

THE MODEL HEALTH SHOW

EPISODE 503

10 Strange But True Facts About the Human Brain

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SHAWN STEVENSON: Welcome to Model Health Show, this is fitness and nutrition expert, Shawn Stevenson, and I'm so grateful for you tuning in with me today. On this episode, we're going to be taking an incredible adventure into the human brain. The human brain is very secretive, and we're going to interrogate it a little bit to find out what's happening behind the scenes. And we're going to look at 10 strange but powerful facts about the human brain. We're going to kick things off with a really fascinating, really strange tenet about the human brain. Now, even though the human brain can tell you about pain taking place anywhere else in your body, the brain itself does not feel pain, and it's because the brain does not have nociceptors. These are pain receptors to actually indicate and express pain within the brain itself. Now again, your brain can tell you about pain elsewhere. Now pain, if we really think about it, is an important part of our survival and our functionality as human beings, because pain really indicates that something is wrong, it gives us feedback that something is wrong, "I don't like this," if you accidentally touch something hot, you touch a hot stove or a hot iron, and you jump back really quickly. That pain indication your body is telling you that this thing could melt you. You're going to get your wicked witch on. You're going to get melted if you don't back away. Alright, it's giving us indication that this thing is harming us.

And if we think about maybe stubbing our toe, for example, rummaging around in the night and you stub your toe, that pain is giving you feedback that you need to be more careful. That's something that doesn't feel good, it's potentially injurious, and it's going to create a heightened state of inflammation. But we're registering that pain response, even though it happened in our toe, our brain is picking it up and giving us this overall data. So, the same thing in internal intrusion experience of pain, maybe you think about something like heartburn, for example. This heartburn is giving you an indication, "Listen, Shawn, you probably shouldn't have ate that chili and cheese nacho from 7-Eleven. If you got to go to a pump and pump the chili out with a pump machine, chili from a pump is probably not the best thing for you, and I'm going to express this Gargamel-level heartburn for you, make you feel the cauldron bubble so that you make a decision other than pumping your chili or meat from a tube." Alright? So, these are things that we might do on a day-to-day basis, but the thing is, too, we can ignore the pain. We can ignore the pain, we can get that pain feedback and keep doing the behavior, but what's going to happen is, our bodies are going to express pain in different, creative ways, to try to get us to pay attention. But it's all going to get regulated by that incredible master station, upstairs in the brain.

But again, the brain itself does not have nociceptors. And these nociceptors are the receptors, these nerve receptors that actually indicate and experience pain. Now, you might have seen videos, for example, of surgeries taking place, where somebody's having a brain surgery while

they're awake and coherent, and they're literally getting their brain operated on at the same time. And partly, this is because, again, the brain itself does not feel pain. Now, just to be clear, something might come up for us, that, "Well, what about headaches? What about migraines?" And we might even experience a sensation of pressure or pain, deep inside of our head, inside of our skull. But what that really is, is just our perception of where the pain is coming from. And that's what it's really about. The brain interprets pain signals sent to it, but it does not, again, feel pain itself. It interprets it, and that perception of pain can be a little bit misconstrued. Now, this is one of the strange facts about the human brain. This is one of the strange facts about this incredible organ. Theoretical physicist, Michio Kaku said, "The human brain is the most complicated object in the known universe." That is a major statement, for somebody to make a statement like that, somebody of his caliber, to say something like that. And one of the complicated things about it is that the brain can tell you about pain elsewhere, but the brain feels no pain itself.

Alright, so that's number one of our 10 strange but powerful facts about the human brain. Now we're going to move on to number two. And number two is that your brain grows three times its size during your first year of life. The human brain expresses rapid development in that first year, in overall functionality, but also in the sheer size of growth. And this might be indicative of babies having a little bit of difficulty trying to balance themselves, getting it together just to walk, 'cause we might have that big sucker on top of our shoulders, we got a little tiny body, and the baby's... Our head could be a little bit bigger, and it can get things a little bit off, until our bodies catch up and are better able to balance our bodies and our muscles, as well. So, this is for a reason. The human brain... And human, if you look at other species of mammals, for example, we come out pretty vulnerable. We do a lot of our development outside of the womb, whereas other animals in nature, many of them, they got to get up and get right to it. If you've ever seen a giraffe birth, for example, and the giraffe, they're already tall, they're already up there, and they drop the baby out, already getting here, literally dropped off from a certain height.

You're entering life with a bang, and you got to get up and get busy because there's predators around, you got to get up and learn how to walk, relatively quickly. Whereas humans, we are very vulnerable, and we're nurtured, we require that human connection for our development. We require a lot of human support and guidance for us to develop. But this speaks to the overall capacity. How much is going on with the human brain? That's where really, all the magic is really happening because there's a lot of transformation taking place, laying down pathways for new functions and memory. It's just like rapid-fire when we first get here. And a part of that, again, is the growth of the overall size of the brain itself, and a big part of that, obviously, is going to be thanks to the nutrition that we're bringing in, giving our brains the raw materials that it needs, to grow itself. If we're deficient on the things that the brain is made of, we're not going to get that growth. We need it.

And unbeknownst to most people, if we're looking at the primary food, the thing that we know for certain, that humans are designed to consume, is human breast milk, when we get here. That is true human food. And if we look at the construct of what is coming along, in breast milk, we start to understand what a major role it plays in the development of our brains. And human breast milk is actually significantly rich in saturated fat. Saturated fat, upwards of 30, even in some instances could be upwards of 50% saturated fat. And this is something, this word has been really vilified in our culture and in our media, and the question is, "Why would saturated fat be so bad for us, if it was literally one of the primary foods for human beings when we get here? How does that even make sense?" It just doesn't. It's taking nutrition and putting it into this very black and white, this dichotomy, polarization, and making it good/bad, versus all of the gray area in between, when we're looking at fats like saturated fat, because the human brain itself, saturated fats are an important commodity, so much so, that human breast milk, again, is very rich in saturated fat.

Another thing that human breast milk is rich in, unbeknownst to most people, is cholesterol. The human brain itself has the highest concentration of cholesterol, versus anywhere else in the body. Cholesterol is more concentrated in the human brain than anywhere else. About 20% of your whole-body cholesterol is located in that amazing brain of yours, and about 80% of that cholesterol is located within the myelin, the myelin sheath of the human brain. One of the primary roles of our myelin is to act as an insulator for nerve conduction, for nerve transmission, for behavior, for signaling to fire faster and faster, as we're laying down more and more myelin. So, if we're talking about a baby taking their first steps, how do we get from there, to being able to walk effortlessly, to being able to walk and talk, to being able to walk and listen to music at the same time, or being able to walk and chew gum at the same time? How can we start to outsource the walking, to just automation and be able to do other things, because it's such a pattern that's been laid down? It's thanks, in large part, to the development of more myelin. That's where we see that repetitive behavior that we might do, is helping to lay down more and more myelin.

And if we understand the role that cholesterol plays in the development of myelin, we start to, again, have a better respect, a more vast understanding of cholesterol, than this very black and white statement that cholesterol is bad for you or that there is even such thing as "bad cholesterol," when LDL itself, for example, it's not cholesterol, I didn't say cholesterol when I say low-density lipoprotein, it's a carrier for cholesterol. And LDL, you would die without it. You need LDL, it's helping to deliver cholesterol various places that it needs to go in the body. Then we get into the conversation about particle size, and we get into the conversation about oxidation of these cholesterol carriers. Some of the real culprits here, if we're talking about the relationship between cholesterol and heart disease. And we talked about that recently, on

a master class episode, with one of the foremost experts in the world, on the topic of cholesterol, Dr. Jonny Bowden. So, make sure to check out that episode, as well.

But another really important facet of this cholesterol conversation in the growth of babies' brains that, again, gets three times, grows three times its size during that first year, if we're lacking on this input with cholesterol, for example, a tremendous amount of cholesterol is synthesized in the brain, within the first few weeks of birth. And disruptions to this process can lead to neurodegenerative disorders. So, this is helping to fortify the brain for a lifetime, potentially, and we got to really start to investigate and ask questions, "Are we getting the same benefits if we're looking at infant formula versus human breast milk? And what are some of the solutions there, because we need to have adequate amounts of these things that are often not considered?"

A study published in the American Journal of Clinical Nutrition found that breast-fed babies tend to have healthier levels of blood cholesterol later in life. So, the researchers uncovered that having abnormal or what they consider to be dangerous levels of cholesterol, that potential, that risk goes up when the child is formula-fed, versus breastfed. The research believed that the reason breastfeeding may result in lower cholesterol is that the high cholesterol content of human breast milk may exert physiological changes that influence cholesterol synthesis. So that input, that influx of cholesterol from breast milk, helps the body to actually be able to process and utilize cholesterol properly, not just then, but later in life. It's powerful stuff. Powerful insights. So again, number two on our list of these 10 strange but true facts about the human brain is that, during our first year of life, our brains grow three times their size.

Now we're going to move on to number three on our list. And number three of these strange facts is that our brain eats most of our energy. The human brain actually consumes the greatest proportion of our caloric intake, our energy intake, versus anywhere else in the body. Now, the crazy thing is that our brain actually only takes up about 2% of our body's overall mass, but it consumes 20 to upwards of 25% of our caloric intake. It is a hungry, hungry organ, and it's constantly consuming energy. A big part of that, we've talked about recently, in a master class, really looking at what the brain itself is made of, and we dove in deeper, on the three different types of fat that the brain is made of. So, make sure to check that episode out, because we mention cholesterol. We also ended up... So, we talked about sphingolipids, we also talked about phospholipids and so much more. So make sure to check that episode out, as well.

But here's the crazy thing. The human brain, a big reason it's driving and siphoning all that energy, it isn't just the brain itself, but it's also the brain security system, the blood-brain barrier, which is abundant in mitochondria. And mitochondria, well noted to be these energy

power plants in our cells that kick off a lot of energy, but they require a lot of energy as well. So that's one of the big theories around why the brain is utilizing so much energy, and calling for so much energy, is the protection of the brain itself, not to mention, all of the trillions of processes that's happening in the brain every second. It needs energy for all of it to work. Alright, so your brain, even though it's only 2% of your body's mass, it is consuming the majority of your energy. So that's the third of our strange facts about the human brain.

Now, to take this a step further, and number four on our list, yes, our brain consumes the majority of our energy, versus anywhere else in our bodies, but your brain has its own selective diet. Even though your brain consumes most of your energy, it's also a very picky eater. Not everything you consume, not every nutrient is allowed to make its way into the VIP section of your body, which is located upstairs, in that amazing brain of yours. Again, we have the blood-brain barrier, which is a protective force that helps to ensure that only the right stuff, with the right certification, with the right pass, is able to make its way, that make sure that they're on the list, to get up into the brain's VIP section. And also, the elimination of things, like what's coming out of the brain. We've got this dual-action function with the blood-brain barrier. Very, very powerful and again, we talked about that more in depth on that episode, looking at what the brain is really made of. So, the blood-brain barrier is determining what's going to make its way into our brain. Now, the diet that the brain has, being that it's a picky eater, we like to call it neuro-nutrition.

We have whole-body nutrition, we have nutrition that is preferentially used by our fat cells, by our joints, by our liver, the list goes on and on. But your brain is the most picky eater of all. The blood-brain barrier really acts sort of like a helicopter parent, or a parent who's really spoiling the kid, right there, front line. The brain is like, "No, I don't like that, I don't want to eat that." And the blood-brain barrier is like, "It's okay, we'll just get you what you want," and it's always looking out, trying to make sure that the brain is happy and really paying attention to what's making its way in there. Now, most abundant openings or gates that the blood-brain barrier has, to allow into the brain itself, is going to be gates for certain types of fats, structural fats. It's going to be gates for certain types of minerals, like magnesium. It's going to be gates for glucose. It's going to be gates for certain gases, like oxygen. It's going to be gates for water, but there's very specific nutrients, again, that are able to make their way into the brain. Now, a problem that can take place is that that protective parent can get damaged, it can get overburdened, and start to lose function where things that are nefarious, are starting to make their way into the brain itself.

So, the degradation of the blood-brain barrier is a massive issue today. So, whether it's from toxicants from our environment like pesticides, well noted to damage and disrupt the blood-brain barrier function. Alcohol can be very detrimental to the blood-brain barrier. Alcohol is one of those things that also has express pass gates to get into the brain. Also, excessive

amounts of sugar can degrade and decay, break down the blood-brain barrier, as well. So, we have to be mindful of this and support the blood-brain barrier to protect the brain and make sure that the brain is able to access the most healthy diet possible. Now, one of the things that's been confirmed in the research, to actually help to regenerate and protect and heal the blood-brain barrier, funny enough, this was uncovered by researchers at Auburn University, they uncovered that extra virgin olive oil, oleocanthal-rich extra virgin olive oil, is able to repair and support the blood-brain barrier. This highlights, yet again, the important necessity for high-quality fats, to literally create the tissues of our bodies, including the tissues that protect our brain itself.

So, what the research has indicated was somewhere in the ballpark of two to four tablespoons a day can really have some great supportive effects for our brain and nervous system and many other health aspects, as well. So that's one piece of it, but also we got to understand that as we get older, as we age, as I mentioned before, the brain is just siphoning and pulling up in our early years, in particular, that first year of life, cholesterol and saturated fat, but those gates start to kind of close up shop a little bit, and it becomes a lot less needed or less able to access and get into the brain as we get older. In fact, the brain can make its own cholesterol, and the particular area of the brain or the parts of the brain that are making cholesterol for the brain itself on demand are our astrocytes.

Alright, astrocytes, but through our diet, those gates start to essentially go down. But still, cholesterol is so important that the brain can make it itself. The types of fats that actually are able to get into the brain are not the ones that are more needed for caloric energy, they're the fats that are needed to give the brain structure and support to allow signal transduction and things of the like. And one of these fats that's able to make its way to the brain, this is according to researchers at Yale University... They published data purporting that medium-chain triglyceride, so medium-chain saturated fats can readily cross the blood-brain barrier and be utilized by our brain cells. Alright, medium-chain fatty acids or MCTs. A remarkable study published in the Annals of the New York Academy of Sciences sought to find out if MCTs could have an impact on improving the condition of patients with Alzheimer's disease. Alzheimer's? A lot of folks are not aware of this, but it's been creeping its way into the top 10 leading causes of death here in our society. It's a devastating, devastating condition that has been on the rise for many years, and we need to take a step back and ask, "Why is it happening?" Not just trying to treat the symptoms of Alzheimer's, but ask, what are the causative agents that's leading to this epidemic.

And so, it's also considered to largely be a process that when it takes hold, there's nothing you can do to stop it, you can just try to slow it down a bit, but being able to reverse it, it's very rarely seen. Now, we have this data. So, this again was published in the Annals of the New York Academy of Sciences. The scientist in the study discovered that since MCTs are quickly

metabolized by the liver, prompting the production of ketones, those ketones are then able to easily cross the blood-brain barrier and provide an alternative fuel source to the glucose-impaired brain cells of Alzheimer's patients.

The scientist found that the consumption of MCTs directly led to improved cognitive function in mild to moderate forms of Alzheimer's disease and cognitive impairment. People got better, they got better by utilizing something so simple, medium-chain triglycerides from real whole foods or whole food concentrates. This is accessible for us. These are things that we would have gotten through our evolution. Now the question is, where do we get access to abundant sources of MCTs, medium-chain triglycerides? Well, one of the different types of MCTs, which again, there's many different lengths of the chain, if we're talking about long-chain fatty acids, medium-chain, short-chain, one of them is called caprylic acid, and it actually derives its name from the word "Capra", which is Latin for goat. So, goat's milk is well noted to be an abundant source of medium-chain triglycerides, alright, or MCTs. So, there's a whole goat milk revolution taking place because folks that find that they can't really tolerate cow's milk, they're shifting over to goat's milk.

But some folks, again, this is dependent upon you and your unique metabolism, this is not an advocacy for goat's milk or cow's milk. It's about what's best for you and your individual needs, but some of the science here and asking where do these ideas and these things come from? What have humans been utilizing the longest? That's one of the sources, but also you can find medium-chain triglycerides in coconut products, is another really abundant rich source. In particular, there are concentrated MCT oils right now that are very, very popular for good reason, that are derived from either palm and/or coconut. And coconut is definitely the more ideal source, more sustainable, and I'm a big proponent, a big, big fan of MCT oils, it's something I have pretty much on a regular daily basis because of the cognitive benefits, the benefits with metabolism. Really, really good stuff, but you've got to make sure that you're sourcing it from an ethical place and also that...

So that you're actually getting the MCTs to do these cool jobs we're wanting to do. We've got original MCT oil, which is a clear oil, but there's also emulsified MCT oil, which makes the oil sort of like a coffee creamer, so it's really great to add to coffees and teas and smoothies and things like that. So, where I get my MCT oil is from Onnit. Onnit is world-class when it comes to MCT oils, my favorite is the almond milk latte emulsified MCT oil, highly recommend checking them out. It's onnit.com/model, that's O-N-N-I-T.com/model, and you get 10% off all of their amazing MCT oils. Alright, so definitely check them out onnit.com/model to get Onnit. Now again, remember that MCTs are one of the select foods that's able to make its way through the blood-brain barrier via the MCTs themselves, but also from triggering your body to produce ketones whenever we consume MCT oil, as well. So, our brain is a choosy lover, it's very choosy and selective about what it allows into its inner matrix, alright, very choosy. And

MCTs get chosen, alright, it gets chosen by our bodies as a primary fuel to help to support the function of our amazing brain. Alright, so we're going to move on to number five. Here on a list of 10 strange but true facts about the human brain, number five is that the human brain does go on sleep mode, but it is still incredibly active all the time, even at rest.

We might think that the brain is maybe shutting off, or different parts of the brain might be shutting off. We even have this idea and culture that we're only using a small percentage of our brains, like 10%, for example, of our brain's potential. But that really comes from the realm of personal development, not from the realm of science, because there's not recesses of your brain that are just like, I'm not doing anything. I'm not working. They're not tapping into their true potential. Our whole brain is functioning and working at all times, however, we can, we have massive, really infinite capacity for our brains to work even better.

That's the key. Alright. So, it's not that we're only using 10% of our brain, we're using all of our brain, but the question is, are we using it very well? And so, our brain is also very active, even at rest. So even when we go on a sleep mode, the brain is shifting over. And part of the reason that we know you're asleep is that that we see a change in your brain waves, alright, so the rhythm, the electrical output of the human brain itself. Right now, when we're awake, we're in a state of beta, beta brain wave frequencies, maybe even a little bit of gamma, alright. Gamified. Shout out to the Greeks. But these are some of the more normal waking states, but we can also move into a little bit of alpha, as well. That's when we're really in a focused state, really locked in or even inflow, for example, much more clear, much more relaxed, and much more present. We can really tip into alpha.

And then from there, we can go to theta. This is where we're really transitioning into sleep, and even delta is where we have that kind of deep anabolic rhythm taking place. Alright. So, we're transitioning in and out of these states during sleep, and this is how we really know you're asleep. Sleep is so weird, it's such a weird phenomenon. And the way that we really know that you're sleeping and not pretending to be asleep... Do you remember pretending to be asleep when you were a kid? You're pretending to be asleep, so maybe your parent comes in, wakes you up, and gives you maybe a little snuggle, or they bother you, or your sibling or whatever, so they don't bother you. Have you ever pretended to be asleep? How we know that you're asleep is we see a change in your brain wave frequencies. Right now, there are some advanced meditators that can actually tap into and dip into delta brain wave frequencies, at will. Alright. So, we can train ourselves to get to these very relaxed, in-touch, just tapped-in states. However, for the majority of us, we're just running around, and this stuff is just happening automatically. But this speaks to the power of us getting some brain training and really starting to take control of the ability for us to stay focused, to improve our attention span, to improve our memory, the list goes on and on, by us understanding and training our brains and even helping to modulate our brain wave frequencies.

So again, a lot is taking place when we are physically inactive. The brain is still very active, and another one of the things that's taking place, even speeding up, when we're asleep happening in the brain, is the action of the brain's cleaning system, the janitor system is showing up in the evening to keep the building clean. Alright. And this is called your glymphatic system. The human brain itself, again, we've got trillions of processes taking place in our brains every moment, and there's a lot of metabolic waste that takes place, and we need to keep the house clean. We do not want build-up taking place. And one of the things, is also well noted and seen in Alzheimer's isn't just insulin resistance in the brain, as we touched on a tiny bit earlier, but it's also the inability of the brain to clean itself, the build-up of amyloid-beta plaque, for example.

And so having the opportunity for us to understand what also has been changing in our society recently, and that is more and more sleep deprivation. It's become a commonality, where again, we were just, we evolved in places where we had natural day and night cycles. Maybe we can tinker with that a little bit, but now it's society-wide. Where we can artificially manipulate and change these patterns. We can create daytime effectively with our artificial lights, and we can just ignore real daytime and people getting access to getting outside and getting some sun on their skin. Or if they do go outside, we're walking around with sunglasses on and not letting our optical receptors to pull that light in and help to inform the circadian timing system. The list goes on and on, but if you understand this, that our sleep hygiene has been declining and Alzheimer's has been increasing, these two things are not an accident, alright.

Because the greatest time of renovation and house cleaning for the brain is when you're asleep. The glymphatic system to clean house in your brain is 10 times more active when you're asleep than when you're awake, 10 times more active. Not two times, not five, 10 times more active, getting to work and cleaning house. Alright, so this is another one of the things that again, you might go on a sleep mode, but the brain is still incredibly active. Another thing that the brain is doing while you are on sleep mode is kicking up something called memory processing, and a lot of that takes place actually during your REM sleep, alright, so rapid eye movement sleep. This is where a lot of dreaming takes place, and it's during that time that your brain is taking what you're learning even right now if it is of importance to you and putting it into your short-term memory. It's filing it away and making it something that is a little bit more permanent than something that's just here today, gone today. Here in this moment, gone in this moment.

We can actually... If there's something that we're wanting to learn and pick this up, a lot of the filing takes place when we're asleep. Really, really powerful stuff. So even though your brain can go on to sleep mode, it is still very active. So that's number five on our list of these 10

strange but very true facts about the human brain. Now we're going to move on to number six. Number six is, your incredible brain, as powerful as it is, it's also incredibly fragile. Alright. The human brain itself is the consistency of soft butter. Alright. So, this is the butter that you leave out, some people have a little butter tray. You can get into a debate about families like this. Some people believe the butter should be in the refrigerator at all times. Some people believe you should leave the butter out, so there's this room temperature, it just kind of leaves out in the butter tray. I'm not saying, which is best, but there's a debate on the streets. But when you leave it out, the butter gets soft. So soft butter, that's the consistency of your brain, it is very, very delicate. And so, this is why the human brain is the only organ that's fully encased in hard bone, alright.

So, your cranium, your skull, is protecting that delicate brain of yours. It is so powerful, there's so much change. Part of the reason that it is so delicate is that it is also so malleable and changeable, alright. The plasticity of the brain, it has to be able to change quite a bit every single microsecond, so this is why it remains and has a soft consistency because it has to be very changeable and adaptable. So, keep this in mind that we want to be adamant about protecting our brain and not necessarily being a little bit more cautious about participating in things that might rattle our brain around.

There's a lot of work being done around being more mindful of brain injuries, and even in what we would consider small things, even though they can be absolutely devastating, which is concussions, for example. We've had on one of the foremost experts in the world, if not the foremost expert in the world, Dr. Daniel Amen. And he has the largest database of SPECT imaging. So, SPECT imaging is actually looking at blood flow in the brain and being able to get a peek and see what's happening in that very protective brain of yours, taking a peek behind the cranium and seeing what's happening. His work has been utilized in some of the big changes that have been worked towards or they're working towards, which again, there's so many levels to this. But with the NFL, for example, and his work was included in the work that was kind of brought to the forefront in the movie Concussion, as well. He really helped to support in that research.

So, Dr. Daniel Amen and will put one of his interviews for you here in the show notes, and I'll tell you right now, he is very much not a proponent of contact sports that has your brain rattling around. He gives the example that your brain is sort of like in a very tight jar of water. You've got your cerebral spinal fluid and your brain just kind of just floating around in there, but it's a tight quarter. And hard hits and things knocking against your body, your brain is just kind of just shaking around in there and things can get damaged, things can get disrupted. So, you want to be a little bit more careful about this. It's not that these contact sports are inherently bad, it's a big part of our evolution as a species. You've got the Warrior Guild, people getting out and competing and doing various things. We just need to be more mindful of this

and if we are doing any types of contact sports, we need to be even more adamant about brain health and brain hygiene to help to heal up and support the brain proactively, protectively, preventatively, but also providing the things for the brain to heal and recover as fast as we possibly can.

So again, that's number six here on our list of these 10 strange but true facts about the human brain. Your brain is the consistency of soft butter. Alright, we're going to move on to number seven. Number seven, of these strange but true facts, is that as complex as your brain is, as powerful as your brain is, it's mostly water, it's mostly made of water. Your brain is approximately 78% water. It is the most water-dominant organ in your body after your lungs. Your brain truly is, it's a liquid foundation. It has this incredible fluidity to it if you really think about it. And this is the amazing thing about water, is that it can have fluidity, but it can also create structure. Right? So, keeping this in mind and remembering about the blood-brain barrier, you have express pass entry for water to be able to make its way into the brain. Now, the question should immediately be, if we're talking about optimal brain health and brain functionality, what happens when we are dehydrated? Well, according to the Journal of Neurology, even short-term dehydration literally reduces the volume of your brain.

Again, that's just short-term dehydration, shrinks your brain. Alright. It is that serious and it's that simple. We have a tremendous amount of gates with the blood-brain barrier that allows in water. The brain needs water in copious amounts because it's made primarily of water. Every action and activity, every nerve firing, every activity of myelin getting laid down, every neurotransmitter, all of it's happening in a water medium. We require, your brain requires water in order to fortify its function and to maintain its form. It is that important. The study also noted that rehydration, which is the opposite of dehydration, rehydration rapidly restores brain volume. Alright. That's the good news. So, wouldn't now be a good time to get a sip? Wouldn't now be a good time to make sure that we are hydrating our brain? Another study cited in Medicine and Science in Sports and Exercise found that just a 2% drop in your body's baseline hydration level can lead to impairment in tasks requiring attention, motor coordination, and executive function. Alright, just a 2% drop. Water is that important for the form and function of our incredible brain?

Alright, so keep that in mind. If we're looking at the next fancy-pants nootropic, if we're looking at improving our cognitive function, water first. It's the primary foundational thing. If we're missing out on this, we're really missing the point. But also, again, keep in mind that we have aquaporin channels, these protein channels throughout our bodies that allow water to hydrate our cells effectively, and with the blood-brain barrier, these carrier bridges that allow the hydration into our brain. We've got to keep in mind that water when we talk about water... In nature as we evolved, it's never been just water, it's never been just H₂O, that doesn't exist

anywhere in nature. It's always H₂O with other things dissolved into it, namely minerals that gives the water structure that gives it conductivity.

We talk about these things, but we don't really get it in our culture, electrolytes. Electrolytes are literally needed for signal transduction in the brain for that electrical potential, for our brain cells to talk to each other, this is how important these electrolytes are. It's not just about sports performance and hydration for the rest of our body, it's primarily for our brains. So, we need to make sure that we're getting adequate amounts of electrolytes. Take sodium, for example. One study and this was conducted by researchers at McGill University, found that sodium functions as a "on-off switch in the brain for specific neurotransmitters that support optimal function and protect the brain against numerous diseases."

This is how important sodium is, one of the primary electrolytes. Again, we want to get it from real whole foods. The majority of sodium found in the human diet today in our culture, it's from processed foods. It's about 70 to upwards of 80% of the sodium people are taking in are from processed foods. Low quality, sodium source, low-quality sodium. When we think about salt and sodium, these are two different things, but we often use them interchangeably. And common table salt, that's sodium chloride, so which is 40% sodium, 60% chloride. There are many different types of salt, there's magnesium salts, there's potassium salt. If you think about Epsom salt, magnesium sulfate, there's different types of salt, so we don't want to just cookie-cutter, put it in one box.

But that's what we tend to do in our culture. We think about sodium and then we also tend to dub it as a potential problem more so than a potential help, and we need sodium. Without sodium, the sodium-potassium pump, we can't really even do anything in our body. All our metabolic processes depend upon this sodium-potassium pump. So, another fascinating study, and this was published in the journal *Neuron*, found that magnesium, another critical electrolyte is able to restore critical brain plasticity and improve cognitive function. Again, we mentioned how the brain is so malleable, neuroplasticity is the ability of the brain to change and adapt. Magnesium, thank you, we need to make sure we're getting a viable source of sodium and magnesium. Real whole foods, fruits, and vegetables in their natural state, they're going to be abundant in certain electrolytes, but today, again, a lot of these electrolytes are just getting siphoned and zapped from our system because they're used for so many processes, and our bodies are constantly in a state trying to adapt to this very abnormal environment that we live in. This is why I'm such a huge proponent of getting a high-quality source of electrolytes. It can be a game-changer. I just mentioned some of the impact that it has on literally working as an on-off switch for neurotransmitters in the brain. That's how powerful it is, restoring brain plasticity.

LMNT, L-M-N-T, those are the electrolytes that I use simply add it to your water to provide that structure for the water, to provide improved cognitive function and really to support the function of our cells, overall. This can be an absolute game-changer. The wonderful thing is that you get to try it for free. Go to drinklmnt.com/model, and they have made such a great gift for us with the Model Health Show to provide everybody with a free sample of LMNT. Go to drinklmnt.com/model that's drink-L-M-N-T.com/model. And they're going to send you a free gift pack of LMNT for you to try for yourself. All you got to do is just pay a little bit in shipping and they're going to send it right to your door. So definitely take advantage. Drink, that's D-R-I-N-K-L-M-N-T.com/model to take advantage of this special gift. Absolutely love LMNT. It's one of the things that I use on a consistent basis now, and the science is pouring in. And also, just the fact that it's based around so much peer-reviewed evidence, even the formula that was put together, the certain ratios of magnesium, of sodium, of potassium to really hit the right notes for the majority of people. It's really, really something special. So again, number seven here on our list of these 10 strange but true facts about the human brain, the brain is mostly made of water.

You are mostly made of water; water is helping to create this sentient being. Water is intelligent and clearly, because again, it's hydrating and creating the most complex object in the known universe. Number eight here on our list, number eight is, information running between the neurons in your brain is happening at mind-blowing speeds. The fastest speed for information to pass between neurons, noted so far by our current level of science that we have at this point, is noted to be traveling at about 250 miles per hour. Incredibly fast transmissions are taking place between the neurons in our brain. Much, much faster than we can comprehend, so much magic is taking place in our amazing brains. So please understand, we're able to process a tremendous amount of information very, very quickly, and these things are happening simultaneously. Your brain is running processes to keep the sensation and awareness in your toes on point, while beating your heart while digesting your food while producing new stem cells, while... The list goes on and on, while regulating your body temperature while regulating your cognitive ability and your function and your focus and your vision and the list goes on and on and on. All happening together at lightning speed. That's how powerful that amazing brain of yours is.

Alright, so shout out to the quicksilver brain that we have. Shout out to the flash. Shout out to that amazing fast brain. Alright, now I'm going to move on, we got a number nine here on our list of 10 strange but true facts about the human brain. Number nine is, despite comprising only 2% of the body's mass, our brains actually consume 20% of our body's oxygen supply. It's not just hungry for food, it's also hungry for oxygen. So that blood-brain barrier is also allowing in certain types of gases, namely oxygen to be utilized by our brain cells. A lot of the processes taking place in the brain are aerobic-type processes that require oxygen to run optimally. So,

if you've ever thought about that before, when we're taking a breath, when we're breathing in, it's not just going to our lungs, it's going to our brain, as well.

Alright, so we want to make sure that we're breathing with some efficacy and effectiveness. Definitely check out the episode that we did with New York Times best-selling author, James Nestor. That one is a game-changer in talking about his incredible project that really highlighted and brought to the forefront the power of our breathing. So that is number nine on our list, is that even though our brain is only 2% of our body's mass, it's consuming a lion's share of our oxygen intake. Alright, now we're at our final one, number 10 on our list of the 10 strange but true facts about the human brain, and number 10 is that your brain is completely unique. Your incredible brain is not the same as anyone else who's ever existed or who will ever exist.

Your experiences, including what happens to you in your life, what you learn, wire your brain in a completely unique way, and that wiring continues to develop as you learn and experience more. It is a completely unique design, unique to you. Your brain is special. It's a one-of-one. And this speaks to how special you are, as well. According to renowned neuroscientist, Dr. Caroline Leaf, she shared that our amazing brains, they aren't just the out-picturing of what's happened in our lives and the world around us and that kind of educational input. She shared that our thoughts themselves create our brain. The flaws that we tend to think that our thoughts are just contained solely in our brain, but as Dr. Caroline Leaf shared, even here on the recent episode of The Model Health Show, our mind, which is far more expansive than just our body, our mind is actually creating our brain. And our thoughts, our ability to think externally of our circumstances, as we thinketh, so are we creating-eth. And no, I'm not trying to do a Mike Tyson impersonation. As we thinketh, so is he. As a man thinketh, so is he?

That's the powerful tenet, and it's really speaking of creation, and it's really speaking of the power of our thoughts to create our reality, and literally to create our brain. Because as we're thinking, we're planting new seeds, we're planting new potential trees that are going to grow and bear fruits. And again, Dr. Leaf really articulated that, and if you watch the video of that episode, she actually gave and showed some visual representations of what happens when we plant a new thought tree into our brain. Because again, our thoughts literally are creating our brain itself, and you have the ability to think the thoughts that you want to think. We've unfortunately been programmed to believe that we are simply the result of our environment, we're simply the result of what we've been indoctrinated with. We are thinking based on our environment alone, but that's not true. That's not true about you and it never has been. We can give silent permission for that to be our reality, but the truth is, you get to think the thoughts that you want to think, you get to think thoughts that empower you or disempower you. Both are true. You get to pick.

But I want you to know today and moving forward that you have the power to choose your thinking and your thinking will literally create your brain. And from there, as we're creating this powerful source of information storage and processing, your thoughts are also going to create the out-picturing of your body. Your thoughts are going to create the out-picturing of your feeling and your emotion, because every thought that you think also has correlating chemistry that's released in your body, as well. These can be thoughts that produced abundant anti-aging, rejuvenative hormones, and neurotransmitters associated with things like positive disposition, happiness, joy, peace. Or we can have thoughts that produce chemistry in our bodies associated with stress and fear, and a sense of anxiety and depression. We have the power to determine our thoughts. Now again, many of these things are happening on automatic, but we are able to change them, nevertheless. You are that powerful. You are that powerful, but how do we stack conditions in our favor so that we can think the thoughts we want to think?

That's really about understanding the power of intentionally putting yourself in environments that are nurturing, that are encouraging you, and reminding you of how powerful you are. Because it's not just the thoughts that we think, of course, it is a powerful first domino, but it's also understanding that it makes it exceedingly more difficult to think the thoughts we want to think when we're in pain when our bodies are in a state of unrest. It's not impossible to think healthy thoughts when you are deficient in key nutrients when you're experiencing acute pain or chronic disease. It's not impossible, but it is harder because our wiring is such that that pain is getting fed to your brain and it's informing you that something is wrong. But we can get caught in that vicious circle by believing that that's all that is, is wrong, something's wrong, is pain, because you can think externally of those things and start to change the chemistry, start to change the cells that are getting made, starting to change, helping to accelerate healing and support healing, rather than inhibit it.

And so, this is a big reason why I wanted to do this episode today was to remind you of how powerful you are, that your brain is a one of one, that means none before it, and none to come. You have a special opportunity right now in this life to fortify and support that amazing brain of yours with incredible experiences, with incredible adventures, with adventures of the mind and creativity, and the adventures of service and support and helping to uplift our world, but it starts with you. Alright, I appreciate you so much for tuning into the show today, I hope you got a lot of value out of this. If you did, please make sure to share it out with the people that you care about. You could tag me on Instagram. I'm @shawnmodel if you want to share the show over there. Or I'm @shawnmodel on Twitter, as well, and I'm at The Model Health Show on Facebook. And of course, you could send this right from the podcast app that you're listening or watching on, and just keep this message of empowerment and education going.

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