



## EVERYDAY IMMUNE RESILIENCE

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Hi, everyone. Today we're going to talk about focus and concentration. I'm going to spend the first 15, 20 minutes and give you some key concepts about the mechanisms of focus and concentration and some of the clinical causes for a person to have poor focus and concentration, and then some things you may be able to incorporate to improve that, if you're having some issues with that.

The first thing you really need to really make sure you understand is that focus is basically the ability to stay on track with a particular interest. So, when you're looking at a person that has, for example, lost their ability to focus, sometimes when you talk to them, they're all over the place, you have one topic and then they can't even remember what they were initially talking about. That's lack of focus. Focus could also be the inability to, let's say, emphasize your brain on one specific topic or one task like reading or doing a project, and then you just get distracted all the time. So, that's focus.

And concentration is really related to sustained focus, that you can do it over and over and over again. So, it's really related more to a brain endurance issue. In a clinical setting, when someone complains of focus and concentration, there's one thing we immediately know. The one thing we immediately know is that their brain, especially their frontal lobe, and specifically their frontal lobe, is not really doing its job.

By the way, thank you everyone who's joining in and it's such a pleasure to have you all join us. Thank you for saying hi.

But when you're looking at focus and concentration, these are letting us know that the frontal lobe isn't working well. Now, let's talk about what the frontal lobe does. The frontal lobe is right in front of the brain and there's different areas of the frontal lobe, like orbital frontal, and prefrontal, and frontal eye fields, and motor strips. We're not going to get into all of those basic concepts. But the very front of your brain, the prefrontal area, or just simply the frontal lobe, is really involved with what's called the executive function. And the executive function is planning, organizing, judgment, being able to reason, being able to figure something out. That's all involved with the frontal lobe.

Now, the frontal lobe is also involved with what's called working memory. So, as you're processing information, and you're hearing things, and you're really thinking about it, that's all called working memory. That's all frontal lobe. That's different than declarative memory. Declarative memory is your ability to recall a name, or an event, or some fact that you know. That really doesn't involve the frontal lobe as much, even though the frontal lobe is involved with that, it predominantly involves what's called the medial temporal lobe, and that's the key target area, for example, where dementia first starts to have an impact.

When we're looking at someone who is really struggling with the ability to stay on task, whether it's academic school work, whether it's sitting in class for a lecture, whether it's the ability to follow through a project or even just a conversation, then we know the frontal lobe is involved. When someone says that their concentration is an issue and their ability to concentrate is an issue, that's letting us know that they don't have the endurance. That something's impacting their brain's endurance to have sustained focus. From that, then we can work backwards.

The key thing to understand is that focus and concentration are specific to frontal lobe activity, and endurance in the frontal lobe is really critical for sustained focus, which is basically concentration. So, once you have that concept, then you have to go back and go, "Well, why is that happening?" Right?

Now, when you're looking at focus and concentration issues, the other thing that is involved is, how progressed is it? How often does it take place? Are there other things that trigger it? How long has this been going on? Is this a new development? Those will give you clues to try to pinpoint the mechanisms that are causing it.

Now, the other thing that is really important to know is that when people have focus and concentration issues, there's also another pathway that's involved with the frontal lobe that can be impacted, in this scenario of the brain, called the basal ganglia. The frontal lobe basically gates or suppresses this area, the basal ganglia. The basal ganglia is a part of the brain that's really also known as the animalistic brain or the impulsive brain. For example, if you see someone eating a sandwich and you're hungry, you're not going to just go and eat it. You may have an impulse of like, "Oh, I'd like to eat that sandwich." And then your frontal lobe says, "Don't do that." That's the frontal lobe suppression of this impulsive type behavior.

So, one of the things that also happens that also happens when the frontal lobe isn't doing its job well, besides lack of focus and concentration, is it loses the ability to gate typical impulsive behavior. You'll see this all the time, for example, with kids that are diagnosed with Attention Deficit Disorder, or more specifically, Attention Deficit Disorder with Hyperactivity. It's not really that they're having hyperactivity, it's that they can't stop their impulses so it appears as if they're hyperactive. They may go into a classroom and say, "Hey, please don't touch this ball right now." And they just can't stop it. They have to touch the ball. That's the ability for the frontal lobe to work and gate that basal ganglia impulsive behavior.

You also see it with some people as they get older. As their frontal lobe starts to degenerate, they just don't gate their thoughts anymore. They can seem very offensive or rude. They can get bad service and go, "Your service sucks" and whatever. They can be very offensive to people, because they lost the ability to gate their impulsive thoughts over impulsive activities. The frontal lobe being impaired can really cause people to have problems within society. You see that all the time with children that have ADD, and then they progress into adults that have ADD, which is Attention Deficit Disorder, which is basically a frontal lobe dysfunction. You also see it with adults as they get older. As your frontal lobe starts to degenerate and becomes more

inefficient, they have problems with planning, organizing, and if it gets bad enough, where they can't get the basal ganglia, they can also lose the ability to dampen and get those areas.

You may have experienced that yourself at times. Maybe if you didn't get enough sleep, you just couldn't get input and everything just came out. So, your frontal lobe is in functional stage too. Like, if you're totally exhausted and your brain isn't firing well and there isn't any endurance, then you also have difficulty with planning, organizing, thinking, executive function and getting that basal ganglia. So, those are the basic initial things that you really want to understand about the frontal lobe. Okay?

Now, some other key things about the frontal lobe is that the frontal lobe concentration and focus... The focus pathways. Let's focus on that first. The focus functions of the frontal lobe are actually generated by all neurotransmitters, but the one that really has the biggest impact is catecholamines. And catecholamines activate the areas of the brain that are really involved with staying on track and staying on focus. And catecholamines are activated by caffeine. So, this is why a lot of people will feel a lot better and they can focus much more when they drink coffee. Nutraceuticals like green tea extract or things that have some natural caffeine in there really have been shown to help activate catecholamines which are involved with concentration.

When you look at the medications that they're giving kids with ADD, ADHD, they're basically giving him stimulants, which activates these catecholamine pathways to try to get that neurotransmitter activity going. It's not actually rehabilitating the brain, it's not actually improving the frontal lobe, it's just getting that neurochemical response.

So, we know that the frontal lobe is involved with focus and concentration, we know that the main neurotransmitter of the frontal lobe are really catecholamines. So, those are the background information that you really want to understand with them.

Now, when someone has focus and concentration issues, the first thing that I like to do clinically is try to figure out, do they have it all the time to some degree or is it sporadic? So, what you're concerned about if someone has focus and concentration issues, to some degree it can vary intensity almost all the time, then if it's a child, you're looking at lack of development of their frontal lobe, and if it's an adult that really has focus and concentration issues all the time, then that's an indication of some degree of neuro-degeneration. And lots of neurodegenerative diseases, like Parkinson's disease, Alzheimer's disease, and just general global brain degeneration impact the frontal lobe, and that's one of the key things that you will notice. You may have noticed even with some of your elderly friends, family members, they just can't stay on track, they can't stay focused, you have to write everything down, you've got to repeat everything. That's frontal lobe degeneration.

So, that's the key thing. If it's happening all the time, to some degree, then that is a sign of neuro-degeneration if it's an older person, or lack of development if it's a younger person. And then some people get traumatic brain injuries and they have an acute onset, if their frontal lobe is injured, they have focus and concentration issues.

Now, other people will have some just sporadic issues. Sometimes they're perfectly fine, and other times they're just not. And some of this is normal and physiological. For example, if you just can't get sleep, you're going to have a brain that's impaired. Your brain really requires you to sleep properly. So, if you've ever had episodes where you just weren't able to get adequate sleep for yourself, then obviously, your frontal lobes are not going to be very, very efficient. So, that's kind of an expected response to physiology. So, we're not talking about that, but just perspective.

Now, there's some people that have frontal lobe issues and they really react to, for example, an environmental or an immune trigger. So, that happens with certain people that have sensitivities to various dietary proteins. One of the most common ones is, for example, gluten. Gluten and dairy can really be a problem. So, if you're involved working with children that are suffering from ADD or ADHD, you have parents tell you all the time, "My kid gets exposed to gluten or dairy and they're all over the place, crawling over furniture, they can't be controlled, they can't reason, they can't plan." And that's an inflammatory mechanism.

So, in those cases, the food protein is triggering inflammation in the brain. And what inflammation does in the brain is that it slows down nerve conduction. So, if you already have, for example, a child that has decreased development in their frontal lobe, and then they get a trigger that makes it worse, then you can have these significant reactions. So, sometimes it's people that have their memory and cognition go down when they get into, for example, certain environments, maybe it's where they're reacting to different chemicals in the air, or it could be for example, if they go into a damp building. We did a video on mold and mold sensitivity. And those are the environmental triggers that are then causing this type of brain inflammation.

There's people that they notice that the brain function is really poor and they have to exercise or move to get the brain function to come back. Those are people that really have poor circulation to the brain. So, lack of circulation to the brain can be an issue impacting the frontal lobes. There's women that have changes in their focus and concentration during times of the menstrual cycle. So, those are hormone influences in the brain. Hormones have a major impact on different types of neurotransmitter responses in the brain, including catecholamines.

So, in a clinical setting, whenever you see someone that has focus and concentration issues, you're trying to take a look back and go, "Okay. Right off the bat, we know their frontal lobe isn't working." And the question, is this happening all the time or is it sporadic? If it happens all the time, obviously, triggers can make it worse to different degrees, but some people have great function and they lose function. That's a different scenario. And then you try to kind of work your way backwards and see what those triggers are.

Now, focus and concentration issues are always a red flag for some degree of unhealthy brain function and potentially neuro-degeneration as well. Now, if we see someone that has constant focus and concentration issues and it just continued to get worse, then you want to look for some other symptoms to get a clue if they are starting to develop into neurodegenerative disease. And one of the biggest concern is are they starting to develop really symptoms of Alzheimer's disease or dementia? And the key thing that will give you a clue with that is that

they're also having difficulty with, first of all, visual spatial processing, because now it's not just the frontal lobe, it's also the medial temporal lobe, and in the right medial temporal lobe, you really probably process the ability to remember physical directions. Can they function within a navigation system at all? Can they remember how to drive home? Can they remember images and shapes and things like that? Those are all associated with the medial temporal lobe. Or can they just remember phone numbers or names? And those are involved with the left medial temporal lobe.

So, if you see someone that's starting to have focus and concentration issues but they're also having declarative memory recall issues, and really having a hard time with visual spatial processing and with sense of direction and where they are, those are basically early signs of dementia. And if you look at the Alzheimer's disease scale, they are stages from one to seven, and once you start to lose focus and concentration and lose the ability to remember directions very well or recall names, you're really in stage three. And that can progress to different stages where there's a problem, and it usually when you get into stage five, six or seven, you're going to need help and support to get through daily activities. So, that's one of the first things you're going to see in focus and concentration. Are there also signs of declarative memory issues associated with dementia.

Also, if you see people that have frontal lobe issues, focus and concentration issues, you really want to look for early signs of Parkinson's, because Parkinson's disease also impacts the frontal lobe in early stages. And the Parkinson's disease, the earliest symptom is actually not tremor. Tremor doesn't show up for years and years later. Their earliest symptoms of Parkinson's disease is loss of smell and chronic constipation.

So, if they have loss of smell, and they've identified the most predictive smells that they lose, which is coffee, anise and peppermint. In my office, I test those things right away with patients to see if they can smell them. And if they can't smell coffee, anise, peppermint very well, and they have focus and concentration issues, and they have chronic constipation, and the other key one is stiffness or rigidity, they feel stiff, and they have to move and they feel better, usually starts, for example, on their leg or their arm, then those are signs of early Parkinson's disease development. And it may take many years, five, 10 years, for them to even develop a tremor, but they're in that Parkinsonian pattern.

So, focus and concentration is a red flag right away, especially if it's happening all the time and progressively getting worse in an elderly person, then they're actually starting to develop neurodegenerative diseases.

There's also another subset of patients that have focus and concentration issues, and these are people who, at some point, had some type of traumatic brain injury, and at the time, they didn't really think much of it. For example, they may have been in a car accident and hit their head, they may have been playing sports and hit their head, and they feel like they're okay now, but what happens is that when there's traumatic injury to the brain, and especially if there's loss of consciousness, to some degree, there are cells in the brain called microglial cells

and they get primed. What that means as they get into a heightened state of inflammation, and anything, systemically, that causes inflammation can flare up these areas.

So, if a person gets a frontal lobe injury, for example, when they hit their head on something, then anything that can cause inflammation can really have a devastating impact on their brain. And research is really showing past traumatic brain injuries really do catch up with us over time, especially if you've lost consciousness to mean there's some significant degree of injury to the brain.

So, when you look at traumatic brain injury, the old model was like, get a brain injury, just recover, you feel better, great, then you're fine. Well, really, what we're finding out is those types of injuries do have effects on prime and glial cells, and maybe five years 10 years later, that they really start to have some significant impact. And these are really being studied with the NFL athletes and looking at Post Traumatic Encephalopathy, chronic traumatic encephalopathies, and it is a fact that if your frontal lobe does get to have an injury at some point, you can get focus and concentration issues that develop later. Okay.

Now, all that's related to focus. So, now let's talk about concentration. So, for a lot of people, they can focus for a few minutes, but then they just lose the ability to stay on track. And that is really more of a brain endurance issue. And that may not necessarily be degeneration of the frontal lobe, that could really just be that they can't get enough fuel to the brain. And when we talk about fuel to the brain, we're really talking about glucose and oxygen. So, for some people, they tend to be hypoglycemic, they tend to miss meals all the time, and they don't even know that their blood sugar levels are low. If the brain doesn't have glucose, it can't activate energy powerhouse cells, called mitochondria, to make what's called ATP, so they can have that sustained fuel source to constantly be able to stay focused for sustained periods of time. So, sometimes it's a blood sugar issue.

For some people, their glucose issue is that they're insulin resistant. They eat a meal and they get really tired and fatigued because they can't get glucose into their cells and they actually have to process that glucose, which is energy demanding, and they get really exhausted. So, sometimes when we see concentration issues, it may not even be neuro-degeneration, it just may be a metabolic issue with some kind of blood sugar instability. These are people that feel fantastic if they do intermittent fasting for a while and get to ketosis, their energy levels get sustained, also their focus and concentration comes back. That's a clue that their brain impairment was mostly related to endurance and energy dynamics versus degeneration itself.

And then you have people that just have really poor circulation, and when you have really poor circulation or very low blood pressure, you can't get enough oxygen to the brain, and it's very easy for the brain to fatigue. And these are people that have to drink coffee to get their brain to function, or people that have to exercise to get their brain to function. Those are signs of poor circulation.

So, in a clinical setting, just to kind of give you how I work through the focus and concentration and so you can understand the concepts as well for yourself, is you really want to go through the steps. Is it focus? Is it concentration? Is it sporadic? Is it happening all the time? Are there

any kind of triggers? And then those things can all give you a clue on mechanisms of focus and concentration issues and depression.

So, with that, I think I've kind of summarized, in this first 20 minutes, the key things related to that. So, people usually ask, what can you do to improve your focus and concentration? Well, if it's a metabolic endurance issue, so physical activity, exercise. People that have really bad blood sugar issues, doing ketogenic diets can really help sometimes take the stress off. Stabilizing blood sugar levels are really important.

I put together a really detailed course called Save Your Brain. It's an online program where we go through each of the steps that are involved with improving your brain function over several weeks, and we teach all these principles. So, if you need extra guidance, besides this video, you may want to check that out. It's called save your brain. You can find it at Dr. K. News, [drknews.com](http://drknews.com), and it's an online program with worksheets, and handbooks, and videos and it kind of walks you through it. I also wrote a book, Why Isn't My Brain Working, where I really talked about the importance of all the different mechanisms that we just talked about in great detail with lots of references to the literature. So, those are tools you can use if you really want to get more information on the topic. But let me try to get into some questions here. Okay?

Okay. Ready?

Yeah.

So, Mandy asks, **what roles do heavy metals play?**

So, what roles do heavy metals play? So, heavy metals have a role, but what does that really mean? So, there's lots of triggers that can cause inflammation in the brain, but it's not necessarily due to heavy metals. So, focus and concentration issues just tell you the frontal lobe isn't working. It's not specific to what the cause may be. Now, the problem we see in the healthcare system, there are practitioners out there that truly do not understand the brain, don't know the depths of it, don't know how to work through it, so anything brain related becomes heavy metals. And then they test, and guess what? If you test for heavy metals, you're going to show up with high levels, especially if you do a challenge test. So, it's a mechanism, like anything else that's inflammatory, that can impact overall brain health, but we got to remember that it by itself isn't necessarily the only factor.

Now, we did A study that we published in the Journal of Toxicology where we looked at chemical antibodies, which is different than the total burden of chemicals, and we checked mercury, and we checked various heavy metals, and we checked common pollutants like fire retardants and BPA. In the initial paper that we published in the Journal of Applied toxicology, we took 400 healthy human blood samples and we wanted to see how many of them had antibodies to chemicals, which is different than the amount in the body. Antibodies to chemicals means you have an immune reaction to the chemical. And what we found was, as far as the chemical goes, somewhere between five to 15% of a healthy population had some kind of antibody reaction to chemicals. But if you looked at the levels of lead, mercury and

environmental compounds like BPA, majority of people will have higher levels. They'll be off the charts in a lab test. That's just the fact of being in environmental pollution.

So, what that means is, there are many more people that have higher concentrations, but only a few of them have antibodies to these chemicals. And then we did a follow up study, and we published that in the Journal of Applied Toxicology as well, where we took the ones that had elevations of chemical antibodies, for example, one of them was to mercury. And what we found was that when people start to have antibodies to chemicals, we found that they also had antibodies to myelin and myelin sheath proteins, that there's a neuro-inflammatory response that is caused by it. And then we showed very high degrees of correlation between immune reactivity to chemicals and neurological autoimmunity. And when we published that study, we said this is one of these factors that may be overlooked.

So, for me, in working with patients and doing my own research and publishing that material, what I really came to realize is that when you test heavy metals with people, everyone's got them. That's not necessarily the biggest issue. The key issue is if they're really having antibodies and reacting against them. So, I'd like to do chemical antibody measurements. And in my clinic, I use a lab profile from Cyrex Laboratory called Array 11 and I check the chemical immune reactivity. And that is one way to screen for it. So, saying heavy metals is a cause of focus and concentration, yeah, it's one of the factors that causes brain inflammation, but at the end of the day, you have to look at it from a multifactorial perspective and not just limited to metals.

Because what as a practitioner, what I see is patients having brain issues, they go to healthcare professional, they get diagnosed with heavy metals, because they have high levels just like everyone else, they go on some expensive chelation program for many, many months. And it's only a small percentage of that noticing anything noticeable after that care, because they still have a frontal lobe that isn't activating, it's not firing, it still needs to develop plasticity, it still needs to become healthier, and just getting rid of those chemical burdens isn't enough to really get the frontal lobe to efficient and functioning again. Not to say it's not important, it's just they need more.

So, next question.

Sure. **For LPS and endotoxins, can LPS and endotoxins cause these degenerative problems?**

Sorry. My computer just shut off.

Yeah. So, can LPS endotoxins impact...

Cause neurodegenerative problems, and is there a protocol to reduce LPS and endotoxins?  
Sorry.

Yeah. The question is, do LPS and endotoxins cause these problems? So, for those you guys that aren't familiar with this, one of the key things that happens is something called endotoxemia, when people have intestinal permeability. So, if you guys remember, intestinal permeability, also called leaky gut syndrome, is when the intestinal tight junctions open up. And when these intestinal tight junctions open up, for some people, especially if they have what's called

dysbiosis, where they have more, let's say bad bacteria than healthy bacteria, and that happens from diet really high in carbohydrates, or sugars, or heavy antibiotic use, or just all the things that really make the gut microbiome unhealthy, there's gram-negative bacteria that gets released from the tight junctions into the bloodstream, and these are called lipopolysaccharides.

There's different versions of lipopolysaccharides, but these gram-negative lipopolysaccharides, from these dysbiotic bacteria get released in the bloodstream. And what they've been shown to do is they bind to what are called toll-like receptors, and specifically TLR4 for receptors, and these TLR4 receptors are found all throughout the body, including the brain.

So, this is why some people that have leaky gut issues, if they have endotoxemia... and you can measure this with laboratory. You can measure serum LPS, and you can measure what are called [inaudible 00:26:51] antibodies to determine if they have this leaky gut endotoxemia pattern. If they have those patterns, as you would expect them to have some degree of systemic inflammation throughout their body. And studies have shown that these LPS compounds can increase liver inflammation, they can damage blood vessels, they can cause neuro-degeneration. To protect the brain, you really need to have some blood-brain barrier permeability.

And blood-brain permeability, by the way, is correlated at a high degree with leaky gut. We published a study, I think it was in the Journal of Molecular Science, where we evaluated patients that have leaky gut to see how many of them had blood-brain barrier. So, we were looking at S100B and other composite proteins to the blood-brain barrier and markers for leaky gut with people that had Crohn's and ulcerative colitis. We found a really high degree of correlation with them. And I think we found like an eight to 12 fold risk of having blood-brain barrier permeability of leaky gut.

So, some of these people that have leaky gut also have blood-brain barrier permeability, and when those gram-negative bacteria gets into their bloodstream and gets into the blood-brain barrier, they can actually activate microglial cells, cause neuro-inflammation, and if that neuro-inflammation is happening in the frontal lobe, then they'll have folks with concentration issues.

So, clinically, we'll see some of these people that have intestinal permeability issues resolved and they improve their tight junctions and heal their gut and change their microbiome, so they don't have this dysbiosis pattern, have significant changes in their brain function. And there's actually been several papers, not published, where they looked at major depressive disorders, and a key feature of major depressive disorders is they also have, not only depression, but focus and concentration issues, and when they were put on intestinal permeability protocols, they saw some significant change with that. I think the main publisher with that is Dr. Maes, M-A-E-S, but he's done some great work with that. So, I hope that answered your question.

Okay. From DeeDee. **Can PC supplementation help with focus and concentration? I think she refers to phosphatidylcholine.**

Right. So, can phosphatidylcholine supplementation help with concentration and focus? So, the answer is yes and no. So, let me explain. So, phosphatidylcholine is very essential nutrient for the brain, and there's some studies that show that phosphatidylcholine is important for memory. And phosphatidylcholine is really most impactful for the medial temporal lobe. And the medial temporal lobe is involved with declarative memory and it's an acetylcholine based pathway. And phosphatidylcholine seems to have a really powerful impact on acetylcholine pathways. And acetylcholine pathways are there to activate the areas of your brain that are involved with long term memory.

So, phosphatidylcholine is a great nutraceutical for the brain, but if you're really trying to get improvements in focus or concentration, it won't be the most efficient compound. Things that really impact focus from nutraceuticals would be again, things like really unnatural stimulants like caffeine or green tea extract. Things that can improve concentration or things that improve endurance. Those would be things like Ginkgo Biloba, that really helps get blood flow to the brain so you can have sustained focus, things like vinpocetine that also help improve blood flow to the brain. So, those are the key differences between phosphatidylcholine specifically for the frontal lobe.

In my brain book, *Why Isn't My Brain Working*, I go through all the different mechanisms ever published on nutraceuticals and how they work in different regions of the brain. And if you have any interest in learning more about that, please check out my book. Next question.

Okay. **What if you had an injury to the back of your head?** From Amy. I think because you're saying frontal lobe.

Yeah. So, if you have an injury to the back of your head, you can get a frontal lobe injury. It's something called a countercoup. So, when you hit your head, you get injury to the area where your head hit, but then your brain gets pushed forward. So, a lot of frontal lobe injuries actually involve having a person fall back and hit their head, not necessarily just in their front. So, for example, just want to think about if that trauma is hard enough, that you're going to actually get two injuries. The first one being on the area of impact, the second one being where the brain gets pushed to the other side of the skull. So, it's really, really common to have people injure their frontal lobe, not from damaging the front of their head, but from falling backwards and having that countercoup where their brain gets pushed forward to the front of their skull and also gets an injury there.

Okay. Next question.

Sure. **What about ketones for the brain?** From Brian.

Yeah. So, ketones for the brain become a very effective strategy, especially for people that really have endurance issues with their brain, and their brain just fatigues all the time, and they really can't get their blood sugar levels stable. So, ketones are more efficient fuel for the brain. Ketones can be processed into energy for the brain much more efficiently. So, there are a lot of people that have brain impairment that really will benefit from a ketogenic diet.

So, in my practice, for people that are starting to show early signs of neuro-degeneration or have a neurodegenerative disease, I definitely encourage the ketogenic diet for them. And ketones not only provide a better fuel source for the brain to really help us sustain focus, which is concentration, but ketones also have been shown to have an anti-inflammatory effect on the brain. And ketones have been shown to dampen microglial activation, which is fantastic.

Excuse me. And then the other thing with ketones is that people, when they do ketogenic diets, they usually do it with intermittent fasting, and the key thing with intermittent fasting is that it really allows something to take place called autophagy. And autophagy is when you get rid of debris and rid of dead cells. So, if you have a head entry near these prime glial cells and they're just constantly being inflamed, if you do intermittent fasting, you can really promote this autophagy process and really start to clean up the brain from some of these activated glial cells and from debris in the brain that's not very efficient in helping neurotransmitter responses. So, yeah, ketosis is very effective for improving brain endurance.

Okay. From Magda. **Does [inaudible 00:33:21] syndrome cause... It should be can Raynaud's syndrome be associated with decreased blood flow to the brain, and is hyoscine helpful and exercise?**

So, the question is, is Raynaud's phenomenon, which you guys may not know. It's this phenomena where the hands, they get cyanotic, they go white, they go blue, they get red, they go back through this vasospasm response in their arteries. Usually, it happens in the hands, it can happen in other regions of the body as well. But is that associated with circulation issues? It may or may not be.

So, Raynaud's phenomena is autonomic spastic response in blood vessels, and people that have good circulation still can have those issues, but it does happen to people that have poor circulation. So, of itself, it doesn't really indicate you have poor circulation. Your biggest clues that you have poor circulation is your hand and feet are really cold all the time. If you look at your nail beds, your nail beds should be pink. If they're white, that's a sign that you have poor blood flow and circulation. If you have constant white lines on your nails or dots on your lines, that's a sign you have poor circulation because your nails are getting banged up all the time when you just do activities, and you get that whitening effect from trauma to the nails. But if you have good blood flow, the nail beds heal really quickly and you don't have those white lines and dots and those things don't stick around.

Another sign that you may have poor circulation if you have fungal toenails, because if you can't get blood flow to your toenails, you can't get immune cells to really deal with yeast overgrowth that happen just by wearing socks and shoes all day and sweating on your feet. So, those are big clues. Another major clue of really bad circulation is hair loss, and especially in women. If you can't get blood flow to your scalp, you can't maintain your hair. So, if you notice that typically your nose is cold, that probably means your scalp is cold, the problem is they're not getting circulation. So, sometimes circulation is one of the main reasons people have some concentration issues, especially as they get older and their circulation pathways are impaired.

So, let me explain some more things about circulation. So, years ago, they reclassified the vascular system, the blood vessels in our body, as an endocrine gland, as an endocrine system, because they found that blood vessels weren't just pipes carrying blood, but they actually have cells in them that produce hormones. And one of the hormones that they produce is something called nitric oxide. And they found that endothelial nitric oxide is a compound that's produced that helps dilate blood vessels and allows for improved circulation. And they also found that this endothelial nitric oxide, when it's activated, also can get rid of plaquing in the arteries, so it has very protective effects on blood vessels. And they found that the most effective way to really activate this nitric oxide pathway was just with movement.

So, as you move in exercise and increase your heart rate, that causes increase flow dynamics to your blood vessels, that increase flow of dynamics turns on reflexes that then cause release of endothelial nitric oxide. That's why people who are sedentary over a long period of time, they just don't activate that pathway for a while, and that becomes inefficient, and then they really have cold hands and cold feet, and then they start getting activity and movement, their circulation is improved. And that's also why people that are serious athletes, you see their vascular arteries and they're ripped, that's a sustained long term nitric oxide release that's really helping them have those vascular dynamics. So, those are the key things about circulation.

So, people always ask, what supplements do you take for circulation to improve it. The key things are like Ginkgo Biloba, has an extensive amount of literature on it, and it raises endothelial nitric oxide, and then vinpocetine, which is another botanical, raises it. There's some information in arginine as well, I just don't think that it's as great as some of the other ones. Niacin can help with circulation to some degree, but it causes flushing in a lot of people and most people don't like the feel of that. But those are the things you can use to improve your circulation.

The other key thing with circulation is just having a low blood pressure. If you don't have healthy blood pressure, you can't have what's called perfusion and push blood into tissues like your brain. So, sometimes someone will come in my practice, and I focus on concentration issues, and we find that it's really more of a sustained focus issue, it's an endurance issue to the brain. And really the way to manage that is to just help figure out ways to get their blood pressure back up so then they can have perfusion, and sometimes that really makes a big difference for their brain health, depression, focus and concentration pathways.

Okay. Next question.

Okay. It's from Rebecca. **Can long term unaddressed hypoglycemia cause neuro-degeneration? Long term unaddressed hypoglycemia.**

Can long term unaddressed hypoglycemia cause neuro-degeneration?

Yeah.

So, most of the studies that have been done with insulin resistance, but the answer is yes. So, long term hypoglycemia is going to have some consequential effects on physiology that can really promote neuro-degeneration. One of the main ones being is constant spikes of cortisol. So, whenever your blood sugar levels drop, your body has to get the blood sugar levels back up, and the pancreas is involved with releasing glucagon to do that, but there's also release of cortisol by the adrenal glands to really promote what's called gluconeogenesis to get your blood sugar levels back up. And cortisol, especially sustained and chronic cortisol spikes throughout the day that are released in hypoglycemics, that has been shown to have a significant neurodegenerative effect on the brain.

The other key thing is if the brain is always in a hypoglycemic state, then it doesn't have the fuel source it needs to activate and to constantly fire, and those types of mechanisms may also have some neurodegenerative promoting effects. So, hypoglycemia has some secondary effects that are involved with neuro-degeneration. The worst pattern is actually however, insulin resistance where someone has high blood sugar levels, and those are people that usually fatigue after meals, or have a fasting glucose that's in the 115, or higher range, or high HbA1C or pre-diabetes, and there's many papers now in the literature that are referring to Alzheimer's disease and dementia as type three diabetes, because the insulin response is so inflammatory on the brain that it really makes a major impact in neuro-degeneration.

Okay. Next question.

**Okay. I read a study that citicoline is better than phosphatidylcholine. What about phosphatidylserine?**

Yeah, [inaudible 00:40:11] between different types of phosphatidylcholine and phosphatidylserine, I think they're truly insignificant. They're not that clinically significantly different one from the other. So, when you're looking at one form of phosphatidylcholine or another phosphatidylserine, these are really more by nutritional companies trying to motivate someone to use one product over another. It's not necessarily that there's such a huge clinical effect of one that really matters.

**Okay. I think it's Sornia. I had a focus and motivation issue. After adding B12, I felt a huge difference. I got my focus and motivation back. How does B12 play a role in this?**

Okay. Thank you for sharing that. Who was that?

Sornia. S-O-R-N-I-A.

Sornia. So, Sornia is noticing that when she started to take B12, her concentrations dramatically changed. So, that really suggest that you may have some issues with what's called methylation. And methylation is the transfer one-carbon groups biochemically. And this methylation pathway, this transfer of one-carbons is strongly dependent upon B12 and folic acid. And what they found in the human genome study was that about 25% of the US population and even European population, that they have genetic uniqueness where they don't process this methylation pathway and they need really more than the basic levels of B12 and folic acid that

most people associate with the RDA levels, but there have been increased need for B12 and folate.

And B12 and folate will activate this methylation pathway, and methadone, used for the transfer of methyl groups have a profound impact on neurotransmitters. They're involved with making acetylcholine, they're involved with the clearance of epinephrine, norepinephrine, and it's just known as a methylation imbalance. So, you may want to do some of these genetic testings and see if you have a mtH4 for polymorphism. There's a lot of testing online, 23andMe, and different ones that measure these. But you can check to see if you have this mtH4 poly gene uniqueness, and that would make you increasingly vulnerable to B12 deficiencies and you may really need to constantly supply yourself with B12 and folate. So, thank you for bringing that up.

Okay. Sorry. **Is auditory processing disorder primarily a frontal lobe issue, medial or temporal?**

The question, is auditory processing disorder a frontal, temporal-

Frontal lobe issue, medial or temporal, or both?

Auditory processing disorders is a condition when people hear sounds, they're trying to process and interact and interpret what that means. And it really involves an area of the brain that intersects between the parietal lobe, and the frontal, and temporal lobe. So, it's really an integration area of the brain. But the most specific region of it is the lateral auditory cortex, which is not in the middle of the brain, but on the outer side of the brain. So, it's an integration side of the brain but primarily involving the auditory cortex.

Okay. Here we go. Sharon. **I am postmenopausal and never had brain issues, but now I have some issues. Can you say something about the brain and the role of estrogen and brain function, and progesterone and testosterone too?** Thank you. Sharon.

So, Sharon's saying that she's postmenopausal, she's having greater degrees of brain impairment symptoms-

Never had [crosstalk 00:44:02].

... never had it before, and then menopause turned it on. Okay. Not to sound like a broken record, but I actually talk about all the hormones and how they impact the brain and the research behind them. But the simple answer is, yes, there's been a lot of studies done specifically of post-menopause on the effects of brain, because the in a timeline fashion, physicians, healthcare providers have noticed, and people have noticed, they're fine, fine, fine, fine, and then get through menopause and all sudden their brain function rapidly declines.

So, what they found is that the mechanism that's involved are actually these microglial cells, and these microglial cells really create neuro-inflammation and they have this accelerated activation of brain inflammation and neuro-degeneration once a woman can hit post-menopause. And it actually seems to be, for those women that have had a hard time with transitioning to post-menopause, and that sudden drop estrogens is one of the things they've

done some research with. So, as we get older, as women get older, their pituitary feedback loop becomes less efficient.

So, the way the ovaries respond to follicle stimulating hormone from the pituitary becomes less efficient and then the body can compensate for that, especially the adrenalin put out estrogens, then the levels never spiked down and they can kind of stay stable. And those people don't really have the significant changes in brain function. The ones that significantly drop, those significant drops of endogenous production of estrogens really turns on this inflammatory cascade in the brain. It's like kind of a fire being turned on in the brain, which then accelerates neuro-degeneration. And then once the brain has accelerated neuro-degeneration response, they found that estrogen replacement therapy has been shown to be able to kind of calm that down, to some degree, but it doesn't get rid of all of it.

So, there's some susceptibility for women in general, once they get post-menopause, that they have those inflammatory reactions turned on. At the end of the day, you really want to find out what the triggers are, whether it's food, environmental, other things that are involved, you may want to look at your own philosophy of how you want to use your hormone replacement, if that's appropriate for you or not. But it's a pretty known mechanism, commonly well-known mechanism, and it's really a sudden drop of estrogens in post-menopause, turns on glial cells, and those glial cells get activated and stay on.

And this is actually one of the most important reasons why you want to have healthy endocrine function and adrenal gland function and physiology if you're about to head into perimenopause, because if you can transition to perimenopause very efficiently without the sudden drops, then what's been found is that these glial cells don't get activated as they do when there is a sudden drop and so forth.

Okay. From Sean. **Do you find the MRI based NeuroQuant TB report to be helpful to visualize inflammation and atrophy in the brain? Does it help you diagnose which brain region is being impacted most?**

So, for people who aren't familiar with this, when routine MRIs are done, there's a calculation that's called NeuroQuant that's done to compare volume size for a person to different age groups. That's not going to tell you if you have any type of neuro inflammation, it's just going to measure your brain volume and compare it to people in, let's say, your own age group. So, the NeuroQuant test is controversial because volume itself doesn't determine function. You can have smaller volume and have high degrees of function. So, it doesn't necessarily mean that your volume, just because it's smaller, means that you have less function. But on the other hand, there is research that shows that when you have some volume loss in certain regions, you have some impairment.

So, I think the difficulty with kind of the NeuroQuant test is just knowing those limitations. So technically, if you have some volume loss, that could be a bad thing, and studies have clearly shown that volume loss is an issue, especially if it's significant, but I would say if you a NeuroQuant test and the whole brain is looking like the volume is changed, is that just that person's brain? NeuroQuant would be most useful is if you had a baseline of your brain and

then compared it down the road. And that's why I think we have the benefits of dealing with those limitations of the NeuroQuant test where they look at these calculations. If you just do your first NeuroQuant test, and then they compare you to the general population again, your volume being less doesn't actually mean that you've lost function. However, if you see your volume size is changing over the next year, over the next two years, then that is definitely a sign that you are at neurodegenerative process.

So, I think the best way to look at NeuroQuant testing is to get your own baseline, get a general idea of how you are to the population. It doesn't necessarily mean if the volume is lost that you're in bad shape. But if your volume is slowly getting worse and worse, that you're losing volume, that is a sign your brain is absolutely degenerating.

So, does it help you diagnose which brain region is being impacted most and how do you [crosstalk 00:49:09].

Does it help diagnose which brain region is being impacted most? Not necessarily, and this is where you have to really look at the functions of the brain, and you have to look at physical examination findings and just know what different regions of the brain do.

Not to sound like a broken record-

No, just do it again.

In my brain book, I go over all the different regions of the brain and what their symptoms and functions are. And then in the Save Your Brain online program, I actually give you a questionnaire form to fill out and how to do a self-exam, teaching you how to do a self-neural exam to kind of determine which areas of the brain are involved. Because volume doesn't include function, but symptoms and examination findings really clearly identify function.

Okay. For Shannon. **Is ketogenic diet okay for someone with a leaky brain?**

Yes. Is ketogenic diet good for someone with a leaky brain? Absolutely. As a matter of fact, a ketogenic diet may have tremendous potential to heal the blood-brain barrier, even though it hasn't been published yet, because ketones, again, dampen microglia, neuroglial cells, and one of the neuroglial cells are astroglial cells, which contain the blood-brain barrier, and ketones have an anti-inflammatory effect on these cells. That's actually what you need to heal the blood-brain barrier. So, I would say you should definitely use a ketogenic diet if you feel your blood-brain barrier is impaired.

Something you talked about, no one can understand vinpocetine from here.

Oh, the supplements? So, vinpocetine, V-I-N-P-O-C-E-T-I-N-E. It's just botanical. You're probably not going to find it at Whole Foods, it's not that popular, you'll probably find it on Amazon or some online sources. But everyone knows about Gingko, and Gingko, if you look at it from evidence-based medicine model, has hundreds of papers on how it impacts blood flow and circulation. And there's even clinical trials and meta-analysis done with Ginkgo Biloba for focus and concentration. And it's very inexpensive. It's just that it's not cool anymore. I think it was

popular for a while and now it's kind of people want the newest coolest thing, but Ginkgo Biloba is very effective, and numerous studies definitely have been able to show that it does impact circulation and blood flow to the brain, which could be a big issue with sustained brain fatigue and concentration issues.

Okay. Here's two questions kind of in one. **How can you improve circulation and blood pressure?**

How can you improve circulation blood pressure naturally?

Besides exercise?

Yeah.

Well, sometimes some people that have low blood pressure, you got to find the underlying cause why they have low blood pressure. Some people, for example, may have antibodies to their adrenal glands, and they're not able to produce so much testosterone and cortisol, so you have to really treat it from an autoimmune perspective. For some people, they just genetically have to have more sodium. Their aldosterone pathways are inefficient that they have to be salting much more than throughout the day. Some people have less than ideal functional adrenal glands because they're hypoglycemic or they keep missing meals and they keep having like a smoothie for a meal and their blood sugar levels are constantly low throughout the day, which taxes the adrenal glands to put out epinephrine and cortisol. And at some point, the adrenal glands lose their reserve functions and they can't produce aldosterone, and they can't retain sodium, and then they have some issues.

So, you have to really go after the underlying mechanism. That's best how I can answer it.

Okay. Hold on. Sorry. **Can poor circulation be a result of low thyroid?**

Yes. Can poor circulation be a result of low thyroid? Absolutely. So, another key thing with low circulation, cold hands, cold feet, is low thyroid function. So, if you have poor circulation, especially if it's really gotten worse as you've gotten older or all of a sudden you noticed... when you're age 30 and 40, that's when most thyroid diseases turn on, you really want to go and get a blood test for your thyroid, a TSH test. If the TSH levels are higher, then you're hypothyroid, and you may need thyroid replacement. And if you go on and thyroid replacement, it may have a huge impact on your blood flow and circulation pathways and your overall brain function.

Okay. From Yael. **Can all blood work be good if people still have diabetes or blood sugar issues?**

Can all blood work be good but still have blood sugar and diabetes issues?

Yeah, for people who still have diabetes.

Well, they wouldn't have diabetes. Diabetes is definitely classified as a fasting glucose above 126 or higher, or HbA1C levels are elevated. So, no, you can't be diabetic unless your lab saw it. You could have a blood sugar disorder that isn't caught with routine labs, and this is where a

glucose challenge test comes in. So, there are many patients that have blood sugar symptoms, they eat meal, they get tired, they get fatigued they have all these symptoms that their blood sugar levels are unstable, you look at their fasting blood glucose levels and HbA1C or things like fructosamine, they all look normal.

And then you have them do an oral glucose challenge test, where they go to the lab and they get a predetermined concentration of glucose, they drink it, and then they measure their insulin and glucose levels like one hour later, two hours later, three hours later, and they see how the levels work. And these are people that, if you don't see with a routine lab, you definitely can catch them with those types of testing, and sometimes their insulin surges, they are way too much, sometimes their insulin doesn't respond, sometimes their glucose levels are high or they won't go down. But sometimes if you don't see a blood sugar disorder with your typical fasting test, you have to do a glucose challenge test.

Okay. Next question.

**Cynthia. So, GABA test for leaky blood-brain barrier versus GABA RX for anxiety. Please explain the difference.**

GABA?

Test for... One was for blood-brain barrier. Okay. GABA test for leaky blood-brain barrier, versus GABA RX for anxiety. Please explain the difference.

Okay. I'm not sure if I answer the question, so I'll try to answer the best I can. As far as GABA test, I think referring to what's called the GABA challenge test, and I talk about that in my book. And the mechanism behind that is that GABA is a large structure. It's a macro-molecule, and it doesn't have the ability to cross the blood-brain barrier. So, one of the things that we were noticing with people that had blood-brain impairment is when they take GABA, they actually feel much better. And that shouldn't happen because it shouldn't get into the brain. And as you know, there's a lot of people who take GABA and don't notice anything from it.

So, the theory was that... and I wrote this in my book, the theory was that sometimes the people reactive to GABA, we suspect they may have a blood-brain barrier permeability issue. Well, we can actually test for that now. So, we can measure lab markers called S100B, or we can do a test called blood-brain barrier protein antibody through Cyrex, and we can see if there's actually permeability of the blood-brain barrier. So, that would be the best way to kind of pick those things out.

So, I would say if you take GABA and it really helps you, you would suspect you may have some blood-brain barrier permeability. There's a possibility there's other pathways involving GABA that don't involve the blood-brain barrier, but those have not been shown yet. So, that's really where the GABA challenge test comes in.

Okay. **Is there a good test to see if one has B12 hidden deficiency?**

Is there a good test to see if someone has B12 deficiency? Yes. So first of all, let me tell you the worst test that everyone runs is serum B12, and serum B12 levels are not a reliable test to determine if you have B12 deficiency. And the reason is, is because-

I'm interested in this.

... the reason is because if you take a multivitamin, your serum B12 levels are going to be off the chart, looks like you're being overdosed. If you take food that's been fortified with B12, like orange juice today is sometimes fortified with B12, then your levels are going to go up. So, energy drinks, sport drinks, smoothie cups, having nutrients put in, any kind of exogenous B12 supplementation is going to raise your serum B12 levels, so that's not really a good test. The gold standard test is a test called methylmalonic acid, and all the conventional laboratories in healthcare have the test available. And methylmalonic acid can be measured in urine or blood. And methylmalonic acid is broken down by B12 and B12 specifically and only. So, if methylmalonic acid levels are high, it's a really good indication that a person is really B12 deficient and it's one of the earlier signs of a B12 deficiency. So, if you suspect you may have a B12 issue, then you really want to measure your methylmalonic acid.

I think we have time for one more question.

Oh, let me pick a good one. There's two. **Someone's asking the root cause of vertigo, which might be too hard to get into. And then thoughts about huperzine A.**

Huperzine A.

Yeah.

Yes. So, the question is, what are my thoughts of huperzine A? I love huperzine A. And huperzine A is a natural compound and it's a compound that helps activate the acetylcholine pathway. And there is a pathway where acetylcholine is cleared out. When your brain releases acetylcholine, which is very important for recall and memory and cognition, that you release acetylcholine, but then the synaptic cleft acetylcholine has to be cleared out. And what huperzine has been shown to do is allow acetylcholine to hang out in the synaptic cleft longer, and it's also been shown to have some preventative effects on tau protein beta-amyloid production and people that have Alzheimer's disease. So, it's a very promising botanical, definitely one if you want to try to improve your acetylcholine function, you can definitely find Huperzine; H-U-P-E-R-Z-I-N-E at your online stores, health food stores and whatever.

Anyways, thank you all for joining me. I hope you were able to find some information that was useful. Please check out our website, Dr. K. News. I've talked about my book 1,000 times, but really, we put a lot of information in there that can address a lot of the questions that came up. And we had the Save Your Brain online program at Dr. K. News too if you want some guided help in implementing some of these strategies. And again, thank you all for joining me today.

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