

Natural Stress Response: Cortisol and Adrenaline



Speaker 1: The information presented in this podcast is for educational purposes only and does not substitute for or replace professional medical advice, diagnosis, or treatment. You should always seek the advice of your physician or qualified health provider with any questions you may have regarding medical conditions or treatments before undertaking any new health care regimen, fitness, or nutrition program. Never disregard professional medical advice or delay seeking it because of something said in this podcast.

Speaker 2: You are listening to VALOR Voices, a production of the VALOR Officer Safety and Wellness Program. The VALOR Program is funded through grants from the Bureau of Justice Assistance (BJA), Office of Justice Programs, U.S. Department of Justice. The points of view and opinions expressed in this podcast are those of the podcast authors and do not necessarily represent the official positions or policies of the U.S. Department of Justice. Here's your host.

Steve P.: Hello, I'm Chief Steve Petrilli with the VALOR Program and host for this VALOR Voices podcast. I am currently the chief of police with the Normal, Illinois, Police Department and have over 24 years of experience in law enforcement, and I'm excited to be with you today. Today, I'm joined by our guest, Dr. Greg Huron. Greg, thank you very much for joining me today.

Greg H.: Oh, thanks for having me, Steve. It's great to be here.

Steve P.: Greg, could you take a moment and just give us a little bit of background about yourself, so the audience can get to know you a little more?

Greg H.: Thanks, Steve. I am a licensed chiropractor who's been practicing for over 30 years, and my practice covers everyone from children to everyday people, all the way up to high-end professional athletes. I've made it my goal and quest to constantly study how the body works naturally. I am really excited to be here and share some of that information and have a great discussion with you as how it relates to officers.

Steve P.: That's excellent, Greg. I appreciate that intro, and that's exactly what we're going to do today is, we're going to dig a little bit deeper on maybe some little known knowledge as it relates to physical health, hormonal health, and things like that that are very important to the health and wellness of our officers that are working the street. Greg, I want to kick it off with a question that I'm going to pull from my knowledge and experience of being in the field for a little while. Like I said in the intro, I am currently the chief of police, but I've been in law enforcement for over 24 years.

One thing that I've noticed over the course of my career, from the time that I was hired through all of my experiences in law enforcement, is that we generally bring officers into the job in good general physical and mental health. But then what we tend to see over the course of time, and I've seen this repeated over and over again, is we tend to take these healthy individuals that walk into this career field, we tend to subject them to 20, 30 years of trauma based on the experiences that they all go through, through the course of this career, with little to no guidance on how to navigate that.

Greg, could you speak to that a little bit on what working in a high-stress environment with varying sleep cycles and some of the traumatic things that they deal with on a daily basis? What are some experiences or some input that you could give us on that?

Greg H.: Well, Steve, let me just say thank you for your years of service. I mean, we can talk a lot about a lot of different hormones, but I'd

really like to focus in on two and one main one, which is cortisol, and adrenaline is the second.

It's just a fact that those hormones can be helpful to your body, and you need those as officers to get through your every day, but out of balance, which can happen very quickly, can create major, major health issues. I think you know these—you've seen these in your officers, and I think we can help uncover why some of that's happening, and maybe we can even get to some resolution or some great ideas for them to get through it.

Steve P.: That's great. When you talk about the stressors, the C word always comes to mind, right? Cortisol. Cortisol, I think, has taken on a lot of different personas, if you will, amongst the general population and officers in general as to what really is its role. A lot of times, cortisol gets really a negative connotation. Can you talk through maybe some of the negative connotations behind cortisol, the hormone cortisol, but then also maybe touch on what are some good things about cortisol and that stress hormone that we deal with?

Greg H.: Absolutely. One of the first things to understand about cortisol is that almost every single cell in your body has a receptor for cortisol. There's cortisol impacting almost every cell in your body. It's the largest hormone to do that. Some of the really negative impacts of too much cortisol in your body is increased weight gain, particularly in your face and your belly. As most of us know, weight gain in your belly, that type of fat is more unhealthy than any other type of fat on your body. It also causes more flushing and a rounder face. It causes increased blood pressure for some of the older folk. It increases osteoporosis.

Your skin has more bruising and purple stretch marks. Here's the big one, it increases muscle weakness. You think of it as this hormone that can help you battle a stressful situation, physical and emotional, but it causes muscle weakness over long term when it's negatively impacting. Here's the other big one—mood swings. It is responsible for a large amount of our anxiety and

depression. Finally, over extended chronic time of too much cortisol, it increases sex drive and increases thirst. Those are just some of the big things that step out the top of my head.

Steve P.: That's actually something—when you talk about the flushing of the face and weight gain and some of those things, when we have a chronic cortisol response, would you consider that an inflammatory response, doctor? Are the two related?

Greg H.: Yes, absolutely. That's a great question and let me lead back a little bit to some of what cortisol does do in a positive way, which is anti-inflammatory in a healthful amount. Cortisol is anti-inflammatory in your body.

I mean, some of us may have had an issue where we've had an acute injury to our knee, and we've gotten a cortisol shot. That's designed to shotgun effect and get the inflammation out of the body. But it also is supposed to help with metabolism, imbalance, memory formation, your water and salt balance, and your blood pressure.

Steve P.: I think that is imperative. The officers especially understand this. I think that you've done a good job of differentiating between the acute stressor responses as it relates to cortisol, and then, really sounds like when cortisol becomes the biggest issue is when we have these chronically elevated levels of cortisol that then lend to some of the other disease risks and things that you touched on there. Would that be accurate?

Greg H.: Absolutely. I think one of the interesting things about cortisol is, like we said, how helpful it is in balance. It's anti-inflammatory in balance, and then over chronic time of too much cortisol, it becomes pro-inflammatory. The cortisol is released in your body under normal healthy circumstances in little spurts throughout the day, and it's usually more in the morning and less as the evening or nighttime comes. You know, you've got a lot of officers on the overnight shift—maybe their bodies are flip flopped that way.

But for most people, it's released more in the morning, a little bit throughout the day, and dies down. But when you are under stress, cortisol gets on that hamster wheel and just keeps dumping out through the day. Your body thinks it's helping, but clearly it's not.

Steve P.: With cortisol, doctor—a couple follow-up questions because as we speak to the health and wellness of officers, and this is such a robust topic, the stress response in the body and the role that cortisol plays, but for many officers, one of the biggest issues that we deal, a disease risk is the phenomenon of insulin resistance. A lot of times with insulin resistance, we know that there can be dysregulated blood sugar in the body. Can you talk a little bit to—how does cortisol play into the insulin resistant spectrum and the glucose response in the body and what that cascade looks like on a very high level?

Greg H.: Yeah, absolutely. Let me back up and say this. When we have a stressful situation, here's how your body responds. It's got these two hormones that it creates in the same place, basically the same place, in your adrenal cortex, and it's your first response. This could be something exciting. It could be you're competing in an athletic event, but it's also when there's danger or a large amount of stress. Adrenaline is produced first. Adrenaline—think of as your 9-1-1, your emergency hormone, and adrenaline's job is to help your body get more glucose out of the bloodstream into mostly your muscle tissues where you need it to perform under those circumstances.

Shortly after that, your body dumps cortisol, which—its job is to create more glucose or keep more glucose in the bloodstream. It causes your liver to dump more glucose into your bloodstream. You've got one that throws the glucose into your muscles. You've got the other one dumping glucose out of your liver, and it also prevents it from going into other tissues, and—here's the big one—slows down everything else. I don't need digestion right now, so I'm going to slow down my digestive tract. That's a whole other myriad of health issues.

The long and the short of it, back to your original question, is when you have too much constant glucose in your bloodstream, which these hormones are creating under too much stress, it causes the insulin, which normally helps you process all that, your body to become more insulin resistant or your insulin is—I want to say it in simple terms. Your insulin is used up. Your insulin is no longer able to access, and it just creates another spiral, which leads in many cases to diabetes, among other health conditions.

Steve P.: Yeah, because we understand that what we want to really strive for on that health and wellness spectrum is to be more insulin sensitive. When the pancreas in the body is releasing insulin, that it's allowing that insulin to drive the sugars and things into the muscle cells, into the brain to be used as fuel and not to be chronically hanging out in the bloodstream raising those blood sugar levels, which can lead to a lot of chronic health conditions. We definitely understand that cortisol plays a role in that whole process, and I think that that's an interesting nexus between the two.

Greg H.: I was just going to say—you nailed it. Again, back to normal healthy conditions, that insulin is what helps your body process the sugar. And like you said, we've got to get it to other areas too. We've got to get it to the brain. We've got to get it to other things. I want to say your body gets worn out, and the insulin is no longer productive. It gets used up if you want to look at it that way. You no longer have enough insulin around, and your body's going, "Hey, I can't help you anymore with that," so you don't process the glucose, and the glucose hangs around even more.

Steve P.: Absolutely. Doctor, I want to shift gears here a little bit and give the audience some takeaways on—we know the inherent risks of law enforcement and the high-stress environment, a lot of times the poor sleep cycles based on shift work and things like that and how they accumulate. We've touched on the chronic elevated cortisol and some of the issues that can happen there. When we start talking to officers about building that resilience,

building that stress hardiness, how do we take some of the known factors of this profession and build a resilience or a stress hardiness?

Greg H.:

That's a great question, and a lot of them will sound familiar, and hopefully there'll be some new ones out there that I can help share. When I talked about that stressful situation, adrenaline gets dumped, then cortisol, the other thing cortisol is supposed to do is it signals your brain under stressful situations to lower the level of acute stress response. It's tough. I don't have to tell you it's tough in that stressful, traumatic situation to think clearly. But once you get that dump, once you get that cortisol dump, too much of it doesn't allow you to think clearly through that.

As the danger starts to lower, you're stuck in this loop of like, "I can't think as clearly as I'd like to." I mean, no one wants that. I just wanted to add that quickly. Starting out how to prevent or how to guard yourself for that, there's a lot of real simple basics. Time and time again, this is true in other areas of health, but particularly with cortisol, one is you need to, regardless of your shift or time, you need to really try to regulate what time you go to bed and what time you wake up. I know under emergency situations, that's a different story, but it's a huge piece to try to get the same bedtime, if possible.

There are other things. If you're working the normal day shift or your normal day person, really, really limit your caffeine after 2:00 to 3:00 p.m. That can really kick back and cause a bad cortisol response as well. I think the biggest thing, which we can talk more about, is looking at what foods you eat and drinks you have that are pro-inflammatory. You've already got too much cortisol. You're already having an inflammatory response in your body. How can you prevent that from getting worse? And on the flip side, what anti-inflammatory foods can you consume to help you balance that?

Steve P.:

I think those are all excellent points, and you did a great job of helping take the stress response that we're feeling—that chronic

stress response is the one that we're really honing in on, and then relating it back to some easy lifestyle things when we start talking about the quality of the foods that we consume, getting those normal sleep cycles, being cognizant of physical activity, which is where I want to go next. What could we do from a physical fitness standpoint from working out?

And that could range from the beginner with very little experience—is there any benefit to walking all the way up through weight training? Can you talk about how a little bit of any of those activities that you don't necessarily need to jump in and be doing a 500-pound back squat in a gym to see any type of benefits from this—it really can be something basic, right? Could you talk through that a little bit for us?

Greg H.: Absolutely. I think, Steve, you nailed it. It's about looking where you are today and moving forward. If you're not working out at all, get up out of your bed the next morning and do five jumping jacks. Can you commit to five jumping jacks or five push-ups every morning before you do anything else every day? After 30 days, it becomes a habit. Maybe you start to add a few more in, going for a walk. I don't care if it's five minutes. It's so important to improve from where you are. It will change your heart rate, your blood pressure. It'll change your mental aspect as well.

And likewise, if you are exercising, take a look and make sure you're getting a balance between strengthening, stretching, and your cardiovascular health. We've talked about how much cortisol affects blood pressure and heart rate. We want to have those dialed in. We want to have those as good as you can get. It's absolutely vital to start wherever you are today and keep moving forward.

Steve P.: I think that's great, because that's really what we're looking to do here, I think, is to capture all experience levels, age ranges. I mean, this is things that are applicable to just about any officer given no matter what amount of time they have on the job, no matter what their current state of physical fitness is. Really, the lesson and the message that I'm hearing from you is, "Hey,

anything that we do can help move the needle in the right direction as it relates to physical activity.”

Greg H.:

Absolutely. Steve, things like having a beer or a glass of wine at the end of the day is okay. The one is good. Two is not twice as good. It's some of those things in moderation, and that's a big one to watch. The other two, which to me are related, but meditation is a great thing. Meditation has been proven time and time again to help bring down that blood pressure, that heart rate, and balance the body—especially what we call your circadian rhythms, which cortisol is a big part of. We want to balance those rhythms out. Even in the acute short-term gets to my all-time favorite, which is your breathing.

Steve, you and I have talked about it a little bit. There's different types of breathing, but breathing can help you in an acute situation. It's your wheelhouse here, but knocking on the door to serve a warrant or something, before you make that knock, take ten seconds and work on some breathing, or in your downtime before you start your shift or come into work. I mean, breathing has also been researched time and time again to be so helpful in balancing all your body rhythms, but particularly cortisol.

Steve P.:

That's excellent. I think that that was exactly where I wanted to go with our next batch of takeaways, if you would, on what can our officers on the street—what are some of the methodologies that they can start to employ immediately, and you touched on breathing. Breathing is one that's so, a lot of times, not even really—we don't discuss it enough. It's something that's simple. It's accessible. It's free. With a little bit of knowledge, a lot of us could employ this with some very, very good results.

When we talk about breathing, and we have to discuss the central nervous system a little bit, can you talk about the difference, doctor, between being in a sympathetic nervous state and a parasympathetic nervous state and maybe how breathing is the nexus that gets us between both of those and the impacts that that has on cortisol?

Greg H.: Yeah, absolutely. For people to understand, sympathetic and parasympathetic and all those nervous system concepts are really great, but what we're dealing with is your body needs moments in life where you need to speed things up, and other times, it needs to speed things down. You just ate a meal 30 minutes ago—your body needs to speed up digestive juices being released and digesting your food. When you have a stressful situation, you need the other things we talked about.

Creating a balance in your sympathetic nervous system is vital. Breathing has been proven time and time again to create that balance. Again, it's like we talked about cortisol, too much is not good, not enough is not good. We want to have that happy medium. Breathing is absolutely one way to do that. There are some other ways to talk about breathing, and I'm sure we'll get to that, but real simple in the moment or more long term.

Steve P.: What I wanted to touch on even a little bit further with that is a lot of officers find themselves in that situation that you described there. Maybe you've been tasked with serving a warrant, or you're responding to one of those higher priority calls. For a lot of people, there's a lot of commonalities there. It's an officer needs assistance, or there's a violent crime in progress. As soon as we are dispatched to those calls right away, we feel those physiological changes in the body. The blood pressure goes up. Depending on the situation, sometimes that visual acuity can be a little bit skewed. Our auditory acuity can be a little bit distorted. That really is that sympathetic nervous response, right? It's kind of the fight, flight, or freeze. And then we don't want to be existing too long in that type of nervous state. How do we get back to a parasympathetic response in the body, which is essentially our body feels like we're, "Okay, we're going to be safe."

For the officer out there on the street that may be hearing this and going, "You know what, I can relate to that," do you have any type of simple breathing patterns? I know that there's several out there, from box breathing to different nasal

breathing, mouth breathing for different time frames. Can you maybe give our listeners some tips on—hey, what would be an easy cycle that if you find yourself in that sympathetic nervous response that you could revert to some breathing patterns that might help with that?

Greg H.:

Steve, when you're in a nonstressful situation or that stress situation has calmed down a bit, and you're free to use your hands, again, we can start with really the quickest one, which is what I call, or most people call nasal breathing. You basically take your thumb, and you close off one of your nostrils, and you breathe in through the other one that's open. You switch your finger to close that one off, and release the other one, and breathe out through that one. That's a real simple one and maybe not the most effective.

But in the moment when you have ten seconds, you can do a few of those, and that will already help to balance your system out, your breathing out. The one you refer to as though my favorite one is my go-to, which is the box breathing. In essence, just think of a box and think of four seconds. You're going to inhale through your nose for four seconds. You're going to hold for four seconds. You're going to exhale for four seconds, and then you're going to hold for four seconds again. Just think of it like a box and three or four rounds of that has been shown time and time again to really create that balance in your system.

Steve P.:

Absolutely. I think that box breathing is a very effective tool because that is something that it really is accessible to anybody, anywhere, anytime. It's a hands-free approach. It's just training yourself that, "Hey, when I feel myself fall into that sympathetic nervous state, what do I need to control at this point, outside of the situation at hand, if I can start balancing my breathing a little bit?" There's a lot of positive effects that come from that.

I think that this all really ties together nicely with what we've been talking about all day is essentially recognizing that stress response in the body, which is going to result with some elevated cortisol, that hormone cortisol, and then putting some

practical systems in place to balance that. We've talked through things as simple as—hey, you know what? We need to be cognizant of physical activity, whether that's resistance training, walking, getting some type of physical activity.

Also, being aware of the situations that we're in and maybe using some breathing patterns or some other type of realization through meditation or controlling our breathing to help us get out of that stressful state. I think everything that we've talked about in relation to that is accessible to people and really can be incorporated as part of a daily routine to help see some benefits.

Greg H.:

I agree. You hit another one, which we didn't go into too much detail. Like I said, you don't have to be an experienced yogi to know how to meditate. Because one of my favorite and go-to—I've taught it to my children over the years and working on my grandchildren now, but is a real simple meditation where you close your eyes, and you're going to breathe in and hold. And as you hold, on a chalkboard, you write the number ten with a piece of chalk. And then as you breathe out, you erase it. And then you go to nine, erase it—eight, seven, six, five, all the way down to one.

It's something I use when sometimes, I know we all go through this, you wake up in the middle of the night, and you're not even stressed, but your brain's awake. It's a great way to get back to that deeper quality sleep as well. I know we both agree meditation is great, and that's a real simple one I wanted to at least teach to everybody that they can implement right away.

Steve P.:

I think it's great, Greg. I can tell you that as our time gets close to closing here today, I want to thank you for all the knowledge, all the simple approaches to—hey, how can we put some simple systems in place to often mitigate a lot of these stressors that we may or may not necessarily be aware of? I want to thank you, and really, we appreciate you being with us today and appreciate your time and attention to such an important topic.

- Greg H.: Thanks, chief. I appreciate you and everything you do for our community, and I'm really honored to be here and help any of the officers I can.
- Steve P.: Great. For our listeners, thank you all for listening to this podcast. I encourage you to visit the VALOR website at www.valorforblue.org for more information about this topic and other topics related to officer safety, health, and wellness. Remember, it's never too late to make changes that impact your physical well-being. Until next time, stay safe, stay well, and be healthy. Thank you.
- Speaker 2: The VALOR Program is dedicated to delivering training, developing resources, and conducting research to improve the safety and wellness of law enforcement professionals across the country. For additional information regarding the VALOR Program, please visit valorforblue.org, download the app in the Apple or Google Play Store, or follow us on Facebook and Twitter. The Bureau of Justice Assistance (BJA) and the Office of Justice Programs, U.S. Department of Justice is committed to making our nation's communities safer through resources, developing programs, and providing grant funding opportunities to support state, local, and tribal criminal justice efforts. All are available at no cost. Please visit www.bja.gov to learn more.
- Speaker 3: This project was supported by grant number 2019-VIBX-K001 awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the U.S. Department of Justice's Office of Justice Programs, which also includes the Bureau of Justice Statistics; the National Institute of Justice; the Office of Juvenile Justice and Delinquency Prevention; the Office for Victims of Crime; and the Office of Sex Offender, Sentencing, Monitoring, Apprehending, Registering, and Tracking or SMART. Points of view or opinions are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice.