Introduction to Dr. David Jockers

Welcome to this episode of the Reverse Alzheimer's Summit. I'm your host, Dr. Heather Sandison, and I'm delighted to introduce you to Dr. David Jockers.

He's a doctor of natural medicine and runs one of the most popular natural health websites at drjockers.com It's gotten over a million monthly visitors, and his work has been seen on popular media such as The Dr.

Oz Show, Hallmark Home and Family. Dr. Jockers is the author of the bestselling book The Keto Metabolic Breakthrough by Victory Belt Publishing and the Fasting Transformation.

He's a world renowned expert in the area of ketosis fasting, brain health, inflammation and functional nutrition. He's also the host of the popular Dr.

Jockers Functional Nutrition podcast. He lives in Georgia with his family, and I'm just so delighted to have him here to dispel some of the myths around ketosis and fasting and how we can really use this to optimize cognitive function at any stage.

Welcome. Well, thanks so much, Heather. Great to be on with you. So let's dive into like straight in ketogenic diet and brain health. What's the connection?

Why would we suggest this for someone who's struggling cognitively? Well, for sure. Well, anybody that's struggling, cognitively I always start thinking there's probably inflammation in the brain.

Ketogenic Diet, Inflammation, and Brain Health

So if you're noticing brain fog, depression, anxiety, irritability, constant cravings, if you have headaches, if you have like any any kind of neurological symptoms, we have to look at inflammation as the root cause.

And so if we're going to reduce inflammation, one of the big things we have to look at is our diet, our nutrition. And a big factor with inflammation in our diet is blood sugar imbalances.

See, our blood sugar needs to be at a kind of a very, very stable point on a regular basis. And so high blood sugar, we call that hypoglycemia is really problematic because the sugar molecules will bind to proteins and create something called advanced glycation end products.

And these advanced glycation end products are like shrapnel going through our bloodstream. They drive up all the inflammatory activity in in our bloodstream and they damage the endothelial lining of the blood vessels.

You think about somebody with uncontrolled diabetes. What happens? They end up with, you know, typically they die of congestive heart failure or kidney disease because again, the blood vessels are becoming severely damaged or they get neurological symptoms, peripheral neuropathy, optic neuritis, dementia obviously is really common.

Alzheimer's, they call type three diabetes because again, these advanced glycation end products damage all the neurons in our in our system and they restrict blood flow to our brain.

And, you know, of course, what happens with high blood sugar, we end up with high insulin. Insulin is the hormone that tries to get the sugar down. It tries to bring the sugar out of the bloodstream, put it in the cells where can be used as energy.

This is really trying to save us from this glycation process or this rusting process taking place in the body. And also,

you know, it's obviously helping us create cellular energy by getting the blood sugar in there and insulin's key, we just can't have too much insulin because then the cells stop responding well to it and we end up with insulin resistance, which is a hallmark for dementia and Alzheimer's.

Now, we don't want too low of blood sugar as well, because then we get hypoglycemia. And for certain body types, I'm like this. If I have a big amount of processed sugar, I get a huge increase in insulin.

And then that insulin drives the blood sugar down real low. And then I end up with hypoglycemia. So this is my life growing up, you know, I'd have a big bowl like my mom for for breakfast.

She wouldn't get the cereal I wanted, which was like Froot Loops or whatever. Whatever I saw on TV growing up, she would get what she thought was healthy, which was Cheerios, and we would have skim milk because we wanted to avoid the fat.

This is, you know, early nineties. We wanted to avoid the fat, skim milk, put a banana on there because it's fruit. And then and then a glass of orange juice for vitamin C, right.

Sounds like, you know, all-American breakfast right there. And I would have that. And then 2 hours later, I'd be falling asleep in my high school English class because my blood sugar would skyrocket, drop significantly, and I'd have this reactive hypoglycemia and the blood sugar drops too low.

Then our brain cells don't get energy that they need and they start to die. And we actually create something called neurologic cytotoxicity, where one nerve, one neuron dies and it spills out calcium and all these different electrolytes and content contents.

And then that actually over excites the neuron next to it. And it's like a domino effect, right? All these dominoes going off and you actually get brain cell death.

And so that fatigue that you get when you have hypoglycemia is actually neurons dying, right? You're actually you don't have the energy and you're actually causing brain cell death.

And there's actually research that shows that if you have a severe hypoglycemic reaction, if you have one of those in your life by severe, it means like you passed out.

Right. And you may have been in somewhere. I was at church last year, you know, we were in worship and a girl falls down. Right? She passes out. Right.

It's her, you know, they give her orange juice and all, you know, all that kind of stuff. And it's like people this happens to people, right? What happened?

This girl was very metabolically inflexible. Apparently, she hadn't eaten breakfast. You know, she, you know, wasn't taking good care of herself, probably on a high processed food diet.

And so she or she is 10 a.m. in the morning and she passes out and so reactive hypoglycemia that right there that incident actually increases her risk of developing dementia later in life by 40% having one episode like that.

And so it's really problematic. And so ketones are really the bridge for helping us become very metabolically flexible. And so when we teach our body to run off fatty acids and ketones more ketones come in is when we are taking periods of time between meals.

Okay, our body uses up glucose, right? So we have glucose in our blood. We also have stored glucose in our liver and our muscles. So we're using that and the brain really eats up a lot of that glucose.

And then we start burning fatty acids a higher percentage of fatty acids for energy. Now, fatty acids, most of the cells in our body can use them for energy, but they're too big to cross the blood brain barrier.

So our body has a system where it will take fatty acids, convert them into ketones, and these fatty acids could come from our diet or they could come from our body fat, right?

So taking our body fat, converting into these smaller water soluble molecules called ketones that get up across the blood brain barrier and the the main ketone that we measure in blood is called beta hydroxy butyrate.

And so that gets up into the brain. And that key, those ketones can be used as energy, which is key because if we don't have enough glucose now we have a backup energy source.

And so it's really great when our brain is using a percentage of ketones and a percentage of glucose, so is going to use some percentage of glucose. But also it's great when we're also able to use those ketones.

Now, not only is it an energy source, but it's also what we call an epigenetic modulator and it sends messages to our overall physiology. And one of the main messages it sends is turn down inflammation.

So when people have these neurological symptoms, inflammation elevated. Okay, so and I think about inflammation kind of like a fire in a fireplace. We want a small amount of inflammation is fine.

It actually, you know, in a sense primes us to kind of prevent against pathogens coming in and immune attacks just like a fire in a fireplace is a beautiful thing in the house.

Ketones, Fasting, and Neuroprotection

The problem is when the fire starts spreading onto the walls and we start burning down our walls, obviously none of us want that. And that's what's happening when we have chronic inflammation.

So ketones help say, okay, wow, the walls are burning up, let's shut that down, you know, pour water on it. Whatever we going to do, get that fire down back in the fireplace, where it belongs, where it's doing us good.

And so that's what's happening. So ketones tell the body, okay, bring down and in fact there's something called the inflammasomes. And in the brain they call it the neural inflammasome.

And the inflammasome is an inflammation amplifying system. So in the inflammasome gets activated. So normally you might have like like for example, you sprain your ankle, you get inflammation in the ankle, right?

Or you bang your finger. Yet localized inflammation. Localized inflammation makes sense. You know, that area needs to get here. You know, there's tissue damage.

We need some healing process is taking place. We want to protect against infection getting in their normal natural process. Problem is when the inflammation in our body gets activated, it turns up inflammation throughout the whole system.

And in particular for, you know, we all have kind of in a sense a weak link, right? Or multiple weak links. And so depending on our genetics, those weak links can be overexcited over activated.

So people with dementia, Alzheimer's, brain fog, a lot of these neurological symptoms, brain is the weak link there. And so that inflammasome is just saying, oh, you know, let's turn up inflammation.

It's like a massive alarm going off, turning up inflammation in the system. So ketones turn that off and so now we turn that inflammasome off. It can be reactivated obviously if needed, right.

But you know, it's actually a life saving mechanism because it helps protect against, you know, getting it some sort of systemic infection like meningitis or pneumonia or something like that and killing us quickly.

So we need it, but we don't want it turned on unless it's absolutely necessary for shortest amount of time. So

ketones really help to modulate that inflammatory.

Also, they help to modulate what we call the glutamate to GABA ratio so they help to balance. This is key because glutamate is the excitatory neurotransmitter in our brain.

So I think about glutamate, I think about the gas pedal. It helps us think sharply and quickly, helps us have great memory recall, helps us thrive in a sense, right?

So we we need glutamate, we want it functioning well. I'm doing a you know, I'm talking to you right now. I want my glutamate function as well, but I need the brakes as well.

Right? Just like you wouldn't want to drive a high speed car without brakes. Dangerous. So GABA is the brakes. And so we need a good ratio. We want be able to step on the gas when we need to and hit the brakes when we need to.

What happens when people have neuroinflammation? They end up with too much glutamate, not enough gaba. So it distorted this sort of ratio when you have too much excitatory activity, not enough brakes, not enough of the inhibitory, you end up with anxiety, irritability, right?

So like domestic abuse, you know, people just getting over over angry, like people getting upset about things that they shouldn't necessarily get upset about.

It's a sign of this imbalance in this neural inflammation. You get more cravings. You you can over excite brain cells and then that can cause depression or manic periods like where you're all of a sudden you've got tons of energy, you know, and then all of a sudden you drop signifier gently.

That's a sign of neuroinflammation disordered glutamate to GABA ratio. So all of these types of symptoms that we're talking about, you know, they can all be ketones are like a super medicine in a sense to help address those things.

And so when we get ketones elevated in our bloodstream, it's a it tells the genes in our system, it tells all of our physiology, quiet down inflammation.

Let's balance out that glutamate to GABA ratio and you know, let's and also increases BDNF. I didn't even mention that so brain derived neurotrophic factor which is like Miracle-Gro for the brain cells so it helps with maintain meaning healthy neuronal cell membranes, healthy synapse, synaptic density which synapses are little gaps in between the neurons that help us be able to think sharply and quickly, react to stress, have creative thoughts, so it increases BD and RF as well.

And so one way that, you know, people have gotten into endocytosis, for example, throughout history, is fasting. And then, you know, in every single spiritual approach, there is an element of fasting.

And people have said that, you know, their intuition is heightened, that they have spiritual breakthroughs, that they're able to peer from God and hear from the Holy Spirit at a higher and deeper level.

And so if we were to look at it from a physiological perspective, we would say, well, there's this huge increase in body, and if there's a reduction in neuroinflammation, there's a balance in glutamate to GABA ratio that's taking place here.

And so, yeah, that person, their brain is a greater antenna, right? And there's going to be you know, a deeper and a greater expression of thought and creativity that's going to come from this individual.

And and, you know, that could be reflected in spiritual breakthroughs. So really powerful stuff that takes place when when we get into a state of physiological ketosis.

I love to chat about excuse me, the risk of frailty here as we get into ketosis and as we consider fasting, especially for a population who is older, right?

Where, you know, a single fall can mean a really downhill downward spiral. And so how do you balance kind of the body composition changes that come with the ketogenic diet and with fasting with that risk of losing too much weight?

Yeah, this is really good because a lot of people get introduced to a ketogenic diet or to intermittent fasting because they want to lose weight. Now, fortunately, you're talking to somebody that's never tried to lose weight. I've never wanted to lose weight.

Always been, you know, just like you. I'm a thinner body type and I want to build muscle.

Preventing Frailty with Keto and Intermittent Fasting

And so I'm lifting weights for me personally six days a week because I love lifting weights and I love maintaining my muscle mass. And so you can practice intermittent fasting and also maintain, if not gain healthy muscle weight because ultimately when it comes to weight and it comes to frailty, we don't want just bad weight.

You know, there's a lot of people out there that are skinny, fat. What that means is that, you know, you look at them with clothes on and they seem thin, but they have a high percentage of body fat.

And that extra body fat, particularly visceral fat that's around their organs, organs actually increasing the fat cells themselves are triggering releases of cytokines.

They actually have different inflammatory compounds that are being released driving up overall systemic inflammation throughout the system. So we want healthy weight.

Healthy weight is going to be lean body tissue. You need a certain percentage of body fat, but beyond that, you want healthy bone tissue, you want healthy muscle tissue.

So here's what I recommend. I would recommend everybody should be doing a minimum 12 hour overnight fast. That means you finish your meat, your dinner at, let's say 7 p.m..

You don't eat anything with calories until, let's say 7 a.m. the next morning. So you might drink herbal tea or something like that's fine. But you know, you give yourself at least 12 hours.

And ideally what I like to see is 14, 16 hour fast, somewhere in that range, intermittent fast where you're again, you're drinking non caloric beverages, black coffee, herbal teas, things like that, fine water in general, water with a lemon.

All that's totally fine doesn't break your fast. But you're you're reducing or not consuming calories during that fasting window and you're eating your meals and let's say a six, eight or ten hour eating window.

Okay. And so a good place to start would be like a ten hour eating window. You eat three meals, let's say 8 a.m. to 6 p.m., you eat three meals in each meal.

I recommend getting at least 30 grams of protein. Getting enough protein is going to help maintain your lean body tissue. You got to kind of figure it out.

But something along those lines and a healthy fat sources are going to be from our grass fed animal products are going to be coming from extra virgin, high polyphenol, extra virgin olive oil, avocados, coconut oil, grass fed butter, right.

Things like that. That's going to be, you know, even nuts and seeds to a degree can can provide some healthy fats.

So so that's basically eggs like I mentioned earlier.

So that's going to be where those healthy fats come in. And then you want a lot of colors in your meals. So I recommend high phytonutrient, rich fruits and vegetables.

One way to do that is kind of get a variety of colors. I like to have reds, purples, raga, purple onions, red cabbage, right? Things like that. Reds, tomatoes, red bell peppers.

Right. There's got to get a lot of colors in in your meal and you round it out with that. So you prioritize around the protein. You think, okay, what's my protein source?

How, what do I need to do to get the 30 grams right? What's my fat source? Oftentimes, again, could be the same as the protein source, right? Kind of figuring out where your fat threshold is and then how do I just get as much colors into my my diet as possible?

Right. And so if you do that, you do that, you know, with 2 to 3 meals a day, you're going to feel very you're going to feel very satiated when you hit that protein, hit the or get the right amount of fat, you feel satiated, not going to feel hungry.

You're going to have a cravings throughout the day. You feel a lot better now. Obviously, if you were to eat a lot of processed sugar, you take in you know, you eat a handful of cookies along with your meal, you might have more cravings.

So stick with the real foods, right, as much as possible. That's going to be key there. And that's going to help stabilize your blood sugar, reduce cravings are going to make fasting significantly easier.

The other thing is between meals hydrating your body. Well, right. Especially, you know, we're having this conversation right now in the winter. A lot of people know hydrating.

Well, you know, as as the weather gets cooler. So try to make sure between meals you're hydrating. I recommend not drinking a whole lot with your meal.

Maybe enough to take a little bit of supplements or taking supplements. But outside of that, let the fruits and vegetables be the hydration that you're consuming.

And when you consume a lot of water with your meal, you can water down your stomach acid. You can delete your stomach acid and affect your digestion. But in between meals, let's say starting like an hour after a meal, you want to be hydrating.

Well, staying hydrated, that's going to reduce cravings is going to help you feel more mentally clear functioning. Well, you want things moving through your body like.

Like a river, not like a stagnant pond. Right. And keeping all your drainage pathways working well. So water is key for that. So anyways, this is kind of how you set up your meal and then to prevent against frailty.

And also this is also amazing just for your brain as well, strength training. So doing strength training regularly, I recommend 3 to 4 days a week of doing structured resistance training.

And nowadays most people are living near a gym that has equipment that takes the load off. Right. It's not free weights. It's not dangerous Nautilus style equipment.

There's trainers there that can usually they'll give you even like a free trial. They can show you how to do these things. But I recommend doing two upper body days to lower body days a week, ideally, right?

3 to 4 days a week. You might do, you know, upper or lower, upper or a full body, even give yourself a day off, at

least one day off for that particular muscle group.

So a good a good routine would be Monday. You do upper body and you're doing push pull exercises. What that means is something that you're pushing like an overhead press or or kind of a push press type exercise that's going to work more of the front or anterior musculature.

And then a pull exercise. It could be like a row, for example, rows are phenomenal exercises. That's going to work. The whole exercise. All right. I'm sorry.

The the posterior or you're back in a sense. And so that's going to work that musculature and then Tuesday you're doing legs and also your core so you might do squats, deadlifts.

And I know that for an average person out there that, you know, the average seven year old woman that's never done this training, she hears she hears deadlifts and she thinks that's going to kill me.

But it's actually one of the best things for preserving, giving you longevity. And I'm telling you, you can do these exercises. And so our ancestors, I mean, if you go to any of the anywhere where, you know, outside of first world countries, third world countries, where people are older, they're doing deadlifts every single day, they're not doing structure deadlifts.

They're just doing it to pick things up right on a regular basis. And so you've got these are exercises that are so powerful for stimulating lean body mass and also your muscles when they're being stressed like this, they released something called male queens.

And these male canes go up into the brain and they increase that body and F Right. And we talked about that. So like Miracle-Gro for the brain, so really powerful.

So I recommend squats, deadlifts, lunges, things like that. Work with a trainer if you're really concerned. If anything I just said they're like, makes you fearful or you think or if your mind shut down like, I'm definitely not doing that.

Just get a trainer that's there, have them show you a routine that and let them know that you're number one priority is not getting injured. Right. Injury prevention number two is building lean body tissue so that now they'll help kind of design something for you.

So when it's so. Think of maybe like a lot easier a yoga class or even they're like, I went to a power fusion class at my yoga studio the other day and there were some small weights, some like £2 weights that we used and that had an instructor.

And it was also the cost was a lot lower because it's in a group setting. So you have any thoughts about using something like that for strength training?

Definitely. I mean, anything is better than nothing. So even using bodyweight I think is great, right? So doing bodyweight, fantastic. Great way to start.

I just want you doing resistance training. That's the key that's going to help preserve your lean body mass. If you're worried about losing too much weight, number one thing you could be doing is resistance training.

Number two, increasing protein protein levels. And then number three, prioritizing good sleep.

Exogenous Ketones and Troubleshooting Ketosis

Because sleep is really where when you heal and regenerate, when you sleep well, you're going to produce the kind of hormones, human growth hormone to starts around that really help with preserving maintaining lean body tissue so super key really focus in on that and then that's a way that you can actually as you do this, you will notice and we talked about the nutrition principles with getting the right protein and fat for a lot of people.

They notice that they're not really all that hungry and they may even go down to two meals a day and feel great with that in a condensed eating window.

I just had a call with a lady, you know, when she's, you know, in this demographic over 70, she told me she's doing eating two meals a day. Now, I had her eating three and she's like, I just I'm them not hunger, not that hungry.

So she's eating at 12:00 and 5:00. Right. And it's great. And so we know that her body's getting into ketosis because that's why she's not hungry and only doing two meals a day.

It's a sign because she's metabolically flexible. Her body's good at burning fat for fuel. She told me her energy is significantly better brain, foot, mental clarity significantly better, and so these are things that definitely can be done.

The key, again, is resistance training, dialing in those macronutrients, really finding out, you know, getting the right amount of protein, healthy fats, you know, getting a lot of those phytonutrient rich vegetables.

And then as the cravings reduce and the overall appetite reduces, you can kind of condense that eating window a little bit more. So you get even more benefits from the ketones.

I'm curious what your thoughts are on exhaustion as ketones. Yeah, I think exogenous ketones are another great tool. And so you could do something like for example, C8, MCP oil, which turns very quickly into ketones in your system.

And so a lot of time, especially as people are first starting, I'll have them do a teaspoon of that with each meal, C8, MCT oil, that's great. And then you can also use exogenous ketones.

So there is ketones salts and then there's also ketone esters. In fact, I just talked to a new company, TechEd in and they've got a great drink. That's key ketone esters increases.

Your ketones doesn't have the salts. You know it's really I mean they designed it for people dealing with dementia. I have to give you an introduction to them.

They designed it for people dealing with PTSD so they get the ketones quickly into the brain. I think it can be a wonderful tool and especially if somebody is dealing with, you know, a lot of neural inflammation, just keeping the ketones elevated can be really powerful.

So if somebody's shrinking exogenous ketones or we want them, we want to get the body producing ketones, but we can also assist the body and we can also bring down overall inflammation by using some tools, whether it's C8, MCT oil ketone salts or ketone esters.

I think I'm a huge advocate of those. And when people are struggling to get into ketosis, maybe it's their first time ever being in ketosis and they're trying really hard restricting carbohydrates.

They're testing their ketones and they're not getting over like one meal. What do you suggest as ways to troubleshoot that? Well, you know, definitely focusing on good sleep.

Stress reduction is key. You can get like a continuous blood glucose monitor that you can actually be looking at how your body's responding to all the particular foods you're consuming.

I think that's a good thing to do. Just see if there's anything you're you're consuming or stress or maybe the coffee you're drinking in the morning or whatever it is that just seems seems to really cause a jump in your blood glucose.

And so the nice thing about a CGM is you're able to test rates, right? It's right there in your arm doesn't hurt to put on and you know, you just check your phone with that.

Right. It's got a yellow app you are able to see. Oh, my. Blood sugars 92. Oh, my blood sugar is 98. And you're

able to see how your body's responding to the various input that you're putting in. So I think that's a really good idea.

And then using so I've been using this MCT oil trick or C8 only msi2. Also, not all Msi2 oil works the same. All Msi2 oil will break down into ketones.

However, some are a lot quicker than others, and so the C8 is the quickest and also it tends to be the easiest in the digestive system. Some people have a lower threshold for how much they can take before they get, you know, kind of the symptom that people get if they take consume too much too quickly is they get diarrhea, right?

Disaster pants. And so obviously you want to avoid that. So I recommend you start with about a half a teaspoon with a meal, see how your body responds and does. Or you can do half a teaspoon.

You know, you could do during fasting window as well. It's going to have minimal effect on, you know, technically it breaks your fast, but it has minimal effect.

If your goal is to get into ketosis, it's not going to it's not going to negatively impact it's actually going to positively impact that element of fasting.

And so so take a little bit at a time, right? Just kind of see how your body responds. If you feel fine with that, you go up to a teaspoon, right? And for a lot of people, they can do a tablespoon.

I mean, I can do two tablespoons at a time and and feel great, right? Feel phenomenal. And so you could try the MCT oil or exogenous ketones, right? There's a lot of different exogenous ketones that are out there.

Most of them are flavored with like stevia and things like that. Sometimes in some situations that can trigger more cravings. Or if you're doing during fasting window.

And so that's kind of why I like the MCT oil. Oh, really? Yeah. And so. Most of those is when I drink something. We yeah. Gasoline like they taste so disgusting.

Know these guys have a certain patent that they were able to create Quito Ester that doesn't have like, you know, the diesel fuel type flavor to it. So and then they don't have to flavor it with like a bunch of stevia and stuff.

And so, so anyways, I think that's a really good, good, good, good strategy as well. So those things can be super helpful. Could I I'm curious, you know, we've been talking about Quito, but I know that you have a wealth of knowledge around other things.

Biohacking Exercises for Brain Health

Would you want to leave our audience with some ideas of biohacking strategies outside of ketosis to support brain health? Well, for sure. You know, we talked about exercise and there are certain things that you can do actually from an exercise perspective, certain types of movements that give you an even greater increase in body and f so one of them is cross crawl exercises.

So when a baby I have four children so my children are crawling, you know, there's most parents think, oh, the faster you can get them to walk the fat, you know, the smarter the child is or the more advanced they are.

But actually, the crawling process itself is actually increasing body and RF, particularly in their corpus callosum, the part of the brain that connects that to hemispheres and so they're actually increasing a lot of synaptic density, which gives them greater and greater complexity of thought and whatnot.

It's thought to at least be able to do that. And so you can actually do that. You know, we're adults. We're not, you know, learn how to walk, but you can do cross cross style exercises, you know, right hand hits, your left leg, left hand hits your right leg.

You could do balance exercises, for example. You could do it, you know, depending on where you're at with your physical condition exercises on one leg, right?

If you're doing something on one leg or, you know, I mean, I do exercises, for example, I'll do like a bent over reverse fly exercise where I am bent over.

I have I'm on one leg at a time and I have my eyes closed and then I'll I'll alternate legs, right? So I'm really challenging my brain to adapt. So these can be really great exercises and we call them aerobics.

And aerobics can be simple things like combing your hair with your non-dominant in hand or brushing your teeth with your non-dominant hand or more complex things.

Like, you know, like I was just talking about like doing something on, you know, one leg with your eyes closed. So they can be all kinds of things like that.

Even like if you look at when, when a police officer pulls somebody over and tests them for a DUI, they're testing a part of their brain called the cerebellum.

Cerebellum is real sensitive to alcohol. You can actually cerebellum is called the little brain and the cerebellum, all the connections from our frontal cortex and our sensory parietal cortex run through the cerebellum and down into, you know, all of our muscle systems and things like that.

And the cerebellum constantly replaying and in a sense trying to perfect all of our various motions. And so actually just doing all the different things that they would test you for if you had to do.

You know, if they were testing for a DUI like Hilda, tell walk, right? Going through a hallway, you know, get your hands available just in case he, you know, bend over a little too much.

But doing a heel to toe walk and especially you start with just the heel to toe walk and then you can do heel to toe walk with your eyes closed and this is going to really ramp up.

BDNF brain derived neurotrophic factor, nerve growth factor. It's going to really enhance cerebellum function. You know, you can do finger to nose, right?

Things like this right here. In fact, people that have a lot of neurological inflammation, they struggle. They'll you'll start getting, you know, this right here.

Right. So especially if you notice that, you know, these movements can be a little more challenging. That means you actually want to train those movements.

You want to train in a controlled setting. You want to overwhelm your system. But training those movements will actually increase and help to heal the parts of your brain that have been breaking down.

So aerobic exercises again, non-dominant hand, you know, if you're driving, if you're if, you know, you feel safe, let's say you drive the same way to church every every week or the same way to your grocery store.

Take a different route. Right. Kind of challenges your brain to start to. Oh, okay. Yeah. This road here this road. Right. Challenges your brain to start to have to really adapt.

It's a stressor and your body gets stronger, more resilient through it. Your neurons get stronger, more resilient. You develop more synaptic density and synaptic plasticity because of it.

And so it's very, very powerful. That's amazing. Einstein, just really interesting is that they studied Einstein's brain at Stanford. They want to see this.

He have more neurons than the average individual of his same brain size. And they found that he didn't. He had the same amount of neurons, but he had almost twice as much synapses.

These little gaps between the neurons and Einstein was said to have like he would walk, he would pace down his hallway. Right. Kind of like a heel to toe walk right.

And sometimes close his eyes and visualize things. So when he was really trying to think through something, he would pace back and forth, close his eyes sometimes.

So he was doing these kind of exercises and it would and obviously it helped him have greater cognitive spark, greater intellectual breakthroughs. And I would say from a physiological perspective, it was this kind of approach of ramping up that cerebellum parietal frontal cortex and just getting more blood flow, more BDNF increases in those regions.

I've had a couple instructors or mentors talk about finding relationships between things. So if you're trying to remember something, if you're trying to learn something in more depth to create those relationships between, say, if we're talking about ketosis and dementia, okay, what are all of the relationships?

And then the physiology relationships. What are what about the cooking, the recipes create all the relationships and kind of draw that mind map, if you will, and that that will help to solidify it in your brain.

And essentially what you're doing is you're making those connections in your mind, in your thought process, but physiologically, physically, in your brain, those synapses are those connections between neurons.

And so it's a great way to learn at whatever stage your and this is so exciting and really, really informative. Thank you so much and thank you for your grace with all of your listeners with my laryngitis today and you as well. David, it's been such a pleasure having you.

I want everyone to know where they can find out more about you. Yeah, of course. drjockers.com is the best place. Of course, I'm on different social media, Instagram, YouTube.

I've got a great podcast, Dr. Jockers Functional Nutrition Podcast. We've had you as a guest on that. And yeah, so that's those would be the best places.

Fantastic. Thank you so much for being here and sharing your insights. Thank you, Heather, for having me on and and really excited about this summit. Thank you.