
Steve Fowkes: Parasympathetic Repair

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Male: For those of you that don't know Steve Fowkes is our technical director here. He's an organic chemist with a broad knowledge of biochemistry, neurochemistry, nutrition, metabolism and nanotechnology. He is also a nutritional consultant, formulation consultant, author, editor, public speaker, inventor, expert witness, is the moderator and blogger for Project Wellness, Projectwellbeing.com, chief chemist of eCycle Systems, executive director of Cognitive Enhancement Research Institute, CERI for short and co-founder and chief science officer of Nanopolymer Systems. He has numerous publications, references can be sent upon request and in the editor's opinion is the most brilliant man she has encountered and I third it so Steve will be talking about Parasympathetic Repair. Please welcome Steven Fowkes.

Steven Fowkes: About 25 years ago, I was faced with a challenge. I've been a scientist for many years and one of my colleagues said that he was going to put me on Larry King Live and I panicked, totally freaked out. My experience of public speaking was horrendous. I had flop sweat, stage fright and the thought was very daunting that I was going to put in that kind of a situation to be in front of one or two million people that I really couldn't see. It turns out that that experience of learning to deal with stage fright is kind of related to the topic I'm bringing to you today. The parasympathetic system is a very basic way that we regulate ourselves as multi-cellular organisms with central nervous systems. The autonomic regulation handles all the stuff that we don't want to think about, how does your heart beat? How do you breathe? How do your kidneys work? Do you breathe faster? Do you breathe slow?

If you're sympathetic, you breathe very, very rapidly because one of the jobs of being sympathetic is to dump carbon dioxide as fast as possible because you're in a situation where you're trying to outrun a bear and if you build up CO₂ too fast, the bear gets you, if you keep enough CO₂ down, you're able to run far enough to climb a tree and you live. This is a very, very important survival mechanism and when I was going through biology, it was taught that the sympathetic system basically was in charge of our systems and the parasympathetic system was kind of like this underlying foundation. It really didn't play a big role. Now, we know that's wrong, that it's much more the other way around. Not only does the parasympathetic nervous system play a huge role in our health and our well-being but it's a lot more complicated than we thought.

Back then, it was monolithic. You have the parasympathetic system and the sympathetic system and the sympathetic system overrode the parasympathetic and now, we find that there's actually two parasympathetic systems, one of which overrides both of them. It turns out this is part of what makes us human. We, as humans, are social animals. We live in relationship to each other. How we react in those relationships is a huge part of our private lives, our social lives, our family lives, our culture and we get a lot of the mechanisms for dealing with that from ... For example, the way we read other people's faces, the way we communicate our internal, emotional dialog through our own faces and our own vocalization. Being nervous, I will have a vocal tone that would be different than

if I'm totally comfortable. It turns out that this can be broken down to a basic concept of the perception of safety.

Safety isn't just about whether or not there's a hungry bear chasing you, it's also about whether or not the person who is across from you has a scowl on their face or whether they're smiling. Are they winking at you when they say something derogatory? Is this male insult humor or they're really trying to attack you? You have to make these kinds of judgments as you're reacting to people around you and that's all driven by this new parasympathetic system. When we look at other life forms like amphibians and reptiles, it's a good ... A reptile would be a good example before the mammalian explosion. We find that the parasympathetic system which is cholinergic. It uses choline as a neurotransmitter and it runs from the base of the brain all the way down the spine and then, radiates out to all of our internal organs.

It's controlling our heart, our lungs, our digestive system, our stomach. It's controlling sexual arousal, it's controlling appetites, it's controlling the vascular system. When you stand up, what's to stop all the blood from draining out of your head? Your autonomic nervous system causing all the muscles in your legs to squeeze, to keep the blood in your brain, to keep you conscious, keep you aware. If you stand up and you get dizzy, you have orthostatic hypertension which is a problem of autonomic misregulation of your system. It turns out that a group of scientists, probably about 30 to 40 years ago, kind of broke with the mold of thinking about human health from the perspective of the sympathetic system and about behavior and started looking at it, how does physiology influence behavior rather than behavior being ... Driving physiology? They came to the conclusion that there's a lot about the parasympathetic system that we didn't know and they started detailing it and at this point in time, this theory's been out for about 20 years and it's changing a lot of things.

One aspect of it that surprised me was to discover that the autonomic nervous system isn't symmetric. Most of our body systems are even, right and left or equal and it turns out that the autonomic nervous system, even though it's very primitive, it isn't perfectly balanced. The right side and the left side do different things. The right side does more than the left side and as the parasympathetic system was re-invented in mammals to include a myelinated cholinergic nerve. It became even more lopsided to where dramatically the right side of the brain does the autonomic regulation thing and the left side of the brain does the language and the reading and the logic and analysis and things like that and this is kind of a specialization that as our brains have grown, we've played into this idea that different sides do different kinds of things. The drawing has the nervous system that's going down the spine kind of off to the side to reflect the fact that it's not ... It's not perfectly balanced.

What this means is that subtle issues of how your brain works or how brain is wired influence your propensity of risk regarding autonomic misregulation or disregulation. If you are, for example, a left brain dominant person and are

rationality dominant all the time and don't have an emotional side and haven't developed it and cultivated it, not only can you be potentially at risk of having low vagal tone but you influence everybody around you is to create an unsafe environment. Your kids, for example, won't find you safe and that will affect their autonomic balance. Your relationships will be strained, your business relationships, your working relationships will be strained.

Female: How does it do that?

Steven Fowkes: Hmm?

Female: How is that pertaining to that?

Steven Fowkes: Well, the difference ... Knowing when somebody is ... Has a scowl on their face, what's the emotion behind it. That's what the autonomic nervous system does. We're reacting to visual clues, we're reacting to audio clues, we're reacting behaviors that people have. How do they move? How do they make gestures? A lot of it is about facial expression. Judging from looking at somebody's face, what's going on up here and what's going on up here from an emotional point of view, not necessarily from an ideological view or thought point of view but are they angry? Are they peaceful? The fundamental question that that part of your brains wants to know is are they safe? Are they going to do something that's dangerous or are they trustworthy? Are they safe? When they are safe, your autonomic nervous system increases in tone. If they're not safe, it decreases in tone.

We have all of these primitive responses, the sympathetic system which would be fight-or-flight which is driven. It's overridden by this issue of safety so if you're in a safe environment, that fight-or-flight response is toned down. It's called the vagal brake according to the guys who researched it. If your ... In a very, very extreme situation where the signals that you're picking up are your body is reacting to as extremely unsafe and dangerous and is potentially life-threatening, then you have freezing behavior. The autonomic system [inaudible 00:11:04] as well and those are parasympathetic. You have the very primitive parasympathetic system which is about freezing and you see lizards do this. When lizards are threatened, they freeze and their metabolism goes down. Humans will do this under extreme duress.

If the situation is ... You might have something like that going on in your body because of a pathology but you're in a safe environment with people you know, you trust them, they're around, they're caring, they're supporting you. Then, your autonomic nervous system and having high vagal tone will suppress that underlying fight-or-flight or freezing response. There's a potential for wanting to cultivate this because the people that have the highest vagal tone are people who are happy, people who are fulfilled, people who have gratitude, people who feel like, not only, they love other people around them but that they are loved in return from them. Remember, we had an earlier talk talking about the wonders

of oxytocin? Well, there is your parasympathetic driver or oxytocin in love, it's part of that parasympathetic system.

It turns out that this has a very, very important health consequences. For example, they noted that some people with brain damage who had had accidents, people who had been hit in the head because of sports or who had had an industrial accident and they have their parasympathetic system damaged, that those people all had gut permeability, leaky gut syndrome. They wondered whether or not this was, in fact, causal and they started experimenting with animals and they would induce brain damage and yes, they would become ... They would develop leaky gut syndrome. What surprised them was this would happen in about three hours. Yeah, so we think ... We tend to think of leaky gut syndrome as a result of months and years of eating inflammatory foods that breaks down our gut and prevents it from healing and this cycle then progresses very, very slowly into leaky gut syndrome but it turns out, you can induce it in three hours just by destroying somebody's parasympathetic tone. It turns out that this can be measured by a variety of techniques and one of them has to do with gut motility, the ability of food to move through the system and when vagal tone goes down, the muscles that move the food to your systems slow down. Yes, Susan?

Female: Isn't there a study that like a fatty meal at McDonald's [inaudible 00:13:57] and if we're doing that every six hours, imagine what it would do to our [inaudible 00:14:09].

Steven Fowkes: Well, one could do the same thing, for example, by eating in a cafeteria alone.

Female: Alone? Interesting.

Steven Fowkes: That lack of social connection at a time when you're trying to digest. Your autonomic nervous system is controlling your gut function. When you're sympathetic dominant, your gut system is shut down because all of the blood would go to your stomach, to your intestine, to your gall bladder, to your pancreas, to your colon, all of that blood is needed for your muscles and for your brain. When you're trying to outrun a bear, you have to make strategic decisions as you're going and so, that's ... You don't want to be digesting your food at that point in time. If you have a low parasympathetic tone, you're sympathetic dominant, then so your digestion shuts down. Now, all of a sudden, your parasympathetic tone has dropped. Now, your stomach isn't producing the proper motilin which your stomach, duodenum and jejunum produce in response to food.

If not producing those, so it's not sending the signals for motility and you get constipated. You don't digest your food properly, your microbes, your microbiome gets altered by that. That's one of the things these researches were looking at. For example is they would do coffee enemas in people and determine, did it in fact induce a bowel movement or not because the

parasympathetic system is cholinergically driven and caffeine is a cholinergic stimulant. If their vagal tone was totally crashed, they would not respond to caffeine very efficiently at all. They could take huge doses of caffeine and not have a laxative effect from it whereas other people would take one cup of coffee and 15 minutes later, they got to go. By the way, if anybody has questions while I'm talking, please do.

Female: [inaudible 00:16:21].

Male: Hold on, let me run around with the mic while you do that.

Steven Fowkes: Okay, we'll make it work for your ...

Male: Exactly.

Steven Fowkes: With your pay.

Female: What determines if you are parasympathetic or sympathetic dominant?

Steven Fowkes: Well, on the basic level, it has to do with this ... The highest system which is the myelinated vagus system or the mammalian vagus system. It has to do with that particular system whether it's working or not because it's the one that overrides everything. It's the patch on the system that the early parasympathetic system, the sympathetic system and then the new parasympathetic system were built in stages and the latest one has controls. It's like doing a puppeteer kind of control system for the underlying systems and overriding it when it is needed. For example, infants who are under distress or prematurely born have a tendency to die from overactivity of the parasympathetic ... The primitive parasympathetic system. In other words, all of the nurturing and stuff like that that would normally happen if the baby were with the mother aren't happening because they're premies and they're in a incubator and there's less of that kind of influence and their development isn't far enough along for it to really play a big role. The parasympathetic system is still underdeveloped might be a way to say it. They have a tendency for their heart to stop because of that freezing behavior.

Male: Is that SIDS related?

Steven Fowkes: I don't know. Okay, the question is is that SIDS related, sudden infant death syndrome. I know that there is a mechanism involved in sudden infant death syndrome where there's a redox crisis. Whether or not that's related to the parasympathetic system, I don't know. It's a very good question. I'd love to find out if it is connected. There is also relationships of a lack of parasympathetic tone to development of autoimmune disease and autoimmune disease is also associated with hypometabolism, people with low metabolic rate. They have a low aerobic capacity and whether or not that's directly connected to parasympathetic or the causal error goes one way or the other way, I don't know

but it's a very good question and I'd love to integrate that at some point in the future. Randy?

Male: Could you clarify? When you say autonomic nervous system, are you using that as a synonym to parasympathetic or as a third system?

Steven Fowkes: Yeah, the autonomic system is the automatic nervous system. It's composed of the two parts: sympathetic and parasympathetic and the parasympathetic is itself two parts. Autonomic just means the overall non-voluntary nervous system. The one that operates the lower level of awareness. It's not that we can't learn to control it so if you have a heart rate variability device, you're learning how to control your autonomic nervous system. You're measuring your blood pressure on a basis and studying the effect of different diets and different supplements on it, you're learning how to control your autonomic nervous system but the overall function is way below the level of consciousness. The autonomic nervous system comes up through your ... This reverse engineering. It comes up to your spine through the base of the brain and then, there's the brain stem structures. There are three structures there and that's where most of the nerves terminate the cholinergic nerves that come from your body. About 20% of those nerves are efferent where they're sending signals down to your organs.

It's telling your heart to speed up, it's telling your kidney to speed up, it's telling your gall bladder to slow down, that kind of thing and 80% of it is the information flowing the other way where your brain is getting feedback from all of those organs to say, "This is what's going on and you need to upregulate this other organ," or something like that. The brain is kind of the switching center and 80% of these signals are coming up this autonomic system and it's below the level of your brain, it's down to your brain stem and then, your brain stem has connections to your limbic system which is your emotional centers so that's where you're getting the ... A huge amount of your feelings and your intuition, your musical skills, facial skills, those kinds of things, your personality. Then, those centers are connected to your cerebral cortex. You have these layers of control so it's a top down control system but the stuff that's going on down there in the brain stem is way below the level of consciousness. It's probably considered below the level of subconsciousness. Yeah?

Male: You had said that eating alone in a cafeteria is ... Has a similar effect to and I'm not sure if it was like eating McDonald's or brain damage or something like that but anyway, could you say a little more about that and also if it's ... Is it eating alone when you're surrounded by others or is it eating alone even if you're completely alone or ... Just kind of fill that whole topic out. It sounds really interesting to me.

Steven Fowkes: That's a good ... It's a great question that whole issue of eating alone and it has to do with your perception of it, what meaning you attach to it. It's not necessarily the meaning that you think, it's the meaning that you feel. If you feel like you're part of the group, then you're socially ... It's a safe environment. If you

feel alone from the group, estranged from the group, then it's a hostile environment and your autonomic nervous system will come to an opposite kind of conclusion. There are people who have a low need for that kind of connection who may not be affected negatively pretty much at all from that kind of environment.

Other people have a strong need for connection who that would be starving them on some kind of emotional, psychic, spiritual kind of level. It all comes down to perception and this is one of the things on how your brain is all wired up can make a huge difference. I mean, how different people perceive certain situations, it's all over the map. You can take a particular situation, put somebody into it and put 10 people into it and get 11 different opinions about what's going on. That answer question?

Male: Yeah, so ... If it's perceived negatively then what you're saying is there's a ... It's kind of like there's a fight-or-flight response that's going on in the nervous system at that time?

Steven Fowkes: That [right 00:23:20]. The autonomic nervous system, the myelinated one would not be suppressing. There would be an underlying fight-or-flight that would be going on or if it was really, really bad, for example, if one was in a cafeteria alone at a table where one was being bullied by neighboring kids, that could be perceived as a freezing situation involving the lower level parasympathetic system.

Male: Got it. Then in that situation, you're about fighting off the bear, you're not [about 00:23:54] digesting the food and so, your food is not going to be properly digested on one level and then, you're going to be dosed with all the stress hormones, cortisol and all that other stuff in the other level?

Steven Fowkes: Yeah, so that would be the mind down kind of perspective on it. If you're looking on an upward scale, it would mean that one wouldn't have a connection to God or family or humanity or the universe, however you might want to describe that but it would be suppressing the self-transcendent experience that is a potential birthright for everybody. That person might be, for example, considering suicide as a strategy for dealing with the torment.

Male: Thank you.

Steven Fowkes: That would play to this question of health and healing, how does this fit in to this overall process of healing and part of it is top down driven. As I've been studying aging for 40 years now, I realize that we have all these different theories of aging and they can basically be stratified where we're talking about low level systems like free radicals and anti-oxidant balance and we can talk about redox potential, we can talk about hydration, we can talk about metabolic rate as very, very low level systems. Mitochondrial aging that would be a risk factor for premature death or the over consumption of polyunsaturated fatty acids that would

dramatically increase your risk of some kind of sudden death problem or cancer, for example. On the top down level, you have the neuroendocrine aging mechanisms that are all about how a particular stress is perceived. Is the stress empowering to make us stronger or does it break us down?

For example, learned helplessness is a perfect example of this. If you ... You're a scientist, you're in a lab and you have this big, huge leather gloves so that you can grab rats without getting bitten. You reach into the cage and you grab a rat and you clench it in this glove and the rat struggles. If you allow the rat to go, you let the rat go before it stops struggling, that empowers the rat that their struggling activity has now resulted in their escape and that rat will live to an almost old age. There will be a life shortening effect but it will be small. If you hold on to that rat long enough until they stop struggling, that rat will die very young. It's basically the same stress. You're getting grabbed by a glove but in one case, you get away, in the other case, you don't. You're helpless.

Learned helplessness shortens lifespan and that same kind of stuff takes place in us. What do you if you want to heal? You play to this. You cultivate this in yourself, play to your strengths. Instead of counting your disasters, you count your blessings. Every possible appreciation you can have, the people in your life, something that's going on, you count it, you appreciate it. You encourage relationships that are safe and you discourage ones that aren't. If that means getting divorced, you get divorced. If it means moving away from your next door neighbor, you do that. If it means quitting your job, you can do that. Finding a new doctor, you can do that. I mean, there are lots of ways to identify that there is an unsafe thing going on in your life and to take some action to change it.

Female: [inaudible 00:28:16] ...

Male: Hold on.

Female: Could you repeat what you said about learned helplessness? You said learned helplessness needs to ...

Steven Fowkes: It shortens your lifespan.

Female: Then, you said ...

Steven Fowkes: It makes you unhappy, it makes your environment dangerous. It makes your environment dysfunctional.

Female: You perceive that as unsafe?

Steven Fowkes: Your autonomic nervous system is judging that situation, whatever it is, as being unsafe or unpleasant.

Female: You're suggestion is to move away from those situations, right?

Steven Fowkes: Or change it in some way. You can always change your attitude about it. If you can find something about it that makes it constructive ... For example, I may just pick something ... Frank [Challanberger 00:29:11] for example, when he was first working with his aerobic threshold experiment, he was training to be a competitive mountain biker in the senior category and was not doing that well. When he started studying this, he found that he was over training and that was impairing his function. What he did is he started doing other things that were good instead of training, backed off on his training program and started winning races. You can recognize what's going on and use your mind, your thinking ability to change what's going on in your life. Instead of getting a divorce, you could do some kind of relationship building process. Companies recognize this now. How many people who worked for a company where you've been on a relationship training ... Team training kind of a project? Yeah?

Female: I have one other question, learned helplessness, for instance in the example of the rat and the glove. How does that translate to us humans?

Steven Fowkes: Well, what can you do and what can't you do? Let's pick an example of learned helplessness, the IRS. You can't get away [crosstalk 00:30:31].

Female: You move to another country and you ...

Steven Fowkes: You could look at your taxes as being ... Doing good in the world and develop a gratitude process for things that you have to do.

Female: Oh boy, that's stretching it, isn't it?

Steven Fowkes: Yeah. You could say that, for example, this isn't ... You don't let it become ... One of the things that happens when gratitude becomes compulsory and charity becomes compulsory is that it devalues it for us because it's a voluntary thing. We give when we're motivated to give, we give when we have that connection. You know somebody who is in need and by giving, that you feel good that you've supported that person. Just like you would feel supported if you were in that same situation. Empathy. That's a parasympathetic tone. That's in that right hemisphere of the brain. It's effecting your autonomic regulation. If you look at taxation in an empathetic way that you can say then, "Okay, that's not going to inhibit my charity that's outside of taxation." That is, in fact, not compulsory. It is voluntary and you can then embrace that and it means that that is now workable. It's supporting you, it's empowering you because you are engaging in charity. The compulsory side of it hasn't totally damaged you to the point that you're not giving. That make sense?

Male: Just one quick thing, who is the author of Learned Helplessness? Because there's a lot of book ... Great books out there on learned helplessness and I can't remember the author's name but I think it's actually a title of a book called Learned Helplessness.

Steven Fowkes: The stuff I know about it was done in the '60s and '70s. It's old research.

Male: This might be mid-90s, mid-2000s but yeah, there are some good books on that.

Steven Fowkes: The modern stuff is Steven Porges. I don't know how he pronounces his name, P-O-R-G-E-S. He's got a book out called the Polyvagal book and there's a whole group of researches are now furiously investigating and publishing in this field. In the last 20 years, there's probably been thousands of papers pointing out this kind of thing and it is the new trend, it's just not yet penetrated into medical circles yet.

Female: They're always 20 years behind.

Steven Fowkes: They're always 20 years behind and if it's politics, 40 years behind like with vitamins but ... It's up to us to learn what it means and do something about it and this is ... This is why I'm giving this talk is to kind of bring it to people's attention that these are things that we do have power over. We can measure our parasympathetic tone, we can modify it with, for example, heart rate variability devices, we can practice gratitude therapy, we can ... Appreciation. These are all ... Get in touch with our love of ourselves and others, to promote healthy parasympathetic tone.

Male: When the IRS gives you credit ... Credit and ... For being benevolent, that should change your opinion of the IRS.

Steven Fowkes: Or at least ... At least in some degree. I mean, it might not be like black or white but it could that they've gone from being oppressive to being kind of irritating.

Female: Or just be thankful that you have something that they can take money from.

Steven Fowkes: That's true. There's always ways to look at issues from that perspective of cognitive perception and cognitive dissonance or harmony. There are also emotional aspects to it. One of the things ... One of the meetups that I host which has been very valuable and so I provide ... Randy Hold who is a psychotherapist from Palo Alto, he comes to my house and we do this meetup every other Wednesday involving ... One of the processes is involving what he calls the perfect affirmation which I look at it as being a kind of personal integrity, an affirmation that's not about the cognitive mind overruling the emotional mind. It's about creating harmony and agreement between them. If you make an affirmation, you take the time to react to it and let your emotions connect to that affirmation and you follow it in your body and let some part of your body collect whatever resistance or agreement is going on and kind of find out what it is and ask yourself a question of where is this going.

If you do ... If your affirmation is in dissonance with your subconscious mind, then you'll discover that. If you trace it back to some event that has taken place

like, for example, your father terrorized you for learning the math tables when you were six years old and you remember that situation. You go back into that time frame with your father and you create a new situation, you actually learned it in a faster time frame or your father wasn't so totalitarian against ... About it or you recognize his fear about your welfare. All of a sudden, the experience is different. Now, that block is no longer there and now, that affirmation that you made is now in harmony with you instead of dissonance with you. That's an example of how this could be applied from a thought, emotion point of view to restructure your life to make yourself more harmonious.

Female: [inaudible 00:36:52].

Steven Fowkes: Yeah? Yeah, you can invite him here. He'd do a great mini presentation. He also does a technique called therapeutic shaking.

Female: What?

Steven Fowkes: Therapeutic shaking. For example, the autonomic nervous system. What happens if you're in a such situation, in a basement, in a bunker and you're being bombed and bombs blow ... Explosions going off all over the place and you're sitting there all totally in survival. Instead of fight-or-flight, it's freezing. The bombing is over, what happens? You shake. All animals when they go through this kind of trauma, when the lion goes after the gazelle and the gazelle gets away, the gazelle goes to the waterhole and it shakes. The shaking is to dissipate all that sympathetic activity and to restore calmness and balance the parasympathetic and sympathetic nervous systems again. The therapeutic shaking is a way to just do that in a process that is predictable.

It focuses on the psoas muscle which is one of the core muscles that hold the pelvis together is at the base of the spine and it ... By doing a series of exercise, it will create tiredness and fatigue in that muscle and then, putting yourself into a particular situation, your autonomic nervous system takes over and you start shaking. You'll hit a resonant frequency and you can shake without thinking about it, without encouraging it. You can do e-mails on your phone, you can talk on the phone, you can write while this is going on and this is releasing the stress in your sympathetic nervous system. It's an exercise. Yeah, so he can teach both of those. Go ahead.

Male: Back to the ... Like the [topic 00:38:51] of eating dinner and stuff, has research been done like people who watch TV or people who maybe ... Maybe somebody's in a bad situation when they're eating dinner but like the person in the cafeteria maybe is listening to a positive ... Some really mellow nature music or something like that. Has anything ... ?

Steven Fowkes: Versus listening to the news.

Male: Yeah, yeah or watching some violent TV show while they're eating dinner or something like that.

Steven Fowkes: Yeah, yeah, yeah. There's been research like that. I can't tell you or make citations to it because I don't study things on that level. Something that I consider fundamentally obvious isn't enough for me to dig into the literature and support it but yes. That's one of the things that people will say for good food hygiene is don't be nervous, don't be ... Don't watch the news when you're eating or for a period of time of an hour afterwards. The cycle ... It's a 100 minute cycle for the stomach producing motilin, that runs every ... Every hour if you want to give your stomach that hour to digest the meal and process it and send it on its way before you interrupt the cycle. At some point, during the 24 hour cycle, you want to go into parasympathetic mode and one of the best times to do that is when you're sleeping at night. There's no point in being sympathetic while you're sleeping. Yeah?

Male: Burn brought up epigenetics, how many people are familiar with epigenetics? Great. Yeah, I was just curious because that's obviously exciting research and to me applies because it's not necessarily expression of the gene but the protein wrapped around it and how you communicate helps the expression of the gene, right?

Steven Fowkes: Not only that but when we're developing, there's a reaction to our environment. If you look at autoimmune ... Or let's say autism in children, it turns out that that's connected to autoimmune disease in the mother. If you were gestated in somebody with autoimmune, you are at risk of having ... A high risk of having autism and so, that maybe that this epigenetic mechanism allows for a disturbance in the sympathetic, parasympathetic system to perpetuate from generation to generation to generation because a lot of those kinds of stressful historical times aren't just a matter of being a year or five years, they can be longer. For example, the 100 Year War in Europe, five generations. That would play to things like ADHD which is a developmental situation that arises that helps people ... That when they have the ADHD traits, they're more able to survive in a chaotic, dangerous, noisy, unstable environment whereas if you're born in a idyllic environment and you don't have the ADHD and all of a sudden, you're confronted by rapid change and instability, you're more likely to be overwhelmed instead of to successfully adapt to the change that's forced upon you.

Female: You were talking about therapeutic shaking, is this Steven Porges?

Steven Fowkes: No.

Female: No, it's not.

Steven Fowkes: There's a whole group of people who have been working on this for a long time and it is somewhat related to EFT therapy, the tapping therapy which I use to

deal with my stage fright back 25 years ago where you're just using the stimulation of parasympathetic pressure points as a way of promoting vagal tone. It turns out that you can do that ...

Female: Vagal tone.

Steven Fowkes: Vagal tone, parasympathetic tone. It turns out you can do that by just thinking about stimulating those pressure points.

Female: Yeah, this ...

Steven Fowkes: That was actually fought by some of the people who developed the first tapping thing who were invest in the idea that you had to tap and then, they ... You realize that if you just thought about it, you would create the same kind of safety that you learned when you were actually tapping and so, it's putting yourself into a frame of mind.

Female: Into that state.

Steven Fowkes: Into that state where you're cultivating parasympathetic quality.

Female: Right, I actually do something like that with a dance and movement and I do something called vibrational dance and that is a way to sort of detoxify the system of any stress or blockages that are in there.

Steven Fowkes: You do any vocalization during that?

Female: Sometimes and I also work with a power ...

Steven Fowkes: Okay, good. Because that makes a big difference, singing and ...

Female: Toning.

Steven Fowkes: Humming and gargling and gagging all promote vibration into the parasympathetic nerves that run right down behind the throat.

Female: Awesome. I love it.

Steven Fowkes: You can do ... They have now actually investigated this as a new therapy, it's called forceful gargling.

Female: Forceful gargling?

Steven Fowkes: Yeah, you put ... You start with a teaspoon, you gargle and then you graduate to higher and higher amounts and you get more and more vigorous about it and this promotes parasympathetic tone.

Female: I would imagine because I've done this also in working with people with dance and movement where you use the shaking and also dance as a form of therapy where you literally rewire the brain and you're also working with perfect affirmation intention and actually embodying those various qualities that you talk about, restructuring your life to make yourself more harmonious.

Steven Fowkes: How many dancers do this? We see it as routines ...

Female: Everybody. Athletes ... Athletes do it as well, yeah.

Steven Fowkes: Yeah, that's right. Yeah.

Female: Yeah, by using the whole body temple in all aspects of it so I'm really enjoying the information that you are sharing with us. Thank you.

Male: Steve, how about supplementation or nutrients for the parasympathetic?

Steven Fowkes: You certainly can do that, you could say that the cholinergic nervous system, it's the cholinergic nervous system so if you do have a metabolic nerve transmitter deficit regarding the [fetal 00:45:29] choline by increasing it, you could increase the strength of your autonomic nervous system. That is ... That would be choline, CDP choline, choline phosphates, lecithin, actual purified phosphatidylcholine, vitamin B5 and magnesium plays to the relaxation side of the cholinergic dominant. If you do choline to an extreme, what will happen is that the ... Not only will the cholinergic part of your upper brain produce a lot of vigilance which is part of the parasympathetic system but your motor control systems will get very, very tight and you'll be ... Get tension in your neck right where your shoulders and neck meet, you might also get tension in your calves and other places like that.

Magnesium tends to balance that out and keep the tone from becoming excessive enough that maybe you might get a tension-related headache. That happened to me when I introduced DMAE to the US health food market, DMAE is a demethylated choline and the blood brain barrier rejects normal choline because it's positively charged. Like you take the methyl group off and it's not charged anymore. It goes right through the blood brain barrier so you get this massive cholinergic effect that is sometimes ... It's very easy to blow it and take too much and that's ... I was cholinergically dominant at the time so I got a headache and a friend of mine actually pulled a muscle in his neck. He got so much tension on the side. He was working at this desk and somebody called his name and he went like this and he pulled the muscle on this side of his neck so we backed off.

Female: Okay, so if I want to fix my leaky gut, I've always thought of the protocols of food and nutrition, vitamins, minerals but now, I'm seeing this connection of stress reduction.

Steven Fowkes: Also, there's a difference between eating nutritious food and preparing nutrition, nutritional foods.

Female: Sure.

Steven Fowkes: The preparing part is a performance thing and you could have performance anxiety about it.

Female: No.

Steven Fowkes: It's like, "This is my career on the line, this is my professionalism on the line. This has to be perfect nutrition. It has to be exactly rightly cooked. It has to have the right flavors and the right spice balance." These are the customer's wishes, some of which are expressed and others that may not be expressed but you still have to meet their unexpressed condition so there could be some degree of conflict and lack of safety in that kind of environment. You might be able to think about it in a different way, you could do ... You could do constructive gargling while you're cooking, you could try humming and singing while you're cooking. You could do more ... Spend more time on the vibrating plate. Yeah?

Female: Okay, so this is called the Polyvagal ...

Steven Fowkes: The Polyvagal Theory.

Female: Theory. What ... Explain to me again what poly ...

Steven Fowkes: Poly means more than one.

Female: Yes.

Steven Fowkes: Normally, the vagal was considered to be a single system, the parasympathetic system is just one system. Now, it's recognized to be two different layers, one of which is very primitive and one of which is very new. It's only in mammals. That's just saying that this mammal derived myelinated vagus nerve which is evolutionarily new is ... It rules. I mean, it's a basis for our happiness and well-being, our healing, our longevity. Polyvagal ... It could ... It could be bivagal meaning two. Yeah, but polyvagal sounds better, doesn't it?

Female: Yes. Well, it just seems like I could be three steps forward and two steps back because I'm doing well with my ... The food intake and my diet and the vitamin A, the K2, magnesium. Then if I get into a stressful situation, a trauma, within three hours, my gut could be gone.

Steven Fowkes: Yeah. Acting up again.

Female: Acting up again, yeah.

Steven Fowkes: That's what HRV training, heart rate variability training does is it puts you into a state of familiarity and comfort with restoring parasympathetic tone. By learning and training yourself to be able to do that, you now can trust that you can do it on demand. Instead of it being an accident of your environment, it's now under your control. That's empowering.

Female: Just a quick comment, Steve I think we should do a ...

Female: [inaudible 00:50:56].

Female: I think we should do a one ... At least, a one week retreat so that we're stress free, eating well ...

Steven Fowkes: Gargling everyday.

Female: Gargling everyday.

Steven Fowkes: Vibrating too and doing shaking therapy on [inaudible 00:51:15] on the floor and bouncing up and down and dancing and ...

Male: [inaudible 00:51:22].

Steven Fowkes: Yeah, but it's also to be able to recreate it on demand so ecstatic dancing for example which is all about getting in touch with that inner spirit and creativity. It's all about that right brain stuff, play to it, play to it, emphasize it and once you go there, you know that you can always ... You can go there again and again and again once you prove that it has an effect on your blood pressure, it has an effect on your regularity and your bowel movements and the amount of food that you carry in your gut or the amount of body fat or water, hydration water, that you carry, oxygenation, any of those things. It's now under control instead of being out of control.

Male: Stomach cells are ...

Steven Fowkes: That's a perception of safety, the perception of efficacy, the perception of power.

Male: Stomach cells are usually the fastest as far as regeneration goes but it depends on the parasympathetic nervous system, the diet, et cetera as far as the ability to heal the gut, right?

Steven Fowkes: Yeah, so it turns out that a lack of peristalsis is a sign ... Is closely connected with gut permeability issues. If you just say, "Okay well, since I don't really have a easy way to know how my gut permeability is because it's just mitigating and inflammation and inflammation is affecting all these cytokines and I can't feel my cytokines but one can feel one's peristalsis, one can look at the effect of bowel transit time, you can use a stethoscope and listen to the sounds in your gut and

see if they're following some kind of a cycle and what kind of frequencies are involved and there are ways to play with it.

Female: Along those lines, ways to play with it, would you demonstrate something that we can take away with us? Gargling or something.

Steven Fowkes: Well, this is ... This is only stuff that I've been learning for the last two months so normally, it takes me about two years to integrate this so I can say that I have a certain level of understanding of what this theory is and I've got a few connections to things like, for example, neuroendocrine aging. I study that back in '84, '85 and wrote a book with one of the world's top scientist in neuroendocrine aging mechanisms and so because I have all that knowledge in this, I'm starting to make connections between them but as I learned this, over the next year, I'm going to have all these a-ha things that are going to be happening to me as I delve into it. I'm not in a position to really be comprehensively ...

Female: You can demonstrating some shaking or tapping or toning or gargling.

Steven Fowkes: Well, I can do tapping but that's ...

Female: What's happening?

Steven Fowkes: Tapping. The two pressure points that I learned when I was doing this was from a book by Robert Fried on respiratory physiology and he pointed out that you can do this and dramatically improve your parasympathetic tone. It's right on the suborbital ridge, you feel right where ... Below your eyes, straight below your pupil, there's a bone there and there's a kind of a ridge, you feel the edge of that bone and you just tap right on top of that. There's also a pressure point out here, one right there, one right there, there's a pressure point out on the edge there, there's a couple of them on the chest, there's on the top of the head. You can go on Youtube and see people demonstrate these kinds of things for you. Randy Hold teaches this every third or fourth Wednesday night at our place, he teaches this kind of thing.

He goes through all of this and teaches people how to do it and he will use it as a guide. He will say, for example, "Take your affirmation and go down into the process, find out where the dissonance is. Okay, you got a stomach issue, your stomach tightens up. Okay, what is that take you back to? What memory is connected to the stomach tightening of?" You go back to that point and you feel it and he's going, "Okay, now start tapping and think about tapping or something to add parasympathetic tone to detoxify the experience and then describe it, say what it is and then you can then reengineer, retrain it, reexperience it in a different capacity." Sometimes it's just a cognitive capacity.

You now have empathy or understanding of what your father or mother did, what their motivations were, that at the time when you experience it as a child,

it seemed totally arbitrary to you. There's a lot of stuff that I remember about that time so my perception of what was going on with my parents wasn't in any way honest. It was biased by a lack of familiarity with what was going on in my own naivety. I mean, before you have ... Before you're seven years of age, you don't have your adrenal system in the brain structures before you go through puberty, your understanding of how sex and arousal and stuff so you have to grow into that kind of knowledge. You can go back with your adult wisdom and relive a childhood experience and you can use tapping to keep yourself from becoming sympathetically activated.

That's one of the big things that happens with post-traumatic stress disorder where instead of having a situation spiral into calmness, it's spirals into sympathetic dominance. You're totally out of control, you had no parasympathetic tone and you're back in the war zone, the bombs are dropping again, your friend is dying from being shot or something like this and the trauma of that you need to ... You need to impose a parasympathetic environment on top of the sympathetic drive. Instead of it spiraling up, it spirals back down again. That way, you can relive it, you can recreate it, you can reframe the issue and regain your humanity.

Male: I was wondering, you have such a number of hats that you've worn with institutes, agencies, organizations, projects, et cetera. CERI, what ... Could you spell out for us briefly what the inspiration and interest was behind that really and what you could tell us about that currently as far as [inaudible 00:58:28] or elements that have to do with enhanced memory or intelligence or stuff like that.

Steven Fowkes: Yeah, I can talk about it at length. Right now, CERI is dormant. It's kind of idling. It's still there, the website is there, I still have the title of director but I ... We're not publishing anymore, I'm not actively doing anything with it other than seeking somebody to take all the back issues of the newsletters and PDFing them and putting them online for people to access. The inspiration of it was part of my biohacking experience when I was in college where I started studying neurotransmitters and what loading with certain precursors would do for me and then, when I graduated to being professional hacker in a sense, I started experimenting with drugs like Deponal, for example, which I still take to this day.

That augments my dopaminergic nervous system which is connected to the parasympathetic system even though it's activating and it's driving and so it probably has much more of a sympathetic tone. If there's a reward system that's dopamine driven, it's connected to the parasympathetic system. They can get rewired or miswired, that's a better way to say it, in people who have addictive behaviors, alcoholism, gambling addictions, buying ... Going on buying sprees, those kinds of things can connect the parasympathetic system to an addictive mechanism that puts people into a loop that's fairly destructive.

Male: That could lead to ... I mean, exploring that from your standpoint, could be pretty constructive as far as a sort of mitigating some forms of negative purchasing loops that varies people in our and other societies and cultures get into so I mean ...

Steven Fowkes: Yeah, there's a certain level of estrangement that happens ...

Male: That would be useful for many.

Steven Fowkes: When you're riding the edge of a technology. There's a certain estrangement that happens because you know things that other people don't know. If I were just to walk in to an average group of people and talk about some of what I'm talking about here tonight, some of them will go over like a lead balloon. I did this at Google, I gave a talk on what can I do about grandma. It's about reversing Alzheimer's Disease and during that talk, I talked about the inflammatory effect of foods and I mentioned particularly milk and wheat. How many people in this room understand that milk and wheat are inflammatory? Well, in that Google audience, it was like 5%, 3%. People went nonlinear hearing that milk might be bad and that wheat might be bad.

Male: [inaudible 01:01:35].

Steven Fowkes: Yeah, that's right. It's not a safe environment to raise your hand.

Male: [inaudible 01:01:52].

Male: We are going to open up the floor, Vern has to go pretty quick. If you have any questions for Vern or Steve ...

Steven Fowkes: [crosstalk 01:02:02] open it up to any question you have anywhere, I'm willing to go anywhere you want me to go. I think we've done a good job of kind of introducing this subject.

Male: The last questions has got me thinking about something that I heard that really fascinated me and I think the name of the drug is Ibogaine and it's illegal here but it's legal in Mexico and Canada and so there's a whole therapy now and a friend of mine went down to Mexico and apparently what it does is it configures itself as whatever is the addictive key, like the extra receptors on the cell are key to whatever the person's peptide addiction is whether it's eating or whatever and ...

Steven Fowkes: Yeah, I've heard of it but I can't talk about it. Can you?

Male: No, not much either. It's ... You got to be careful with a lot of these things. Again, ...

Steven Fowkes: I think it's pronounced Ibogaine, right?

Male: Ibogaine? Yeah, apparently it like deprograms or does like a reset of the whole addictive nervous system and then the addiction is just gone.

Male: They've been doing with ... Someone had just e-mailed me something very interesting with addiction and they were e-mailing me that NAD IV within a certain period of time got rid of all types of addiction and there's a doctor in Southern California who is very famous in doing that and I don't know anybody up here in the Bay area so I couldn't really help them out but he sent somebody with a highly addictive issue, alcohol and drug and they did the NAD IV and it worked amazingly well.

Steven Fowkes: Also, Ribisi did that back in 1950 with a lipid selenium derivative with people addicted to heroin and he would give them an injection and it was one gram of elemental magnesium which is enough to kill a hundred people if it's in a different form and these people would tolerate it well and they would lose their addiction for three weeks. Unfortunately, across the river, they were developing ... What's the heroin ... ? Methadone.

Male: Methadone, yeah.

Steven Fowkes: Yeah, methadone and that had political connections so he kind of got creamed politically because of that but that was a very, very powerful way of modifying addiction. What was ... You also mentioned about ... There was another example I was trying ... I wanted to talk about but it's blown the coop so anybody else? We're early.

Male: Yeah. That works anyway.

Steven Fowkes: Good job.

Male: Yeah, let's give Steve and Vern a hand. Thank you. Thank you, Steve. Thank you, Vern.