues.

Dr. Aparna Church led the study. She's the co-director of the Goodman-Luskin Microbiome Center at UCLA.

**Transition:** Spirited acoustic guitar.

**John Moe:** Dr. Aparna Church, welcome to *Depresh Mode*.

**Aparna Church:** Thank you for having me.

**John Moe:** Let me understand some of this terminology and make sure that our listeners understand some of this terminology going into this, because it's really exciting stuff. But we've got to lay a foundation. What is the gut biome?

**Aparna Church:** When we talk about the gut, it contains a large number of—I would say maybe trillions of tiny microorganisms known as the microbiome. So, these can be bacteria, they can be viruses, fungi, even immune cells. And the microbiome plays a key role in our health, including our mental wellbeing.

**John Moe:** Okay, how does it do that? How does the brain and everything that's happening there and might be happening distressingly there, how does that connect with the biome?

**Aparna Church:** So, usually when we think about the brain and the gut microbiome, it's this complex system that shares a cyclical bidirectional communication—or signaling—from the gut, the gastrointestinal tract, with the brain, or the central nervous system. And the brain and the gut are in constant communication with one another. And there are multiple pathways involved.

There's the neural pathway, hormonal pathway, metabolites, inflammatory markers, and vagal signaling. So, when we're talking about this bidirectional signaling, you usually think about top-down signals coming from the brain going to the gut, and then bottom up signaling going from the gut to the brain. And like I said, they're in constant communication with each other. What I like to say is—I like to describe the gut or the gut microbiome specifically and the brain as BFFs. If one is out of whack, the other will soon follow.

So, they basically go hand in hand. In other words, any alterations in the gut health will disrupt communication with the brain, leading to changes in mood or cognition or emotional regulation, and hence mental health symptoms. And then if you have any disruptions in the brain, soon the gut microbiome is going to follow.

**John Moe:** What goes wrong in the gut microbiome? Like, is there an imbalance of all these little critters in there? Or what goes wrong there?

**Aparna Church:** That's one aspect. So, you can have what's known as abundance, whether certain bacteria are present or not. So, you know, people usually tend to talk about good bacteria and bad bacteria. But really, it's a combination of how these bacteria work together. But more importantly is what these bacteria are doing. So, what's their function?

[00:05:00]

And then there's also the immune cells. When we think about inflammatory markers or immune cells, really 70% of these inflammatory markers are happening in the gut. And these inflammatory markers, they jump right into action when there's invasion or trauma by bacteria or pathogens or toxins or even viruses.

So, when we have a healthy gut, it means that we have a lot of these diverse bacteria, but we also have this strong protective barrier. Which means there's no inflammation going on, so it keeps the bad guys out and ensures that the immune system is working effectively and keeping everything in check and balanced and healthy.

**John Moe:** Okay. And let's talk about some of your research, the writing about which came to our attention and really piqued our interest—the connection between the gut biome and stress and people who handle stress in particular ways. What have you found out?

**Aparna Church:** So, let's talk about stress. First of all, why I was actually interested in stress—I mean, we, if we think about stress, it's an inevitable part of your life. And really studying how to handle stress can help prevent, I think, developing disease. If we look at Americans, 77% of Americans report physical symptoms caused by stress, and 33% of Americans report that they are living with extreme stress.

Now, what this actually translates to is \$300,000,000,000 lost annually in stress related healthcare costs and missed work. So, whether we experience mental health diagnosis or whether we experience stress or a physical diagnosis, stress can be a part of that. And it can take on any form.

And what's interesting is that it happens throughout the life cycle. So, you could be a baby, and you could be left crying in your crib, and that's stress. You could be a child going to school trying to, you know, manage making friends or bullying or doing homework. That's stressful. And then you go into adulthood and think about economic hardships and, you know—or even old age, loss of a loved one or a spouse or any of that, that can all lead to stress.

And so, stress is really linked to the onset and progression of disease. And it's also related to mental health symptoms and to physical health issues like obesity and irritable bowel syndrome. And that's what really led us to want to look at stress but look at the other side of the coin. What is it about people who are resilient, who are able to adapt to stress really effectively and efficiently? What is it about these individuals that helps prevent them from dealing with stress in a really effective way, but also preventing them from developing any kind of mental or physical symptoms?

**John Moe:** So it's not so much a one-to-one relationship where if I have—the more stress I have in my life, the more likely I am to have physical symptoms and, you know, other problems that complicate it. It's more a matter of how I'm managing stress than it is the volume of stress itself.

**Aparna Church:** I believe so. Because, you know—let's take an example. If you think about early life adversity—right?—a lot of people will experience early life adversity or even stress for that matter, just general stress. Not everybody who experiences adversity or stress will develop a disorder. So, what is it about those individuals that makes them so resilient or resistant to the negative effects of stress?

**John Moe:** Mm. Okay. So, that's what you set out to figure out with the research.

**Aparna Church:** I did. I did. And you know, we recruited adult individuals, just generally healthy individuals who didn't really have any diagnosis. And we measured resilience using a questionnaire. It's called the Connor-Davidson Resilience Scale, which is a 10-item instrument or measure. And it basically measures resilience as a way of like positive

acceptance of change or tolerance of negative affect, tenacity, the ability to recover after stressful events. And it really measures five factors of resilience.

So, there's personal competence and high standards and tenacity. The second one is trust in one's instincts of tolerance of negative affect and strengthening effects of stress. The third is positive acceptance of change and secure relationships. The fourth is the sense of control. And the fifth is spiritual influences.

[00:10:00]

But we also measured other aspects of clinical and behavioral measures. So, we were looking at questionnaires such as anxiety, depression, even cognitive functioning. And then we put them in the MRI scanner, because we wanted to look at their brain. And when we had them in the MRI scanner, we were looking at different types or different modalities of brain. So, we were looking at the structure. We were looking at connectivity between different brain regions. And then of course we were interested in the microbiome. Not only were we interested in like, say, abundance and function, but we wanted to look at basically how the microbiome was functioning. So, we collected their stool.

**John Moe:** Okay. So, then, if you're—so, you're looking at these people. You've evaluated them in terms of the stress that they're facing and how they're managing the stress that they're facing and what's going on in their gut microbiome. And you found patterns.

**Aparna Church:** We did. It was really exciting, actually. This was—it was tremendously exciting. And what we did—if we just look at the brain data, we saw that there were neurological features or patterns that were related to functions associated with things like improved emotional regulation and cognition. What that means is they had really great brakes. So, I try to describe like modulation or cognitive modulation of emotions as your brakes are working really well, you know. So, you tap the brakes, and you're able to stop in your tracks and be like, “Hey, wait a minute. What's going on?”

And then when we looked at the microbiome, we saw that there were specific metabolites that were linked to reduced inflammation and also better gut barrier integrity. So, remember I was talking about that barrier, that lining, in the gut that helps keep the bad guys out and the good stuff in? So, that gut barrier integrity, those metabolites were related to that.

But what was also interesting was that the highly resilient individuals were nonjudgmental. This is really exciting to me, because it basically shows like being kind, being gracious, having gratitude, being nonjudgmental, just being kind to people, to yourself even—it was associated with high resilience. Also, the highly resilient individuals displayed high extroversion. They were more mindful, and they also had decreased levels of anxiety and depression, decreased levels of perceived stress, and also decreased neuroticism.

**John Moe:** So, do we know—? So, we find these commonalities in these highly resilient people. We find it in their other attributes of their personality. We find it in their gut barrier integrity. It's funny to me that they've literally created better boundaries for themselves. What's the chicken, and what's the egg here? Like, did people who naturally had this gut biome—are they just destined to have better stress coping mechanisms?

**Aparna Church:** I wish I could really answer that question. You know, I get asked this a lot. (*Chuckles.*) What comes first? You know, are you just born being resilient? And you know, you just have a better brain function and better gut microbiome and better personality? Like, you're just a nicer person? Or is it that, you know, you're raised that way?

**John Moe:** Nature, nurture.

**Aparna Church:** Right? Nature, nurture. And it would be really hard to study that unless I guess we studied people longitudinally and followed them and, you know. But it's hard to study in the lab, because you would basically be saying, "Okay, I'm going to bring you in the lab, and I'm going to do something really bad to you." As you can imagine, IRB would have a fit. I probably wouldn't have a job if I treated people that way.

But I think the one way to actually get at this chicken and egg question—actually, there are two ways. One would be to study people longitudinally, because then we could look at, you know, naturally occurring stressors like COVID or job loss or something like that. And we could see how their microbiome changes. And there are studies now that have started to do that. These large, big data sets have started to study people longitudinally, and even kids longitudinally. And that's something that we've been doing in the lab. The other way to kind of get at this chicken and egg thing is to actually implement interventions and see how that changes. So, we could look at people who do experience stress, and we could maybe do like a—you know, like a minor kind of stressful situation in the lab and see how they respond.

[00:15:00]

Or we could just, you know, see people who are resistant to that stress or people who respond better to the intervention and see what it is about that intervention that's helping individuals and what is it that's—who are the individuals that are resistant to the intervention and that are not responding? So, there are really two ways that you could go about it, but that's really the only ways I think you could get at the chicken and the egg question.

**Transition:** Spirited acoustic guitar.

**John Moe:** Dr. Church mentioned the IRB there a minute ago. That means Institutional Review Board, the entity that has oversight over research on ethical and regulatory matters when humans are the subject of a study. Just ahead—okay, so these people with a certain gut microbiome makeup have better mental health; they can handle stress better. How do we get one of those gut microbiomes for ourselves?

**Transition:** Gentle acoustic guitar.

**John Moe:** Back with Dr. Aparna Church from UCLA, talking about her research into the effect of your gut microbiome on your mental health.

Is there anything that—? Like, if people who handle stress well have a certain type of gut microbiome, and we all have gut microbiomes, is there a way to control what's going on

down there so we get to that point of good stress management? Like, do we need to eat a lot of a certain kind of yogurt or mushrooms or something?

**Aparna Church:** Yeah, what I like about this study is that it's really, you know, one of the first studies that has looked at multiple organs. So, you know, I want to step back and say when we look at the whole person, it's really revolutionizing medicine. Because we don't—you know, your brain doesn't function in isolation or your gut microbiome doesn't function in isolation, so you're looking at the whole person. And it's nice, because you're also looking at the whole person and how it responds to your environment. Of course, we don't live in bubbles, so we're definitely subject to what's happening in our environment.

And I like this, because it then offers people multiple solutions. So, you can kind of look at the at interventions as this multimodal, multipronged way of dealing with stress. So, if we think about brain interventions, maybe you're increasing resilience training. Maybe you're helping people be more mindful, mindfulness training or stress reduction. The whole nonjudgmental and like the gratitude—maybe, you know, increasing that, having people write gratitude journals. I know— You know, back in the day when Oprah used to have her show, she used to always talk about this, the gratitude journal. And it kind of makes sense. Like, being kinder, and being kinder not only to yourself, but also to others, I think has—there's something there.

And then, you know, when we talk about the microbiome, you know, usually people are like, “Well, what do I do to change my microbiome? Do I have to do fecal microbiota transplants?”

And I'm like we don't really have to go there. We don't really have to talk about the crapsules. There are other ways that you could improve the microbiome. So, things like—

**John Moe:** (*Chuckling.*) Wait, did you just use the word crapsules?

**Aparna Church:** I did. I did. It's one of my favorite words.

(*They laugh.*)

So, we could, you know, talk about supplements, right? Whether they're probiotic supplements or prebiotic supplements that have been tested and engineered. Because, you know, we know that there's so many probiotics out there, and people don't really know what works or doesn't work. But the one thing that I would say that's the easiest, is the most accessible, and probably the cheapest is diet. It impacts your gut microbiome so quickly. You know, of course, if you're going to change your microbiome, it takes at least three days. But you can see changes within 24 hours just by changing your diet. It's definitely the most influential and easiest way to impact your microbiome.

And so, we can kind of, you know, think about supporting this gut/brain connection by incorporating a balanced and diverse diet that's rich in fiber, probiotics, omega 3 fatty acids, antioxidants, while minimizing consumption of processed foods like added sugars or artificial sweeteners or excessive alcohol and even antibiotics. Now, a lot of people will be like, “Well,

I really would like my Chick-fil-a or my McDonald's," and that's okay once in a while so long as you're, you know, incorporating that good stuff. What I like to tell people is if you have a diet that's rich in fruits and vegetables—

[00:20:00]

—that's the easiest way to support a healthy gut microbiome.

And I usually talk about this—I say ABCs: always be counting. And I don't mean counting calories. I mean, counting different—the number of different fruits and vegetables you have per week. So, if you have about 30, 30 is a good number to start with. I think that's really great. And by fruits and vegetables, it can be even legumes and beans. And people are like, “Wow, 30 seems like a really big number!” And I don't really think that's that bad.

Because if you break it down—say for example, you make a pot of stew or soup, you have carrots, potatoes, tomatoes, garlic, maybe some herbs, maybe some spices in there, some peas. That's already seven! So, you've already introduced seven different vegetables and fruits in one meal. And I think that diversity is really key.

**John Moe:** Where does your research fit in with a lot of the other research that's been done about the gut microbiome related to mental health? I know there's been research about its connection to depression. Am I off base assuming that there's just a consistent finding of a connection between mental health issues and the health of the gut biome?

**Aparna Church:** I think it's natural to assume that there is definitely a connection between the gut microbiome and mental health, because of this whole brain/gut axis. We know that the two are connected. So, of course, if you have an unhealthy brain, if you're depressed, you're going to have an unhealthy microbiome. Or if you have an unhealthy microbiome, it's definitely going to impact your mental health.

**John Moe:** Okay. Okay. What does this finding—what does this research that you've done mean for mental health treatment in the future? Because we're always hoping for a tomorrow that works a little bit better than whatever we're doing today.

**Aparna Church:** Yeah, again, it goes back to that multi-pronged approach. I think that, you know, what I'm finding with my research is not just—you know, people think like, okay, if I have a mental health condition, I need to go see a therapist. And I need to, you know, take medication for that. And that's all great. I definitely think that that helps. But I think sometimes those are barriers to getting mental health treatment. I think there are other ways to also improve your microbiome and your mental health. And that's through things like diet, but also easy to implement things.

So, you know, I talked about being mindful and being kind, maybe increasing our social connection, reducing the negative ways that we treat other people. Those are some easy things that we can implement. And I think that would really influence our mental health. I mean, you know, just anecdotally, if you think about it, sometimes when we overeat or when we eat really badly, we don't feel so great. You know, you feel negative.

**John Moe:** Psychologically.

**Aparna Church:** Yes, psychologically, you don't feel so great. Well, even physically, you don't feel so great. You're bloated, or you might have diarrhea the next day. Of course, I had to go there. We're talking about the microbiome. So, you know, you tend to kind of not feel so great. And you know, one of the ways that I like try to tell people like diet is such a great thing. And when you have a really good bowel movement, people feel elated! Like, they feel so light, and they feel wonderful, and they don't feel so down in the dumps. So, maybe there is definitely something there that we need to be paying more attention to.

**John Moe:** Yeah, well, you're getting the toxins out of the body. You're kicking the bad guys out of the neighborhood.

**Aparna Church:** Exactly, exactly.

**John Moe:** Yeah. Now, obviously knowledge is always good, and we're always happy about research and knowing more about our bodies and about the way things work and about our minds, especially on this show. If I'm a person with stress disorders, who has managed—who gets overwhelmed by stress, and it really screws with me, how excited should I be about these findings that you've had? Because what does it mean for me in the future?

**Aparna Church:** I think every person is different, right? And different things are going to work for different people. So, it goes back to this whole idea where we'll talk about “You need to be on this diet, or you need to do this therapy, and you need to go see this psychiatrist, and you need to take this medication.” And I really think it's trial and error. Like, we just need to know that there's this connection and do more of what works for us.

[00:25:00]

You know, I don't like to prescribe and say like, “This is the rule; this is the only way.” I think it's exciting in the sense that, 1) it empowers you. Because a lot of these things you can implement on your own without really investing a lot of money. And the other thing is that it's very individualized. You can make it what works for you. It's funny, because sometimes—you know, I do a lot of diet studies, and I'll sometimes get like, “Oh, you know, you should eat a lot of berries.”

And people are like, “I don't like blueberries.”

And I'm like, “So what? Eat raspberries, eat strawberries, eat whatever other berry that works for you.” So, I love that you can really individualize this and make it your own and use what works for you. Does that mean that you can't have that steak, or you can't have that burger? No, you can! So long as you use some of these other techniques or other methods or other foods that can help balance that out.

**John Moe:** And just to be 100% clear, when we say diet here, we're not using it as a verb. We're not talking about going out and losing weight. We're talking about a varied palette of things that you eat.



**Aparna Church:** Correct. Again, going back to the ABCs: always be counting. So, having that rainbow of foods and fruits and vegetables in your diet is what I'm really talking about.

**John Moe:** Dr. Aparna Church, thank you so much.

**Aparna Church:** Thank you!

**Transition:** Spirited acoustic guitar.

**John Moe:** Coming up, TMS might really help you a lot! Or it might not. But it absolutely 100% of the time involves a magnetic woodpecker. All you need to know about this treatment, what it is, what happens, what you can expect, after the break.

**Transition:** Gentle acoustic guitar.

**John Moe:** Syllables. Aren't they the worst, words with lots and lots of syllables? I mean, who has the time? You could be there all day with the pronunciations. Take this word for a type of lung disease caused by inhaling very fine ash and sand dust. Pneumonoultramicroscopicsilicovolcanoconiosis, for instance. 17 syllables. It took forever. I missed lunch saying that word, it took so long.

That's why we have acronyms, initials we can use to speed things along. And psychology and mental health are full of acronyms. Some are pretty well understood and easily decoded. PTSD, ADHD, part of the common vernacular. Then there are the ones that might make sense if you're familiar with talk therapy—CBT, Cognitive Behavioral Therapy, DBT, Dialectical Behavioral Therapy. But then there are some acronyms for mental health treatments, and they get used a lot on this show—or instance, TMS, Transcranial Magnetic Stimulation. It was mentioned in our most recent episode with Mike Doughty, but we kind of breezed through it.

And I feel like I should explain it more thoroughly, because if you don't understand it, then you might not seek it out as a treatment option. And then you might not get something that could help you. Not that you depend solely on *Depress Mode* for your mental health—I hope not anyway. But if I can help, I'd like to help. So, let's break TMS down. Let's use all the syllables instead of just the acronym TMS.

Transcranial Magnetic Stimulation. It's a procedure where magnetic fields are used to stimulate nerve cells in the brain, make them more active, wake them up. It's used to address treatment resistant depression—meaning depression that has not responded to talk therapy or medications. So, it's not the first thing you would use. It's used when more common methods didn't work. TMS is a noninvasive procedure, so nothing gets inserted into you, and the skin is not cut.

Besides depression, it's also been approved by the FDA—the Food and Drug Administration—for migraines, obsessive compulsive disorder, and smoking cessation. Does it work for anxiety and other conditions? It might. There isn't a lot of solid research out there yet for anxiety. So, if you want to try this for that, talk to doctors.

TMS is covered by a lot of insurance, but presumably not all insurance. If you're interested, ask your insurance company. If you're uninsured, talk to the doctor's office and see what your options are. There are two widely used forms of TMS—RTMS, approved by the FDA in 2008, and deep TMS, approved in 2013. The most common is RTMS—unpacking the acronym, Repetitive Transcranial Magnetic Stimulation.

[00:30:00]

Your brain get stimulated by a magnetic coil placed against your head. Here's what happens when you get RTMS. At your first appointment, you'll sit in a chair with a whole lot of equipment around that chair. And you may be fitted with a kind of skull cap, like a cloth one. You might not be. Different offices use different approaches. You'll be assessed for your motor threshold, which is the ideal intensity of magnetic stimulation for you to receive. They'll also figure out where on your skull precisely to place the coil. It will likely be on the left side of your head, above the left dorsolateral prefrontal cortex, which is the part of the brain responsible for mood regulation.

So, at this point, you're seated comfortably. You've been thoroughly measured and evaluated, and you have some kind of electromagnetic device—a coil—up against your head. Then the fun starts. The magnetic woodpecker comes to life. Magnetic pulses are delivered in very rapid succession—(*hurriedly*) on, off, on, off, on off. I can't talk fast enough for how these things come in and go. That goes on for some predetermined number of seconds. Then the woodpecker stops for a while, some other predetermined number of seconds. Then it fires up again, back and forth like that. A whole session generally lasts in the neighborhood of 20 minutes.

It shouldn't hurt, but you'll definitely notice it. You can't really listen to stuff on headphones, but they might put something on TV for you to watch with subtitles—nature documentaries, something serene. In terms of getting inundated with electromagnetic pulses, I guess it's a little like an MRI, but it's more focused. You can sit in a chair instead of lying in a tube, and it's not nearly as loud. So, you're in your chair. You get your pulses from the woodpecker, then you're done for the day. But that's just the first day. The next day, you come back, and you do it all over again. It goes a little faster on that visit since they already have the measurements, and they know where to put the coil. A doctor will have you do this every weekday for a period of about a month/month and a half. The word “repetitive” in Repetitive Transcranial Magnetic Stimulation refers to the repetitive magnetic pulses, but it could also mean coming back every day.

Now let's talk for a minute about what's going on with those pulses. Yeah, they go into your brain, but they don't go through your brain. They just go like a couple of centimeters into your brain, right into that left dorsolateral prefrontal cortex. You don't need to remember the term dorsolateral prefrontal cortex. There will be no quiz. And the pulses generate little electrical currents that kind of wake up those cells, which are believed to produce stuff like dopamine, serotonin, and norepinephrine. You know, those chemicals that make life easier. Those neurotransmitters. It gets more of them pumping through.

Not to sound like a drug commercial here, but common side effects may include scalp discomfort and pain, headache, tingling, spasms, or twitching of facial muscles, and

lightheadedness. These generally decrease over time. After that first session, all you'll feel is that your head got pecked. You won't feel cured right away. Maybe you'll be happy that you're doing something, happy to have some hope, but nothing will be immediate. But that's what the repetition is for. So, when will you feel better? Well, this is where it gets vague. This is where we get into “your mileage may vary” territory.

Because first of all, TMS may or may not work for you. As I've said many times, if there was a 100% cure for depression, everyone would just do that. And I wouldn't have to make this show. I don't know, maybe I'd take up golf or something. What are your odds that TMS will help you? Well, there is conflicting data. Harvard Medical School says 50-60% of people will experience what they call a clinically meaningful response. And a third of those people experience full remission. At least for a while. There is a high incidence of recurrence. UCLA Health says 30-60% get a positive result. An article from the National Institutes of Health Points to research that found a 29.3% effectiveness, 18.6% full remission.

So, does it work? Sometimes. It's a possible weapon in your war against mental health problems. Think of it that way. Like, the army doesn't just have guns. It also has tanks, planes, ships, drones—a varied arsenal ready for battle. I'm a podcast host and writer, you guys. And I can't and won't offer you any medical advice. I can just share what I've learned through the work that I've done. Now, as I said, there were two main forms of TMS.

[00:35:00]

RTMS, Repetitive Transcranial Magnetic Stimulation, and Deep TMS. Deep is not an acronym, it's just the word deep. Deep TMS uses a differently shaped coil, and the pulses go deeper into your brain. The idea is that this makes it more targeted and perhaps more effective. A 2024 study cited by the National Institutes of Health reports that “following 30 sessions of deep TMS administered to patients above the age of 60, there was a 79.4% response and 60% remission rate.” Another study I read says “30 sessions of deep TMS led to 81.6% response, 65% remission rate. 20 sessions led to 73.6% response, 58% remission rate.”

A lot of numbers there, I'm sorry. But the upshot is this: Deep TMS seems to have more success than the more common RTMS. Overall, both have promising results, neither is a guaranteed cure. If you're looking into getting this treatment, ask about both. Ask about RTMS and Deep TMS.

So, that's RTMS and Deep TMS. And there's more innovation going on in this field. One treatment I've been keeping my eye on is called SAINT. Yeah, it's an acronym. Of course it's an acronym. Stanford Accelerated Intelligent Neuromodulation Therapy. With this one, first you get brain imaging through an MRI to determine exactly where to send those pulses. SAINT is more intensive, and it doesn't take nearly as long. It doesn't take as many weeks. It's more like a five-day treatment as opposed to six weeks. More pulses overall, total, and in a much shorter time span.

SAINT is still pretty new. It just got FDA approved in 2022, so we're still learning about how effective it is. But a recent study at Stanford—the S in SAINT—had some kind of remarkable results. 79% remission among patients with severe depression. That's a huge number. Remission occurred within days, lasted months, and the main side effects were temporary

fatigue and some headaches. Among the beneficiaries of SAINT would be patients in crisis, emergency room type situations where a six-week protocol is just not fast enough.

So, okay. Maybe you took notes. Maybe you could just remember this podcast and go back and listen to it. Because I threw a lot of information at you about TMS. Much more information is available online, of course. And just so you know, it's not a miracle cure, but it's something that might work and seems to be getting more effective as the treatments advance. Which is another source of hope that maybe things are getting better. I wish you all the success in your journey. Listen to me, of course, but make sure to talk with your doctor.

**Music:** “Building Wings” by Rhett Miller, an up-tempo acoustic guitar song. The music continues quietly under the dialogue.

**John Moe:** Our program exists because people fund our program. People listen to it. They recognize that it costs money to make, and they send us a little something. And it's easy to do. All you need to do is just go to [MaximumFun.org/join](https://MaximumFun.org/join), find a level that works for you. Maybe it's \$5 a month. A lot of people do five bucks a month. Some do \$10 a month. Some do a lot more than that. It's up to you and your budget. I'll let you figure that out. If you're already a member, thank you. Thank you for helping us get information out in the world that can help people. Because it's good to help your fellow human being. Be sure to hit subscribe, give us five stars, write rave reviews of the show. All of that helps get the show out into the world also.

The 988 suicide and crisis lifeline can be reached in the United States and Canada by calling or texting 988. It's free, it's available 24/7.

Our Instagram and Twitter are both [@DepreshPod](https://www.instagram.com/DepreshPod). Our newsletter is on Substack; search up *Depresh Mode* there. I'm on Twitter and Instagram, [@JohnMoe](https://www.instagram.com/JohnMoe). Be sure to join our Preshies group. It's a group on Facebook. A lot of good discussion happening there, people sharing ideas and experiences, helping each other out. It's a lot of support. It's pretty cool. Please use our electric mail address to get in touch with us. [DepreshMode@MaximumFun.org](mailto:DepreshMode@MaximumFun.org).

Hi, credits listeners. I've been watching handball at the Olympics. It's fun, because it's like hockey without having to skate or use a stick. Or soccer, but you can use your hands, as the name implies, and you don't have to run so much. It's lacrosse without worrying about a stick. It's tennis, but you can catch the ball. It's larger, and you can simply throw it where you want it to go. It's basketball, but no dribbling. You can just walk around. I'm not saying it's an easier sport than other sports, but I am perhaps implying that.

[00:40:00]

*Depresh Mode* is made possible by your contributions. Our production team includes Raghu Manavalan, Kevin Ferguson, and me. We get booking help from Mara Davis. Rhett Miller wrote and performed our theme song, “Building Wings”.

*Depresh Mode* is a production of Maximum Fun and Poputchik. I'm John Moe. Bye now.

**Music:** “Building Wings” by Rhett Miller.

*I'm always falling off of cliffs, now*

*Building wings on the way down*

*I am figuring things out*

*Building wings, building wings, building wings*

*No one knows the reason*

*Maybe there's no reason*

*I just keep believing*

*No one knows the answer*

*Maybe there's no answer*

*I just keep on dancing*

**Unica:** This is Unica from South Africa. You're not doing it wrong. This stuff really is hard.

*(Music fades out.)*

**Transition:** Cheerful ukulele chord.

**Speaker 1:** Maximum Fun.

**Speaker 2:** A worker-owned network.

**Speaker 3:** Of artist owned shows.

**Speaker 4:** Supported—

**Speaker 5:** —directly—

**Speaker 6:** —by you!