The Brain in Trauma and PTSD

David VanNuys Ph.D. interviews Robert Scaer M.D.

David: My guest today is neurologist Dr. Robert Scaer and we'll be discussing his new book, "Eight Keys to Brain Body Balance." Robert Scaer MD received his BA in psychology and his MD degree at the University of Rochester. He is board certified in neurology, and has been in practice for 36 years, 20 of those as medical director of rehabilitation services at the Mapleton Center in Boulder, Colorado.

His primary areas of interest and expertise have been in the fields of traumatic brain injury and chronic pain and more recently in the study of traumatic stress and its role in physical and emotional symptoms and diseases.

He has lectured extensively on these topics and has published several articles on post-traumatic stress disorder, dissociation, the whiplash syndrome, and other somatic syndromes of traumatic stress.

He's published 3 books, the first, "The Body Bears the Burden: Trauma, Dissociation, and Disease," presenting a new theory of dissociation and its role in many diseases. A second edition of this book was released in October 2007. A second book, "The Trauma Spectrum: Hidden Wounds and Human Resiliency" addresses the broad and relatively unappreciated spectrum of cultural and societal trauma that shapes every aspect of our lives. A third book, "Eight Keys to the Brain Body Balance" released in October 2012 is geared to a lay audience providing a practical understanding of the physiology of the brain body interface and its role in healing stress and trauma.

He's currently retired from clinical medical practice and continues to pursue a career in writing and lecturing in the field of traumatology. Now here's the interview.

Dr. Robert Scaer, welcome to Shrink Rap Radio.

Dr. Scaer: Thank you David, I appreciate the opportunity.

David: Well, it's great to have you on the show and you are a neurologist, and first of all I have to comment on the fact that you're last name is Scaer.

Dr. Scaer: Right.

David: That sounds like it would have been a handicap.

Dr. Scaer: It caused a lot of laughter.

David: Yeah, I can imagine.

Dr. Scaer: You don't scare me. My nickname was, "Scarecrow" when I was a kid. Yeah, it's been more humorous than a burden.

David: I've always been amazed by, and I think others have noticed this, the weird, sometimes, correspondence between a person's name and their profession. For example I had a dentist named Dr. Bridges, that's just one example that comes to mind, and Dr. Scaer, certainly I'm going to add that to my list. Thank goodness you weren't a dentist though.

Dr. Scaer: Well I know some Dr. Pain's who are dentists.

David: Okay, well what made you decide to become a neurologist?

Dr. Scaer: I had a mentor during my internship who was a British neurologist from what's called Queens Square, which is one of the top neurology study places, it's in London actually. He was extremely delightful, charismatic, and brilliant. I'm a little bit of an egghead and a nerd, I've been one all my life, and I was fascinated by the way that he used the physical examination to figure out where the problem was in the brain.

He did it brilliantly with very clever tools and I had this wonderful experience. In three months I was on neurology rotation and I signed up for the residency.

David: Well you can't discount the power of the charismatic teacher, that person who brings something alive, and I think so many of us changed our major or made some major commitment as a result of an inspiring teacher.

Dr. Scaer: This was directly resulting from that, no question about it.

David: Yeah, now in your preface I was intrigued to notice that you say you've been influenced by your neighbor, Peter Levine. He's done a lot of work on trauma and I recently interviewed Maggie Phillips. Do you know her as well?

Dr. Scaer: Oh, extremely well. I've done two radio workshops with her. A two day workshop and a meeting, so yeah, I know Maggie very well.

David: Oh, that's great. Well I interviewed her here recently so it's a small world. I'm going to be asking you a lot of questions about trauma so don't shoot the whole wad right here, but what can you tell us about in general about his influence on your work?

Dr. Scaer: Well, I'll tell you the brief history of my hearing of him, meeting him, and then having him treat some of my staff in a demonstration, and then having him demonstrate his work with me. I was a medical director of a rehabilitation center for 20 years called The Mapleton Center in Boulder.

I dealt with a lot of patients with early disabilities, with injuries, strokes, and disabling events in their lives. I particularly saw dozens and dozens of auto accident victims with what's called "whiplash syndrome," because we had a brain injury program and a chronic pain program, both of which I directed for portions of that 20 years.

I'd probably see 2 to 3 new auto accident victims a week, and it was a very strange problem. The medical field looks at whiplash with askance ...it doesn't make sense to them, and of course it doesn't seeing the model that they use. They all have the same symptoms which suggested that something was the same about the injury and the experience.

A lot of them were depressed and a lot of them had post-traumatic stress disorder. In 1997, I believe, one of my therapists in the program gave me an article by Levine and I read it and I thought, "My God, he's describing all these whiplash victims."

David: Interesting.

Dr. Scaer: He's describing me in parts of my life because this problem was pretty ubiquitous. I invited him to give a little demonstration, morning lecture and demo with some of my therapists, which he did and two of them had chronic persistent pain from an injury, one from back surgery and one from dislocated shoulder.

He did his little thing with them which was so subtle I really couldn't figure out what he was doing, but he had them do some body tracking and imagery and stuff like that. They came out of it feeling a little better and over the next few days, both of them, the pain was mostly gone. I sent some patients to him and several of my chronic patients came back from 2 or 3 sessions with him and said, "I don't know what that guy does, but my pain is gone! My brain injury is gone!"

I called Levine and I said, "Peter, show me what you do." I went down about 10 miles from Boulder and he did this session with me, it was about 2 hours long. It involved subtle things, observations of me on a balance board, having me scan body sensations, it was very subtle.

At one point he had me lie down and he had his hand under my left shoulder. Of course what he'd been doing was looking at what my body was doing when I was

standing on this balance beam because he could see parts of my body that weren't in-sync. Very interesting, and so I lay there as he guided me and pretty soon I started to feel my left forehead twitch and a little tingling sensation around my left eye.

Then my face started contorting, pretty soon my body curled up into this contorted posture on my left side and I felt three things. 1. I'm not doing this, my brain's doing it. It's not my intention. This is something that medical science doesn't know anything about it, whatever this is. My God, it's from my old eye injury at age 4." My body went into a self-protection movement that it had done 60 years before when I lost my left eye in an accident.

It curled up into the self-protective pattern. I realized, "My God, this is what I did when I was a child." I never remembered the movement but the movement was there for 60 years. Afterwards I sweated and I had an autonomic response, I was freezing and I was sweating and it was quite quite bizarre.

I went home that night, I slept for about 9 hours, the next day I got up and over the next few days I noted that the little tic that I had in the left side of my face and eye had disappeared. I had a tic all my life.

David: Yeah, wow.

Dr. Scaer: Eye clenching tic, so the tic disappeared. And this was an epiphany.

David: I would say so, yeah.

Dr. Scaer: No other doctor knew. I thought also it was like what I was familiar with conversion hysteria, which is a psychosomatic pattern of movement that neurologists are very familiar with because I've saw dozens of hysteric patients. Well, I thought that this was conversion hysteria. I had not had any of this before, but it's the same phenomenon.

I started to read. I read his books. I read everything he wrote. I got a book by Bessel van der Kolk about trauma. It was the best known book on trauma back in the 90s, and I read the whole thing and I began to realize that whiplash was an experience, not a physical injury. These patients like me had stored the movement patterns of that accident in their unconscious memory, and somehow it got stuck there and all of their symptoms reflected all of these sensations and movement patterns that occurred in the accident.

David: Now that's interesting because this goes at least as far back as Wilhelm Reich, who asserted that emotional issues were locked in our body.

Dr. Scaer: Oh yeah of course, he was absolutely right.

David: Yeah.

Dr. Scaer: Absolutely right.

David: What a dramatic story. PTSD is a theme that pretty much runs throughout the book and I think I understand why now just based on the story that you shared so I'll be asking you a lot of specific questions as we go along.

Dr. Scaer: Since you said PTSD let me just clarify what I think about that. I may have mentioned PTSD once or twice. PTSD is the tip of the iceberg, it's what we see. But beneath it is this incredibly complex structure of the trauma and PTSD is only a tiny portion of the complex, which explains all of these body sensations and body phenomenology, which aren't included in diagnosis of PTSD.

Anyway, go ahead with your question.

David: Well actually that sparks a different, I don't know if it's a question or an observation, I was recently at a conference, an International Association for the Study of Dreams conference and somebody got up and made a comment or asked a question and I wish I knew who he was but he was so authoritative in what he said from the audience that I suspect he really knew what he was talking about.

He made the observation that nobody has come up with a long term solution for PTSD. Now I interview so many people who claim to have come up with a solution for PTSD and so those two are kind of fighting in my mind.

Dr. Scaer: Well I think there are solutions, but no complete cures. The trouble is that PTSD is based on the retention in unconscious memory, procedural memory, of all of the events essentially and motor events of any trauma, and they keep coming back and coming back with cues in the environment that relate to the experience, like a rape or an auto accident or whatever or warfare.

Everything keeps recurring over and over again because it's a process stored in memory, and it's stored there by classical conditioning, just like a dog salivating at a bell when a bell is rung with feeding, this is classical conditioning. They call it fear conditioning. If one uses techniques that involve extinction, in other words exposing them to the cue in the absence of threat, gradually all these elements will be extinguished.

I think the trouble with therapy for PTSD is that it's been done, exposure, cognitive behavioral, all of these is they don't include extinguishing the body memories for instance that cause whiplash syndrome.

David: Well I would think the CBT would do just that, that they would have the person be in a state of deep relaxation, imagine a whiplash situation and sort of keep doing successive approximations of that experience until they can mentally review without arousal.

Dr. Scaer: Ah, but I didn't mentally review my situation. It was an unconscious body response. That extinguished all those procedural memories for what my body tried to do unsuccessfully to protect me, and I think that's the critical issue in trauma is incorporating the somatic manifestations, experiences, sensations, and movement patterns that accompanied the trauma.

Cognitive, behavioral, and those other intention therapies tend not to do that. What Levine writes about in his books of course, is extinguishing the body memories through completion of the event, in other words replication of the act of self-defense in a safe setting, which is what I did.

I went on to have about 4 of these sessions of somatic experiencing, which got rid of all the cricks in my neck, all of this stuff that I always took for granted as being part of me. They weren't, they were part of this event but it required my body going through that pattern to do it. That's not part of cognitive behavioral therapy.

As a result Levine is not well respected in the psychiatry community. Because it's alien, it's totally alien to the concepts that psychologists and psychiatrists are taught. It's a neurophysiological phenomenon, so I approach this from the brain solely. Not from the psyche or anything like that. I approach this as a neurologist, and that's the difference.

David: The brain of course is a very complex topic. Who did you have in mind when you wrote your book, "8 Keys to Brain Body Balance?"

Dr. Scaer: This is a book specifically written for the intelligent lay audience. People who are interested in how the brain works, people who have suffered stress and trauma, and they're two different things, and the diseases or syndromes of them. I give them a primer manual on how the brain works in some detail but in simplified language.

Then I correlate it with the effects of native life experience, stress and trauma, how that changes the things that I've educated them about and then how that

provides a substrate for healing through the body-based therapies that I write about at the end of the book.

David: Yeah, now did you in fact yourself become an administrator of this, or a practitioner of this kind of therapy?

Dr. Scaer: No, because in those days I was directing a rehab center. I didn't have time to be a therapist. I was a psychology major in college, but I don't have a psychotherapy training. I eventually, every time one of these techniques came out like Peter Levine's, "Somatic Experiencing" and EMDR and all of these, I studied those and I tried to figure the brain model that explained how and why they worked.

David: Yeah, so that was one of the things that struck me too is that you mentioned EMDR and I think EFT? Emotional Freedom Techniques, some of the tapping techniques, and I think you were initially were skeptical, I know I was initially skeptical of...I know that EMDR actually has been subjected to quite a bit of research and you were able to kind of pause it at least some ideas about how the brain might be functioning to allow those to be effective.

Dr. Scaer: I gradually assimilated the facts that led to that because I obviously read voraciously. Anytime you write a book you read 50 books. It educates you wonderfully. I picked up everybody's ideas about this and then I began to put it together and part of it, and I have to confess, came from a Shamanic journey that I did because I think the Shaman are the healers in a tribe and they incorporate somatic techniques to heal trauma.

That's what the rituals of Shamanism are, and I analyzed what the Shamanic content of behavior was, and it was very much like many of these techniques that have arisen serendipitously, like Francine Shapiro's experience with the birds, figuring out when she moved her eyes quickly, it de-tuned her arousal system.

I really kind of came realize that so many of these things that are done for healing through ages had to do with extinguishing through the memories of a traumatic event.

David: That's fascinating and I totally agree with you about the importance of understanding something about Shamanic approaches, that we don't just dismiss those as some kind of primitive pre-medical stuff.

Where did you get exposed to that? I'm just curious.

Dr. Scaer: Well one of my therapists at the Mapleton Center was resilient and I actually introduced her to somatic experiencing and she spent time with Levine, learned

it, became a practitioner. She was an occupational therapist who worked with kids with attention disorder and autism in the pediatric program in my rehab center.

We subsequently have gone on to put together a series of workshops, three day workshops, we traveled all over the world giving these workshops, emphasizing some of the things from OT background having to do with what's called, "sensory processing disorder" which is a childhood syndrome which extends into adulthood which is post traumatic. It's related to early early pre-verbal trauma.

She invited me to visit the Shaman that she worked with actually in Brazil and a bunch of us went down there and spent 10 days in this Shamanic Journey.

David: Okay, well I have to applaud you for having a very open mind. I think more so than is often attributed to MDs.

Dr. Scaer: Well, I've always been a bit of a rebel but I've also had this insatiable curiosity.

David: That's a great trait to have. Now let's see here, the book is called, "8 Keys," so maybe you can just kind of quickly just give us the quick outline and not even go into them but just tell us what the 8 keys are, and then we'll dig deeper into some of them.

Dr. Scaer: The 8 keys series is that, it's a way of containing a book into a specific structure for lay people of issues related to psychology and psychopathology. I basically fitted my topics and 8 keys based on the education I wanted to give regarding the brain, and then it's application to stress and trauma.

The first key was the brain and body message systems, how the brain and body communicate with each other. Then organizing sensations and movement, which are the things one perceives and the things that one does with the message system. Then I talk about the autonomic nervous system, which is very critical to trauma, because trauma is a cyclical dysregulation of the autonomic nervous system to a great extent, that is the vegetative unconscious system that runs our body. I talk about the emotional brain, our limbic system because that's the part of the brain that processes trauma. It is how we manage emotions. Then I talk about brain plasticity, because the brain changes for better or for worse based on information, and there's tremendous amount of new interest and research in the fact that the brain is changing physically and chemically and electrically with our experiences.

That has specifically to do with how trauma evolves. Then I talk about the brain in stress and drug trauma, and the effects of that on the body and that's Key 7. Then Key 8 is how to heal the wounded brain and body.

David: The first 4 Keys or chapters set up a lot of the background in terms of brain function and control, but let's skip over those here and drill down a bit on the last 4 chapters, would that be okay?

Dr. Scaer: Yeah, it all leads up to that.

David: In chapter 5 you mention that you were taught 40 years ago or so in medical school that the brains allotment of neurons is fixed at birth and I think I was taught the same thing in physiological psychology in about the same time frame.

You say that story has changed?

Dr. Scaer: It's changed dramatically over the past I'd say 20 or 30 years, it started back in the 70s and 80s, but it's changed dramatically in recent years and now you'll see articles in Science and New York Times about brain plasticity frequently, it's a very appealing subject. It's a very exciting subject from the standpoint of what we can do about things regarding our brain, including damage like strokes and that sort of thing.

David: One of the things that intrigued me is that, in fact we have heard a lot about the plasticity of the brain lately, for example, in terms of the ability to recover from brain injuries and strokes and so on. We've kind of come to look at plasticity as a positive thing, but you say plasticity can be for better or worse, how so?

Dr. Scaer: Trauma, which is basically a life threat in the face of helplessness, that's my definition of trauma, trauma freezes the person in that moment in parts of the brain that perceive what went on. All of the sensory organs, the perceived movement patters, all of the actual contractions of muscles for self-protection, all of that stuff is stored in its exact replicable form in a way that it changes the brain. That's for life.

The untreated trauma victim will always have problems regarding those functions which are locked into our memory and if you looked at brain maps, you can do that now with functional or MRI's and magnetic encephalography, you will see that parts of the brain have shrunken and parts have expanded and parts have increased blood flow and parts have decreased blood flow related to these memories, literally, memories have changed the structure of the brain.

David: Okay, there's a kind of new mantra about the brain that I encountered in your book and it's one I've heard elsewhere namely that, "Neurons that fire together wire together." How does that play with what you were just saying?

Dr. Scaer: This is a way of operating in it, it's not necessarily the things that make it happen that way. But if you are exposed to information or you're trying to learn this skill,

it will activate certain parts of the brain. And then it will begin to spread to other adjacent parts of the brain that have similar but a little bit of different functions.

Then what you'll see is part of the brain will enlarge, primarily because new synapses are being formed and new and dendrites are being formed, new connections are being formed between cells in the brain. The white matter will expand, the connective tissue in the brain is white matter.

Actually neurons will replicate and grow. So if for instance you perform complex memory games the hippocampus, the part of the brain that stores memory, will enlarge. Actually physically enlarge in size, the number of neurons, the number of connections.

David: I was really struke by that and was interested to read that the hippocampus is particularly susceptible to plasticity, which was what you just said, and somehow that's related to dreaming, a topic I'm very interested in. So what do you think about that connections with dreams?

Dr. Scaer: Well dreams you rest, restore your energy somehow, it's kind of a generic term, but in fact dreams are inevitable and critical. There are about 7 cycles of rapid eye movement or dream sleep per night, each one getting closer and closer until you're awake.

During those dreams what's happening is the brain is consolidating the memory information stored in the hippocampus from that day's experiences that have emotional content, in other words those that are positive emotions or threat or stress, and the brain will then integrate that information into its storehouse of learned information for future use because it has survival implications.

So this is how we've learned to survive, is storing the days lessons in our brains through dream sleep, and of course if the messages are like old messages, you'll have something that's familiar from your past all tied up in a crazy illogical way with something that's happened that day, but it's doing that in order to incorporate whatever the brain had to learn to survive into our bank of survival memory.

David: Now you say a good night's sleep is essential for effective memory consolidation. What does that say about the tendency of students to pull all-nighters, cramming for a test the next day?

Dr. Scaer: It's the most counter-intuitive thing you can do. You'll hold that information very briefly, you won't store it very long because as you go through your night sleeping, the dreams come faster and faster so that later portions of your sleep

are when the storage is really cemented. What you're doing is depriving your brain of that capacity to store all that critical information you're trying to learn.

David: Well luckily I was never hardy enough to pull an all-nighter. I just couldn't stay up and I just thought, to me my sleep felt more important, although I had no theoretical structure to base that on.

Dr. Scaer: Right, I was the same way. I was a nerd anyway so I knew how to study, but I must have realized instinctively if I didn't sleep, the way I felt the next day was counteractive with regards to learning anything.

David: Talk to us a bit, if you will, about genetics, epigenetics, and trauma.

Dr. Scaer: Epigenetics is very complex. The epigenome was discovered quite some years ago, maybe in the 80s, and the epigenome, I always thought it was a structure, but it's not. It is a system at the tip of a gene which responds to things that happen in the environment and it is shaped by experience, and then it will have the potential to switch on or off the gene that it is influencing.

That introduces a whole concept of genetics in that genetics aren't just a life sentence, but that life sentence has a proclivity perhaps, but it's also based on any negative experiences or positive ones that may switch on certain genes or switch off other genes.

David: What about our thoughts and attitudes? Might those also be releasing or suppressing factors in terms of this epigenetic?

Dr. Scaer: Yeah, well thoughts and attitudes, they occur in response to environmental stimuli. Environmental stimuli will create our thoughts and our thoughts will change our epigenomes. Most specifically, if these are negative events they will change the genomes on genes that control our emotional brain, including the genomes that affect autism and the autism spectrum, probably schizophrenia.

In other words the major so-called genetic mental illnesses, bipolar disorder... are probably susceptible to being switched on or off by negative life experience in early life and infancy. That of course shakes up the whole idea of, for instance, the epidemic of autism that we're experiencing in this country. Is this an epidemic of autism related to something that's switching on genes? What would it be? Well, it would be negative life experience.

In other words negative experience during early childhood. So when you have an epidemic of this sort, of a gene related mental disorder you need to look at the culture and see if something in the culture is causing this switching on in the epigenome for this gene disorder.

David: Well that's an interesting thought. I don't know where it takes you, the first place my mind goes when I hear that is to think that kids probably don't get nearly as much face time with parents as they used to. Maybe this comes along later, but kids can't go out and play anymore in the neighborhood like they used to. Those are a couple of things that come to my mind. What do you think of when you think of how is the environment different that we would have an upsurge of these kinds of problems?

Dr. Scaer: I came across Allan Schore's work very early on. I met him as I was just getting into this. Allan Schore has written 3 books on early infant attunement and bonding. This goes back to work by Bowdly in the 1980s and 90s on maternal infant bonding.

Schore presents a neurophysiological structure for this. What parts of the brain are operating in the process with a mother and an infant connecting, and what are the implications for the connection being never made adequately? He quotes evidence that the part of the brain that controls and modulates our emotions, it's called the orbital frontal cortex on the right side, grows in the face of attunement and shrinks in the face of mal-attunement or impaired connection between a mother and infant.

His premise is, and there's a huge volume of literature on this now, is that in the infant who is not attuned, they are subjected to a life of disregulation of their autonomic nervous system and their emotional brain. Could that be the switch, the epigenetic switch, that's causing our social epidemic? If so we need to look at what we're doing in the first month or two of life.

What's happening? Well, what we have is daycare and a 40% C-section rate, which renders the mother impaired as far as her attunement capacity because C-sections are very painful, the recovery is difficult, like any major surgery. Anyway, this is speculation. This is kind of a social speculation. but there are people and I'm not the only one saying this, who think that this may be a cultural phenomenon that is creating this dilemma.

David: That's fascinating and it's very exciting that these relationships that we're beginning to understand in so much more depth, particularly the relationships between what's going on in the brain and how that interacts with culture and with other aspects of our lives.

I was really interested in a phenomenon that you reported, I guess somebody else's study, among Holocaust survivors, that you say suggests that traumatic memories might actually be passed along in the genes. I've never heard that.

Dr. Scaer: There are a variety of ways to interpret the statistics, but the Holocaust studies now are three generations old. There is no question, there is a dramatic incidence of PTSD, but also the personality disorders and diseases, physical diseases, that are related to early life trauma.

Now is this due to the fact that the genes that control this are epigenetically changed by the horrible experience of the mother which is then passed on to the children?

David: You're talking about the children and the grandchildren of...

Dr. Scaer: And the grandchildren.

David: ...Holocaust survivors.

Dr. Scaer: Yes. Now it could indeed their patterns of behavior have changed by virtue of the trauma that the mother has experienced, that she is unable to bond because of the effect on her brain of the terrible trauma she's had?

Or is it transcripting genes that have to do with character and personality development, which a lot of people feel is more based on experience than just the genes themselves. That's an incredibly complex issue and one that's very sensitive as well, I think from the standpoint of blame, because we're not talking about blaming this, we're talking about inevitability.

David: I couldn't help, reading about, I couldn't help wondering if this might add some credibility to Carl Jung's theory of the collective unconscious stemming from genetic memory.

Dr. Scaer: I think it could well. I talk about some of that where even in the Swedish studies, the grandfather having lived in deprivation and starving resulted in increased heart disease in his grandsons, which the studies showed.

This is so complex blending the effects of genetic transcription with the effects of behavioral availability. In other words the ability to bond and I talk about that with the social engagement system, Stephen Porges, another topic which I address.

David: I got to interview him too by the way.

Dr. Scaer: Yeah his work, "Polyvagal Theory" is like Schore. It's groundbreaking.

David: Let's move on to chapter 6, I don't know if we'll make it all the way through on the brain and stress and trauma, and one of the things you talk about there is

stress versus trauma. You say those are two different states and two different responses.

Dr. Scaer: They co-exist and one being morphed into the other. Stress is basically the response of the autonomic and the endocrine systems to threat. That is when there is a threat, which can either be stress or life threatening, it activates the sympathetic nervous system through the hypothalamus and then through the endocrine system, the pituitary, and the pituitary system regulates the release of cortisol by the adrenal cortex.

Everybody knows about cortisol is the stress hormone these days, and cortisol prepares the person or the animal for prolonged threat, how to deal with a prolonged that's not life threatening in the moment where you have to go fight and flight, but you are in danger, prolonged danger.

That requires you to gear up your systems that provide energy resources especially glucose and so your cholesterol goes up, your blood sugar goes up, your blood pressure goes up because you retain water because you want to keep your blood volume high in case you lose blood. It does all these things that allow you to manage the danger in the short term, but if you're stuck with high cortisol for a long time you get complications of all these adaptive measures.

David: Yeah, because it's chronic. Right? It makes chronic changes to the brain.

Dr. Scaer: Well chronic changes to the brain, yeah. Actually it shrinks the hippocampus. Cortisol is toxic to the hippocampus and so you get cognitive problems and emotional problems, but you can get hypertension, diabetes, heart disease, atherosclerosis, because of the effects on the body's systems of high levels of glucose, high levels of cortisol and increased blood volume. It's very hard on you.

David: Yeah, what do you think about meditation as an antidote for that?

Dr. Scaer: I think meditation is an antidote to all of these things because what meditation is turning off...it's turning off the monkey brain. It's turning off the issues in your life that haven't been resolved and that involve negative implications which is the definition of stress. All these little things that go over and over and over and over in our minds at times when we can't turn them off, they imply something dangerous is going on, a threat.

If one can clear the mind, and the techniques mainly involve breath work, if you can calm the mind through breath work, you will shut down that part of the brain that causes this chronic low-level arousal. It's very hard to do and I've developed a meditation practice and I've been doing it about 5 years and still have to work at it.

It's very hard to do because in these ruminations that we call it, always have to do with a conflict that we haven't resolved, which means they're just about to be trauma, threat in the face of helplessness, and so they're hard on the body too. With the breath work you incorporate the, Porges's ventral vagal, the part of the vagus nerve that promotes homeostasis. Breath work helps you to modulate the stress response. Conscious breath work will bring down the arousal system and produce a period of homeostasis.

So you're healing not only the body but the brain through that period of time when you are in that state of presence and breath awareness.

David: Wow that of course makes me marvel that in yoga, they have this pranayama practice that's probably a thousand or more years old.

Dr. Scaer: Oh yeah, well the ancients knew a lot. They didn't have all the science, but they had the logic and they had the experience and they recognized things for what they were. It's like Shamanism, there's a lot of truth in these practices that is ancient, arrived at through trial and error over thousands of years literally, and there's meaning to these things.

David: In this chapter, you talk about Peter Levine and the freeze response and the shaking that's become an important part of his approach. Maybe you could kind of say a little bit about that?

Dr. Scaer: That concept of the freeze response is the core of trauma, as far as I'm concerned. Trauma is an unresolved, undischarged, uncompleted freeze response and I have a polar bear video from National Geographic that I show. Showing the polar bear who has been shot by a dart immobilizing him so they can tag him to look at migration patterns, and as he comes out of the fog of the shot, he begins to shake and tremble all over and if you run it in slow motion he's running.

He's doing what my left side did when I was with Levine. He was completing the act of escape. He was replicating the motor patterns that were truncated or aborted by the injection of the sedative.

David: We talk about fight or flight, it sounds like there's a third possibility here which is neither fight nor flight, it's freeze.

Dr. Scaer: And freeze is just physiological, it protects the prey animal sometime because sometimes movement cues trigger the attack of a predator, but it also is an innate part of our physiological response to life threat. Coming out of it you need to go through whatever the action was that was aborted.

Like the bird who flies in the window fall from the deck. Then you say, "Oh he's concussed." No he froze, and then he stands up and he shivers and shakes all over just like he's flying. He completes the act of escape in his memory bank so it's no longer there to keep coming up and causing those muscle groups to try to protect him. Then he flies off restored.

That concept of mitigation and completion of the freeze response is Levine's greatest contribution to the whole idea of trauma.

David: Well maybe that leads us to chapter 8 on "Healing Your Wounded Brain and Body," is the title of that chapter or key. In the time that remains maybe you can take us through the highlights of just how we would go about healing our wounded brain and body.

Dr. Scaer: Well, the wounded body has to do with all of the medical syndromes that occur in people who have stored all this threat based memory in their unconscious brain that keeps coming up and throwing them into fight/flight. There are a whole bunch of diseases that have to do with both the freeze response and the fight/flight response.

The freeze response is a time when the gut is active. The soldier in the trench who empties his bowel and bladder in terror, he's in the freeze response which is densely parasympathetic and this reptilian nucleus, the dorsal vagal nerve, is the thing that determines the freeze response. It's a devastating place to be and it accounts for most of the syndromes that we call somatization disorders, the cultural diseases that we all seem to have. That's the irritable bowel syndrome, ulcerative colitis, gastroesophageal reflux disease, fibromyalgia, all these syndromes have to do with a sustained low grade freeze response.

A freeze is damn near dangerous to your health basically. What do you want do? Everything is still driven by these procedural memories, so what you want to do is extinguish them because the procedural memories are conditioned responses. How do we do that? We have to illicit or bring up the event that we want to extinguish, but if you do that, it throws right into fight/flight response.

What you want to do, and what drives a fight/flight response is the amygdala, which a lot of people refer to it as the arousal center in our emotional brain that allows us to evaluate information and then respond successfully by fight or flight. Or if necessary give up and go into a freeze.

Well the amygdala is what perpetuates trauma, all the cues that are stored in our unconscious body memory when you get an external cue and triggers them that arouses the amygdala. Then you go right back into the PTSD symptom, the

trauma symptom, the arousal, or again into another freeze, which we call dissociation.

Dissociation is what we call how we feel and how we behave during a freeze. We need to find a way of accessing the cues that are in our memory banks for trauma, while turning off the amygdala. Somehow switching it off.

David: That's a great place for us to wrap it up, there's so much more that we could talk about and I've really found this to be a fascinating conversation. Dr. Robert Scaer, I want to thank you for being my guest today on Shrink Rap Radio.

Dr. Scaer: It's been my pleasure David, thank you.