THE MODEL HEALTH SHOW

EPISODE 496

Neuronutrition Masterclass: The 3 Dominant Fats Of The Brain

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SHAWN STEVENSON: Welcome to The 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 a journey to the vast universe of the human brain. The human brain consists of over 86 billion neurons, comparable to stars in the Milky Way galaxy. There's about 100 billion stars, upwards of 400 billion, they're still trying to figure that out, stars in the Milky Way galaxy, but there's an entire universe, an entire galaxy happening inside of that amazing brain of yours. Dr. Michio Kaku, theoretical physicist, said that the human brain is the most complicated organ in the known universe, incredibly powerful beyond our wildest imagination, and the amazing thing is that you have one. And on this episode, we're going to learn about how to really optimize that amazing brain of yours, and we're going to really break down what the human brain is actually made of...

Now, those 86 billion neurons, these are specialized nerve cells, but they actually go outside the scope of the brain because we have neurons located in other places of our body as well. Take the gut, for example, the human gut is a mass of neural tissue that actually contains about 100 million neurons in and of itself. Now, this is something we've talked about on multiple episodes of The Model Health Show, and we'll put a couple of those for you in the show notes. But just know that the human brain doesn't just take our food and turn it into you, it also does a lot of thinking in and of itself, and it's in constant communication with the big guy, the headquarters upstairs, with our first brain, and the human gut is often referred to as the second brain or the enteric nervous system. So, there's neurons outside of the brain as well.

Even the human heart. Our heart contains about 40,000 neurons and is often referred to as the heart brain, and this little heart brain is pumping out a tremendous amount of electrical currency. And it has its own nervous system, as mentioned, that is along that access connecting the gut, the heart, and the brain, often referred to as the vagus nerve, alright, the vagus nerve. What happens in Vegas, does not stay in Vegas when it comes to our bodies, alright? But again, it's all connected to the master regulator, the governing force of our bodies, which is upstairs in our incredible brain. So that's where 86 billion neurons are existing, but what we're going to talk about today and really dive in deep on, is understanding that the human brain itself is made of the things that we consume.

Our brain is literally made from the air that we breathe, the water that we drink, and the food that we eat. We get to decide what our brains are actually made of. Now, the greatest proportion of the human brain is actually made of water, and we're going to talk more about that in a moment. But we're going to focus on the dry weight of the brain, alright, the dry weight of the brain. The dry weight of the human brain consists of about 60% fat. Now, this is

where things often get confused and actually get kind of belittled, because there are actually three specific types of fat that make up our brains, that are often not talked about, that are often overlooked in the conversation about nutrition, and also just the structural integrity of the brain.

So today, we're going to talk about the three specific types of fats that make up the human brain. And we're going to kick things off with something called phospholipids, alright, phospholipids. This specific category of fats are one of the primary things that the human brain is made of. Now, phospholipids are made almost entirely out of omega-3, DHA, and EPA, we're going to talk more about that soon, but phospholipids can also be consumed specifically directly from our diet as well. And we're going to talk about some dense food sources, but let's share a little bit about what phospholipids do.

Phospholipids help to provide shape, strength, and elasticity for our brain cells, alright? Shape, strength and elasticity. We also want our brain cells to have a healthy shape and consistency. Abnormalities with the shape of our cells can definitely be problematic. And also, strength, strength not to just contain and create the structure of the cell itself, but to withstand intrusions to be able to withstand damage, and also to generate a lot of energy, alright? So, this is why these three things are important, and this is why phospholipids are important.

But how does this play out in the research? Because one of the most interesting things about phospholipids is that they have a very powerful contribution to cellular communication, so enabling our cells to talk to each other or a signal transduction for data, for information to get communicated throughout your brain cells, which again, when it really boils down to it, that's what we want. We don't want just to have a brain. We want to have a high-performing brain, we want our brain to be firing on all cylinders, we want a healthy memory, we want healthy reaction time, we want the ability to focus, the list goes on and on and on.

So, what do phospholipids contribute in that domain? Well, a big part of this is phospholipids' ability to support mental performance under stress. A recent double-blind placebo-controlled trial found that the consumption of phospholipids helps to enhance attention and improve reaction time when test subjects were placed under acute stress. So, they were putting them under stress, and the consumption of these phospholipids, helped them to maintain their focus and to enhance their attention, even under that acute stressor.

Now, this study had participants also report their subjective experience, and they reported reduced participation anxiety, which is a big issue today. If you've got anxiety around test-taking or doing a certain presentation or performance, phospholipids can really help in this. And also, the test subjects reported an increased sense of mental energy, alright? So again,

that's what it's really all about. It's not just having a brain, but it's having a high-performing brain with a lot of healthy, vivacious, robust energy.

Now, we know a little bit about what these phospholipids bring to the table. Again, this is just one-third of the fats that the brain is primarily made out of, but it's very important. So, what are some of the specific food sources where we can find these phospholipids? Well, phospholipids can be found directly from foods like fish, specifically fatty fish like salmon, like herring, like mackerel, but also crab meat, also salmon roe, and caviar, those are fish eggs. So, there's a very dense source of phospholipids that are found in the eggs of a fish, even more so than the fish itself, also, soybeans, milk, oats, and sunflower seeds are all viable sources of phospholipids that your brain... Literally, it's able to cross the blood-brain barrier and to feed, and support, and to create these building blocks for our brain cells themselves. So now we can get into a debate about which food is going to be ideal from all these different ones that I'm listing, I'm just listing where the data shows they are viable, clinically proven source of these phospholipids. But at the end of the day, it's always going to depend on you, which food source is going to be ideal based on your unique needs, your unique metabolic fingerprint.

We're just going to provide a plethora of different options today, things to think about, things to explore, things to have fun with. So again, those are some proficient sources of phospholipids, but one of the most nutrient-dense sources of phospholipids that you're going to find that has about 10,000 milligrams of phospholipids per 100 grams of product is going to be egg yolks, right. Egg yolks have a tremendous amount of phospholipids, bioavailable phospholipids. So those are some different foods to look for. Now, the group of phospholipids can actually be broken down, it's an umbrella that contains other types of categories of phospholipids, like phosphatidylserine and phosphatidylcholine. And I break those down and talk more about those and some of the clinical evidence behind these other types of phospholipids in my book, Eat Smarter. So make sure that you have a copy of Eat Smarter, is a national bestseller, very, very proud of it, and it's really just taking people through and teaching them how their metabolism actually works, taking them behind the scene and demonstrating how metabolism actually works, and also, which foods and specific nutrients play roles in these metabolic pathways, the things that drive our fat loss related hormones and neurotransmitters, but also what are the foods that are clinically proven to heighten our mental performance. And there's a plethora of those in the book.

Foods that are clinically proven to improve our sleep quality, foods that are proven to help to address and support our emotional fitness, our emotional agility, all of that is found in Eat Smarter. Again, go to eatsmarterbook.com you could pick it up there. There's also a free video series that you get. Or you can pick it up at Amazon, Barnes & Noble, all the good stuff. We've got a national campaign going, another one with Target stores, so you can pick it up at Target stores near you as well. And also, the audiobook is on fire. So, check out the Eat Smarter

audiobook as well. Now, we're going to move on, we mentioned these phospholipids are just one-third of the primary fats that the brain is made of. Again, upwards of about 60% of the dry weight of the human brain is made of fats, but there are three types of fats that are often not talked about. Number one is phospholipids; number two are called sphingolipids. Sphingolipids function as building blocks of biological membranes and play important signaling and regulatory roles within the cell.

So, we're talking about the membrane of the cell. And if you listen, there's brain in that word membrane. For many years, it was considered that the nucleus of our cells throughout our bodies was really considered to be the brain of the cell, but you can actually remove the nucleus of the cell, and we talked about this with the incredible Dr. Bruce Lipton, cell biologist, and really one of the pioneers in epigenetics, and he would do this work decades and decades ago, removing the nucleus, but the cell was able to continue on performing many of the same functions even without its brain. When we remove your brain, we can't do anything, alright. So having that parallel that the nucleus is the brain of the cell, which is what I was taught in my elementary and middle school, and even high school and beyond, even college biology classes, that's kind of the parallel that's made, but the membrane of the cell has a tremendous amount of intelligence and really functions in communication with all of our cells. So being able to think and to respond to the environment, that's really powerful, and this is a big role that our sphingolipids play.

And these are not just located, again, just in our brain, but throughout our bodies, which is the case for many of these different types of fats, but specifically sphingolipids make up another one of the one-third of the most abundant fats in the human brain. Sphingolipids can literally change the architecture of our brain cells, they can literally alter the dynamic functions that a cell membrane participates in, and they can enable them to do things in a different way. So, they can help our brain cells to adapt and change and to do things in a different way. How important is that if we experience any type of damage and we think that if this one pathway isn't working, what are we going to do? How are we going to be able to perform? How are we going to be able to move on? And it's very similar to life itself, when an obstacle comes up in our way if it's on your GPS and you've got an app like Waze, for example, it finds another route.

That's not just out here in the external world, our bodies do that as well. So, sphingolipids help our brain cells to find another way, it helps our nervous system to find another way, another path because there's always a solution. Also, they're involved in intracellular signaling that can alter the behavior of ours cells altogether. So intracellular, the communication within the cell itself, it can totally alter the behavior of our cells. It's really powerful to be able to influence the behavior of our cells like that. Really, really remarkable stuff, sphingolipids. Now, these sphingolipids are not merely structural elements, but they're also recognized as regulators of our cellular events. They actually play a tremendous role in things like cancer prevention. Now,

obviously, we can have cancer show up in a myriad of different tissues and organ systems in the human body, including the brain. Now, sphingolipids assist in limiting cell replication.

So, they're helping to make sure that cell replication process is taking place normally and when things start to go abnormally, like things going past that Hayflick limit where they're not supposed to replicate anymore, where cancer can just have this unlimited growth, sphingolipids help, they make sure that that stays in check. Very, very important. They also within that can help to signal apoptosis, which is a programmed cell death when the cells are going too far. They're just trying to take over things, trying to take over the entire community and do what they want. Sphingolipids help to take out rogue cells if necessary and also dysregulation of our sphingolipids are heavily implicated, not just in cancer, but also in neurodegenerative diseases. When these sphingolipids are functioning abnormally or there's some kind of deficiency taking place, this is when we see a rapid decline in our cognitive health.

Now what are some sources... What are some food sources of these all-important sphingolipids? Now these again are structural fats, and these are maintenance and fats that have a purpose and performance, so these are fats. They are going to have a parallel with our dietary fats. These are oftentimes the building blocks for these things, but it doesn't always necessarily translate, but we do know that sphingolipids, dense food sources are available, and these are some of the most brain-healthy foods that have ever been discovered. Now some dense sources of sphingolipids are going to be found in foods like eggs, butter, yogurt, cream, and then surprisingly, foods like sweet potatoes. Sweet potatoes are a really good source of sphingolipids. And rice is a good source of sphingolipids. And in the conversation of rice, we actually break down rice to the nth degree in Eat Smarter and talk about all things in that spectrum from white rice to brown rice and that whole battle that's been going on for decades now and what's the truth? What's going on with rice? Rice, rice, baby. That's what we talk about in Eat Smart as well, but just know that there's a certain way to cook these foods and they've been utilized literally for thousands of years. So, there's something there, there's a reason behind it that many societies have subsisted on foods like rice and sweet potatoes as well.

We mentioned with sphingolipids we've got again, eggs, butter, yogurt, cream, rice, sweet potatoes, those are some really good sources of sphingolipids. Now, this is where things get really, really cool, really interesting. One of the most dominant sphingolipids is something called sphingomyelin, sphingomyelin. Now, these molecules serve as signaling molecules that hold important roles in neuronal differentiation, so making sure that our brain cells are becoming what they need to become. Synaptogenesis, so the creation of these synaptic pathways, which is how our brain cells are communicating and connecting and many other roles as well. Now the sphingomyelin, if you hear, there's a part of the word here, myelin... This is very, very important, we're going to talk more about that in a moment, but one of the most dominant sphingolipids is called sphingomyelin. Very, very important. Now sphingomyelins

interact with the third of our three major types of fats or lipids that the brain is made of. They interact with this specific category of fats. Sphingomyelins interact with this specific category of lipids to perform a myriad of functions in the brain and this third category is cholesterol.

The brain actually contains the highest concentration of cholesterol in our bodies. The brain contains about 20% of our entire body's cholesterol. Now the human brain is only about 2% of our body's mass, but it consumes upwards of about 25% of the caloric intake that we bring in. It is a very, very hungry organ and it's also very hungry for cholesterol. Now here's the rub because the cholesterol that's located in the human brain is primarily made on demand by our brain cells themselves. It's made on-demand within the brain; our brain cells can make it. It is that vital and that important, but as you know, cholesterol is one of those dirty words. It's a dirty word. It's a bad word in our culture when there's no context, there's no nuance. We just believe that this thing is bad for you, leads to heart disease. And recently, we broke this down with one of the foremost experts in the world on this subject matter, Dr. Jonny Bowden, and we'll put that episode for you in the show notes. It's really a master class on all thing's cholesterol.

Just understand that cholesterol is one of the most important nutrients for the human body. Not to say that there isn't situations where cholesterol can be problematic, absolutely, but for the most part, it's really been shifted so much without any context, without any nuance, and without any education on how important cholesterol is because cholesterol, for example, is literally... It's a precursor to making our sex hormones. If we don't have cholesterol, you're not going to do it. We need it, but our sex hormones are not just for sex, they're just the overarching umbrella label. Alright. Our sex hormones are for so many other aspects of our vitality. Right. Cholesterol is critical in that. Cholesterol is critical in the synthesis of vitamin D, turning sunlight into usable forms of vitamin D. We have to have that. Vitamin D plays multiple roles in our immune system function, anticancer applications, many different roles in growth and development, the health of our brain, the health of our reproductive system, the health of our heart, the list goes on and on and on. And we did a master class on vitamin D as well, so make sure to check out that episode too. But please understand, these are just some of the roles, total body roles that cholesterol plays, but within the brain itself, it is so critical that the brain is constantly making this powerful substance.

Now, the sphingomyelins combine and interact with cholesterol to make our myelin, and myelin is the fatty sheath coating around our nerve axons that literally facilitate these electrical impulse conductions from cell to cell. What that really means is myelin getting laid down over these brain cells, the connectivity of our brain cells helps to insulate conductivity and basically providing an accelerated speed of electrical transmission, a speed of electrical impulses, so the more myelin is getting laid down. We'll just take for example, how does this play out in our day-to-day lives, this activity of myelin in its insulation, being able to speed up

electrical impulses within our brain and our nervous system. What does that look like? Well, this, for example, takes place as more myelin getting laid down when you're taking your first steps to where... A child is taking their first steps to where they're very proficient in walking to where walking is automatic. You can walk, talk, listen to music, listen to podcasts, dance, you could do all kinds of stuff while walking. You don't have to think about it anymore. It's automatic, it's firing continuously, smoothly because of that insulation being laid down by myelin. It makes things automatic.

And here's a big key. When it comes to something like sports performance, for example, and you think about all of the practice shots that someone like Steph Curry is taking to lay this pathway down, this automation of these nerves firing, to where you can do it at the drop of a hat, anytime, anywhere, all kinds of funky crazy positions that pattern, that motor unit, that conductivity. All of those things are firing together, interacting with speed because this is the big takeaway is that it's not practice makes perfect. Its practice makes permanent, and it makes permanent because it's laying down more myelin. That's how powerful this is.

So, all of this stuff in a practical application, cholesterol, and sphingomyelin, we need these to be able to create this insulation for this conductivity of our cells firing in these different processes, these different patterns. This is what makes us more efficient, more effective, faster, and this is one of the things that's again, often looked over in the communication about cognitive well-being and performance, is what is our brain actually made of and what can we do to fortify and to support this process?

So, my question was when I first learned about this and being able to work with some of the most incredible neuroscientists in the world, Dr. Lisa Mosconi, Dr. Wendy Suzuki. I just did a guest lecture for her, a neuroscience class at NYU. And having these incredible conversations and insights, my question is, okay, if the brain is making cholesterol, how is it doing it? What's going on? Are there specialized cells that are doing this? And the answer is, absolutely. It is believed that certain cells in the brain called astrocytes... We already talked about the analogy with the brain and the universe, but astrocytes produce most of our brain's cholesterol.

Now, these star-shaped cells of the central nervous system are a sub-type of glial cells. Astrocytes actually outnumber our neurons. So, we got glial cells and we've got neurons. Our astrocytes actually outnumber our neurons by over fivefold in the brain. There's so many more of these star-shaped cells. In humans, a single astrocyte cell can interact with up to two million synapses at the same time. It's like these incredible little orbits, these little galaxies operating with each and every one of these astrocytes. Again, the human brain is so absolutely incredible, but there's a tremendous amount of cholesterol that is synthesized within the brain with our astrocytes. But also, there's some dietary implications here as well, but in particular, when we are a baby when we're developing.

Now, this isn't often talked about, but the things that have been demonized in our culture so much the last few decades, and thankfully, a lot of really solid science is coming forward. Things that have been villainized like saturated fat, for example, like cholesterol without any nuance or context, these are some of the most important fundamental things for making up the human body, the human brain, mother's milk. Human breast milk can be upwards of even 50% saturated fat, 30%-50% saturated fat. Why would nature do that? If saturated fat's going to kill you. It doesn't make any sense, and this is because it's blatantly wrong. But this is not to say that certain types of dietary saturated fats can't be problematic, but we have to have a little bit more of a meta-perspective, a little bit more nuance, and also understanding, where are our fats coming from? Are they coming from real whole foods or are they coming from highly refined processed foods that our DNA has never interacted with in the history of humanity?

Now, I'm going to say that the former is going to be much better for us, again, if it's coming from real whole foods, especially if our DNA has been interacting with that food for a long time, the lineage of humanity. Now, a tremendous amount of cholesterol is actually synthesized in the brain within the first few weeks of birth, and disruptions to this process have been well documented to lead to neuro-degenerative diseases. So, if this process is inhibited with cholesterol being able to make its way into the brain, also the brain to be able to start to produce it itself, again, based on the building blocks that we give our children, this can set us up for a lifetime of problems, and accelerated aging of the brain, and abnormal development of the brain. So, this is pretty important stuff.

Now, cholesterol also plays a key role in neuronal differentiation, so cells becoming the right stuff that they're supposed to become, and also cellular plasticity in the brain. So, the brain cells being able to adapt and to conform to different situations, environmental inputs, to be able to get jobs done and to adapt. Cholesterol also plays an important role... And this is very, very, very important if we're thinking about something like a traumatic brain injury, but cholesterol plays an important role in nerve regeneration after injury. This is yet another spot that cholesterol might be coming to the rescue, but it's just considered to be the bad guy, if we're talking about heart disease, for example. And it's just like there's a situation going on and we find cholesterol here, they must have lit the fire. But maybe the cholesterol is the fireman. Who knows? There's got to be some nuance, but in this context, make sure to check out that episode with Dr. Jonny Bowden, incredibly eye-opening.

But in this context, cholesterol plays an important role in nerve regeneration. So, helping to build back those nerves and get things back online again. Very important. Now, with that said and this being such a threat in our world today, we're talking about cholesterol and heart disease, which one of the studies that we mentioned in that episode was a major huge meta-analysis that was conducted, and it was revealed that about 75% of the people that are

hospitalized with a cardiac event, with a heart attack, for example, the vast majority of those people didn't even have high cholesterol. And as a matter of fact, that cholesterol number, what's considered high has been ratcheting down lower and lower and lower, putting more people above that threshold. And so still, 75% of the people hospitalized with a cardiac event didn't even have high cholesterol, so how is it the causative agent for heart disease? There's already a big conflict in that hypothesis.

Again, it's not to say that cholesterol can't be problematic, but the overarching black and white, the Michael Jackson version of this, this is good, this is bad, cholesterol, this is good cholesterol, this is bad cholesterol, is completely ignoring the complexity of the human body and the human brain.

With it being such a big player in what's believed to be the major villain in cardiac events and heart disease, this is driving a statin industry, the pharmaceutical industry, that's creating about $30 billion a year in revenue for pharmaceutical companies with statin drugs. They've been raking it in, raking it, like get the rake out. This is like fall yard work, get the rake out. They're just raking it in. They're racking it in, racking it up. But what's the underlying issue here if we're targeting something to reduce cholesterol? What is the impact if your body needs cholesterol for so many different processes? Are the statins selectively targeting the right thing? Well, multiple reports now, and there are several meta-analyses on this, but multiple reports of significant short-term memory loss has been associated with statin drug use, prompting the FDA to actually put a warning on this drug class because of it. We just talked about how important cholesterol is for the human brain. It has roles in helping to facilitate and build our myelin, it has roles in memory as well, focus, attention, all those things. There's actually been by the FDA, they put a warning. They put a warning, "Hey, you might experience a short-term memory loss. We don't know, we don't know. Look away."

But also, we've got to be able to ask ourselves, in taking a statin and understanding the multiple roles that cholesterol plays in the human body, what other “side effects” might be taking place? Because again, we're looking at taking a synthetic drug, a synthetic chemical, to have an isolated effect on cholesterol, but it will inherently affect every other cell in our bodies because it's all taking place within our body. It's not a side effect. These are direct effects. And one of the things that's been noted for years now... I was running my clinical practice. This is over a decade ago. I had reports I'm showing people as they're coming in, they're on their statins, and they're on Lisinopril, and they're on metformin, and they're on all these different drugs. And I'm just helping them to get educated even about drug interactions that their physician oftentimes isn't even... This person isn't talking to that person. The cardiologist isn't talking to the immunologist oftentimes.

And so, looking at the drug interactions, for example, but one of the things that was noted and well documented right at this point... And it's crazy that I'm still talking about this, and this hasn't been changed, but there's a significant increase incidence when someone is on a statin of developing diabetes, of developing insulin resistance, which is one of the most detrimental, damaging, deadly things for our brain and our cognitive ability, because right now, Alzheimer's is actually being re-classified. The name is Type 3 diabetes. There's an insulin resistance taking place in our brain.

The human brain is an absolute sponge for sugar, for glucose, but through our evolution, we didn't get it that often. So, whenever it comes in the brain is like, I got this. Let me get that and your brain will gladly confiscate about half, about 50% of the glucose that comes in, the sugar that you take in, the carbohydrates that you take in in the meal, your brain will gladly confiscate half of that. Now just imagine the amount of sugar that can be flooded into the human brain today with the way that we eat. You know, if I think about growing up and me getting my penny candy, heading to the corner store with a dollar. With a dollar, you're rich. Where I'm from, you get 100 pieces of candy, penny candy. You get 100 pieces. Where's the tax at, actually?

How did that all work out? I don't know. But anyways, 100 pieces of candy, you can knock out a solid half of that bag in a day. Can you imagine all the sugar that's just getting siphoned into my brain? If we think about the two-liter sodas, and we think about all of the pastries and the donuts, and the cakes and the cookies, and all of these different things that are just... I'm inundated with this stuff growing up. What kind of effect is that happening on our brain? When we talk about somebody having a blood sugar high, we think that's some kind of funny term. It's not funny, alright. There's literally a big shift taking place in our brain. And when brain cells start to get damaged from the abnormal amount of sugar and also the sensitivity of those cells to uptake glucose can go down. We start to lose that sensitivity, that satellite dish that's receiving that data from the glucose can start to basically close off, get smaller, or even get broken, and you can't have this glucose just running freely around within that incredible brain of yours.

So, this process of insulin sensitivity or insulin resistance in the brain is incredibly detrimental and one of the leading causes that we know now of Alzheimer's disease. So, all of this time together with statin use, increasing the risk and the incidence of insulin resistance as well, we got to do better.

So many people have no idea about that. This is why conversations like this are so important, to expand our knowledge base, to look at the bigger picture. Is that the solution? Because for the pharmaceutical industry, it absolutely is a solution. It's a $30 billion a year solution. They're making bank. But are they saving lives? Have heart disease deaths gone down? Hell no,

absolutely not. Not even close. 630,000 a year on average. This past year, 2020, almost 700,000 people died from heart disease. And it's a footnote. We got to do better, we got to do better.

So, these are the three major types of fats that the human brain is actually made of, phospholipids, sphingolipids, cholesterol. Shout out to all three of these fellas. Now, as I mentioned at the top of the episode, phospholipids are made almost entirely out of omega-3 fatty acids, DHA and EPA. Now, this is a building block. So many of these compounds, even with cholesterol and the astrocytes. This is why we need to provide our bodies with the raw materials, the building blocks to make these nutrients, to allow the cells to do the jobs that they're able to do.

This is why real food matters. We can't get those nutrients, the building blocks for our astrocytes to do their job on Ding Dongs, okay? And shout out to... Some people might not even know what Ding Dongs are at this point. I think they're getting phased out. No, they're back actually, because Hostess was tanking, they made a big come back. But I swear, even the names that they gave these foods were just disrespecting us, alright. Take these Ding Dongs, alright. Here's some Ho Hos. Ho Ho, are you kidding me? They're so blatant with it, you know. So anyway, but we can't get those kinds of building blocks from those types of foods. It's going to come from real, whole foods. It's why these matters, but specifically, let's talk about DHA and EPA. Docosahexaenoic acid and eicosapentaenoic acid, DHA and EPA. These two omega-3s are some of the most vital and important nutrients for the human brain. Research published in the American Journal of Clinical Nutrition discovered that increasing dietary levels of DHA was able to improve both memory and reaction time in healthy test subjects.

This is a randomized double-blind placebo-control trial, gold-standard. It's the gold standard. We got a specific implement here. We know that adding in DHA specifically, helps to improve our memory just within a matter of months, improve reaction time in a matter of months. Beautiful, beautiful. These Omega-3s are so critical, DHA and EPA, to the structural integrity of the brain, that a study published in the Journal, Neurology, using MRIs to actually analyze and look at the brains of study participants, found that people consuming the lowest amount of EPA and DHA in their diets, had the highest rate of brain shrinkage. So, the people consuming the lowest amount of DHA and EPA had the most accelerated shrinkage taking place, of their freaking brain. The structural integrity of the brain itself, it is made of these fats. It's important. And again, these are Omega-3s, these are the building blocks of our phospholipids. You don't want that; you don't want your brain shriveling up. Nothing's shriveled around here. We don't want that.

We don't want that on a day-to-day basis. We want... Never mind. So, here's what the research stated. They found that folks who were consuming less than four grams of DHA per day, had

the highest rates of brain shrinkage, while those who ate six grams or more a day, had the healthiest shrink-proof brains. So DHA and EPA, this cannot be overstated how important these are. And our big mandate here is, food first, that's our mandate. So where are we going to find DHA and EPA?

Well, unfortunately, even in my clinical practice many years ago, I was under the impression that all Omega-3s were created equal. And so, I'm having patients coming in, I'm getting them on chia seed, chia seed oil, flax seed, flaxseed oil, hemp seed, hemp seed oil, all these different plant... Very concentrated forms of plant Omega-3s, which are great, but that is in the form of ALA. And DHA and EPA are the primary components to making up what we talked about in the ratios of the human brain if we're talking about the Omega-3s. ALA has some roles, largely in energy. So being used as a fuel, but not creating the structural integrity. These are called structural fats. So, these aren't like storage fats, that... If we're talking about our visceral fat, subcutaneous fat under our skin, those store energy. Structural fats literally create the structure of our bodies, specifically, we're talking about our brain.

So, these are wildly important. ALA doesn't do that. And I just didn't... I didn't know, I didn't look at the bigger picture, I wasn't aware of that important tenet. But DHA and EPA are so important that your body can convert some of the ALA you consume from some of those plant sources, into DHA and EPA, but you can lose upwards of 90% in that conversion process. It is so inefficient, and this too is going to depend on your unique metabolism, microbiome, all these different things, if you can get a little bit more, a little bit less. The bottom line is, I want every single person to make sure you're proactively getting in a source, a high-quality source of DHA and EPA. It's one of the most important things for your brain, to literally prevent your brain from shrinking. This is super important.

So where are we going to find DHA and EPA? Well, the most popular source that's talked about oftentimes, is fatty fish. Salmon, mackerel, herring, sardines, anchovies. So, the weird people who put anchovies on their pizza, they are on to something. And no disrespect, if that's you. Being weird is awesome right now because the norm is being unhealthy, that's the norm here in our country at this current time. So, we want you to be weird.

But anchovies. Now, just like we mentioned earlier, there's actually far more DHA and EPA that you're going to find in the eggs of the fish. So, salmon roe and caviar can contain up to three times more DHA per gram, in the best fish sources. Again, I learned this from an incredible neuroscientist and then being able to analyze her work and she's actually looking at the brain and seeing, "Does this have an impact when we add these things in?" And for certain, it's really remarkable. So, moving on from there, we've got fatty fish, we've got fish eggs, eggs, egg yolk, specifically, can be a viable source of DHA, grass-fed beef, fish oil has the most peer-reviewed evidence as far as... When we're talking about DHA and EPA, it's oftentimes fish oil that's used

in clinical studies. So, there's a lot of data there as well. But now, let's get into some vegetarian and vegan options as well, because this needs to be inclusive. But we also... I want you to keep in mind, no matter where your dietary beliefs reside, I want you to give yourself permission to always do what's best for you because what's best for you might be outside of the scope of a particular diet framework. So, I just want you to give yourself permission for that.

I've seen so many people struggling with their health, because they're so bought into a particular diet framework, and we've had many of them on The Model Health Show. The foremost experts in the particular diet frameworks, whether it's a vegan protocol, all the way to a carnivore protocol. And these healthcare practitioners, physicians, they're not doing something to be controversial, they're doing it because they've seen success with their patients, and we need to honor that, but we also need to realize that oftentimes, when we go into any extreme, most people aren't going to fit into that modus operandi. They're going to lie... They're going to exist somewhere in the middle of those things. And so, I just want you to give yourself, sign your own silent permission slip to do what's best for you. Because when we're talking about DHA and EPA, this is serious stuff. If you're not getting this in through your diet, your brain is definitely going to suffer because of it. Again, highest rate of brain shrinkage, when we're getting in less than four grams per day. So, krill oil. K-R-I-L-L oil. Krill oil is an excellent source of DHA and EPA. Now, the interesting thing about krill oil, is that it also contains a substantial amount of astaxanthin. Astaxanthin is a powerful antioxidant that actually, in many ways, makes DHA and EPA even more bioavailable and helps prevent it from damage and oxidation.

With this omega-3s, we got to keep in mind that they're incredibly sensitive. They're incredibly sensitive to environmental intrusions. So, they're sensitive. They're like the boy band of this dietary thing. They're the sensitive singles, okay. Now, krill oil is an incredibly viable source, but also this is going to depend on where your ethics lie because it's a microscopic shrimp and keyword, microscopic, but that can throw people off as well. And so, this can be... And I've seen it firsthand for somebody on a vegetarian protocol, and they add in krill oil and their weight starts to come off, their blood sugar starts to normalize, their brain fog starts to go away.

I've seen it first-hand more times than I can count, getting somebody's DHA and EPA levels back on point again. So, krill oil is going to be a viable option. Microscopic, so tiny, tiny, tiny, tiny, tiny, tiny, tiny. And I often joke, that even if you just lick the air, you're going to be consuming some sentient being, some sentient organisms. You just are. So, this might be a viable option for a lot of folks, and the krill oil that I use, by the way, is from Onnit. Go to onnit.com/model. It's O-N-N-I-T.com/model. And that's the krill oil that I use, and this is the key, it's sourced properly. The supply chain is on point, you're getting what you sign up for, and that's so neglected in the supplement industry right now. Many people don't realize that there's so much nefarious activity going on behind the scenes. You need to get your products

from companies that are doing things the right way, and Onnit is definitely one of those companies. So, it's O-N-N-I-T.com/model if you're interested in the krill oil.

The next step from there would be a full-plant source, which would be algae oil, okay. Algae oil. There isn't a lot of peer-reviewed evidence on algae oil, but we do know that the DHA and EPA is there. I would not wait to get more evidence. If you are strictly, strictly, strictly on a vegan protocol, I would at minimum, get myself an algae oil like yesterday. It's very, very important. But if we're talking about peer-reviewed evidence, krill oil, fish oil, real whole food sources of DHA and EPA is where it's at. Now, obviously, dietary fats are going to be a critical component of literally building our brain cells, our glial cells, our neurons, and these incredible interactions, the myelin that we talked about. But we cannot abandon the number one thing that the human brain is made of. We've already covered the dry weight of the brain, primarily be made of three specific dietary fats, but the majority of the human brain, somewhere around the ballpark of about 78%, 78 to even upwards of 80% of the human brain is made of water.

How much does this matter? Well, according to the Journal, Neurology, even short-term dehydration literally reduces your brain volume. It turns the volume down. Turn it up. Turn it up. Who's got the... Never mind, sorry. According to the Journal, Neurology, even short-term dehydration can literally reduce your brain volume. It's turning the volume down when you're dehydrated. We want to make sure that it's turned up to the right position because they also mentioned in this particular study, that rehydration rapidly restores brain volume.

So, when I'm saying your brain is mostly made of water, no, this is very, very serious. And the protective mechanism, the blood-brain barrier that's making sure that only very specific things are able to enter the very exclusive area within the human brain, water has absolute priority status in being able to make its way into the brain. How does this play out when our brain is dehydrated and we're losing that brain volume? Well, the recent study that was published in the Journal, Medicine and Science in Sports and Exercise, found that just a 2% drop in your body's baseline hydration level can create significant mental impairment with tasks that require attention, motor coordination, and also reduction in performance of executive function. So, this is things like map recognition, with grammatical reasoning, mental math, all of those factors start to decline. Our ability to do those things, those cognitive abilities, simply based on dehydration. So, this is something so simple. Are you doing it? Are you making sure that your brain is hydrated? This is not a joke. Your brain is hungry for water, or should I say, it's thirsty. Your brain is thirsty. So, make sure that you're quenching that thirst on a regular basis. Very important, very simple.

Now, this is an important caveat, because it's not just water. It's not just H2O, some chemical compound that the brain is allowing in. It's water that has structure. These aquaporins, these protein channels that are allowing water to travel in to hydrate ourselves, there's a certain

structure. There's like a lock and key situation. And what actually helps the brain to retain hydration, is electrolytes. It's not just water by itself. Water doesn't exist by itself in nature. It never has. In nature, water is known as a universal solvent. There's always things that it's combining with, specifically minerals. And these minerals, if we're talking about electrolytes, these are specific minerals that carry an electric charge. So important. The brain is critically dependent upon these electrolytes, to help to send electrical signals throughout all of the cells of our brains. Fat plays a major role here, in the structural integrity of these cells. And myelin, the insulation of the nerves and the electricity being able to fire, but the electricity itself is going to be traveling, thanks in large part, to these electrolytes. That's how important it is.

Take sodium, for example. Not only does this electrolyte help to maintain proper water balance in the brain. Come on, right there is important enough. But a study conducted by researchers at McGill University found that sodium functions as an "on-off switch" in the brain for specific neurotransmitters that support optimal function. We want optimal function. I like that, I like that. And also, sodium functions in protecting the brain against numerous diseases, neurodegenerative diseases. It's that important. But again, it's one of those things that's villainized. Sodium's bad, end of story. No. It's a primary electrolyte driving many of the processes of the body. Yes, sodium can be a problem, but there's no context, there's no nuance. Sodium, if we're talking... We generally... It's been villainized because of hypertension, and yes, a certain amount of sodium can cause hypertension, but here's the issue, the majority of sodium consumed in the average American's diet, is coming from processed food. It's about 70% of the sodium people are consuming.

How do you refine really crappy versions of sodium? And sodium and salt are two different things, but they're used often interchangeably. Salt, typical table salt that we tend to think about, is 60% chloride and 40% sodium, but there's other types of salt. As well as potassium salt, there's magnesium salt. Salt is one of those things that throughout our evolution and even just in nature, animals if we just talk... We'll stick to mammals. Have you ever seen those goats that climb up on the side of a dam or on the side of a mountain? Why are... And they're like sideways, and they're basically... The wall is straight-up vertical almost, and they're just literally just on the side of the wall, propped up there, and they're trying to inch their way up to spots where they can lick a little bit of salt. They're risking it all, they're risking it all, for a little dabble, a couple of those goat licks of some salt. It's that important.

And by the way, if you don't see me on the video, I've been standing sideways on a wall this whole time. It's so weird. But it is that vital. When salt is not available... It's needed to run so many different neurological processes, just overall for our health. In our culture, is it a deficiency? High-quality sources. Yes, absolutely it's a deficiency. So we need to make sure we're getting high-quality sources of sodium, because a meta-analysis published in the Cochrane Database of Systematic Reviews, uncovered that study participants placed on low

sodium diets did, yes, have slightly lower... Slightly... Keyword, slightly... Lower blood pressure in the short term, but found that the restricted sodium led to rebound hypertension or high blood pressure because it ended up elevating triglycerides, elevating stress hormones, and accordingly, elevating their blood pressure. There needs to be some balance here. There needs to be balanced, and we talk about that more in-depth in Eat Smarter as well. But also, a study conducted about researchers at Harvard Medical School, and this was published in the Journal, Metabolism, found that low salt intake directly increases insulin resistance in healthy test subjects.

We need the full story here; we need the full story. Sodium is incredibly important, specifically in the context of functioning of our amazing, powerful brain. Also, this is a fascinating new study, and this was published in the Journal, Neuron, found that another electrolyte, another type of salt, magnesium, is able to restore critical brain plasticity and improve cognitive function. Neuroplasticity is the ability of our brains to adapt and change. That's what we need in our world today, more than ever. We need that ability for our brains to adapt and change. Here's another one. This is a double-blind, placebo-controlled study published in the Journal of Alzheimer's Disease, found that improving magnesium levels in adult test subjects, that were aged 50-70, with already noted cognitive decline, increasing and improving their magnesium levels, was able to reverse their brain aging by over nine years. It made their brains functionally younger, by getting their magnesium levels optimized. Why is it such a big deal? The majority of our citizens here in the United States are deficient in magnesium and they're deficient in the right type of sodium.

That's why this is so important. Again, the tenet is food first. Great sources of magnesium include avocados, pumpkin seeds, almonds, dark chocolate, leafy greens, black beans, fatty fish, and many other foods. But magnesium gets used rapidly in the body. We need copious amounts, and also high-quality sodium, for this purpose, for cognitive performance, for real hydration. This is why I'm such a huge fan of LMNT and their electrolytes are out of this world, the best by far. That's L-M-N-T, LMNT. Go to drinklmnt.com/model. That's drink L-M-N-T.com/model, and you get to try LMNT for free. They're going to send you a free sample of their incredible electrolytes. All you need to do is pay shipping, and they're going to send you a free sample, but also, if you've already gotten on to LMNT, you need to re-up, get yourself some more, because this is one of those things that you're going to hear so much more science, coming forward.

On the episode that we did with Rob Wolf, for example, we talked about one of the really interesting peer-reviewed studies that were analyzing the impact of sodium deficiency and electrolyte deficiency overall, potassium included, in people with severe cases of SARS-CoV-2, so we want to make sure that we understand that there's processes taking place, with the immune system function as well. What's regulating everything about us, including our immune

system, has so much to do with what's happening with our brains. So can't stress how much this is important. Go to drinklmnt.com/model for your free sample, or just head over there and get yourself one of their incredible packs of electrolytes. So that's drinklmnt.com/model.

Now we're going to dive into the final component here on this episode, really addressing the primary things that our incredible brain is actually made of. We talked a little bit about water, and hydration, and electrolytes. We'll really focus the majority of this episode on the three specific types of fats that our incredible brain is made of.

So, I want to provide a few more specific foods that really help and support in that primary role, with the performance of that fat. Having a fat head, having a fat brain is actually a really, really good thing. So, one of these foods that has some interesting interaction here with the fats that we talked about earlier, is broccoli. Now, broccoli itself, it has a crown to it, a little bit of an analogy or similarity there, but it's a rich source of the fat-soluble vitamin K. Now, this fat-soluble vitamin has been found to be a critical component in the synthesis of the structural brain fat, sphingolipids. According to the data cited in the Journal, Nutrition Reviews, the interaction between vitamin K and sphingolipids plays a major role in our cognitive function. And on top of that, adequate consumption of vitamin K from foods like broccoli has been found to improve our episodic memory. Episodic memory is a form of explicit memory that involves conscious recollection of information. So, it's kind of important.

In addition, broccoli is also an excellent source of nutrients called isothiocyanates, and these powerful compounds have been found to help reduce brain inflammation and provide protection against neurodegenerative diseases. Broccoli and its other family members in the cruciferous family are great sources of isothiocyanates. But broccoli is the crown jewel of the category, for sure. And one other food that has wonderful brain-healthy fats contained within it, are walnuts, and if you think about the doctrine of signatures and how certain foods look like certain body parts, the walnut looks eerily similar to the human brain. And compounds found in walnuts have been shown to help scrub your brain clear of harmful amyloid-beta peptide that leads to bonafide amyloid plaque buildup in the brain.

Data highlighted in the Journal, Neurochemical Research, demonstrate that walnuts have the potential to reduce oxidative stress, reduce brain inflammation and protect your brain cells from early demise. And how does this show up in the real world? Well, walnuts are packed with brain-healthy vitamins, minerals, and fats. But a recent study conducted by researchers at UCLA suggests that eating a handful of walnuts per day may help to boost memory, concentration, and the speed at which your brain processes information. Another healthy fat-rich food for our cognitive health. So, I hope that you got a lot of value out of this episode. We're diving in today and talking about what the brain is actually made of and what are some of the foods that provide the building blocks of that amazing brain of yours. And we dive in so

much deeper in my book, Eat Smarter. And again, very grateful to say that it is now a national best-seller, and it's also getting translated into a multitude of different languages, as we speak. So, it's going to be coming to a bookstore near you. And if you're here in the US, make sure to head out to your Amazon bookstore or order online at Amazon, Barnes & Noble, Target stores across the US, and also check it out on audiobooks as well.

And I appreciate you so much. We are just scratching the surface of what we're going to accomplish, and our world really needs this right now. We need a bigger, better education on what food really does, and it's the thing that our bodies are literally made out of, what our brains are made out of. So, it is a primary point of education. And so, we're going to keep bringing on the very best experts in the world, in their particular subject matter. We're going to keep doing these incredible masterclasses. And we're not stopping any time soon. Please make sure to share this out with the people that you care about, on social media. You can tag me, I'm @shawnmodel on Instagram and I'm @shawnmodel on Twitter, and I'm @themodelhealthshow on Facebook. Now, of course, you could send the episode direct from the podcast app that you're checking this out on, and if you're on YouTube, you could send it directly to folks, via text as well. So, I appreciate you so much for tuning in to the show today. Again, we're just getting warmed up. Take care, have an amazing day, and I'll talk with you soon.

And for more after this show, make sure to head over to themodelhealthshow.com. That's where you can find all of the show notes, you could find transcriptions, videos for each episode, and if you got a comment, you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating, to let everybody know that the show is awesome, and I appreciate that so much. And take care, I promise to keep giving you more powerful, empowering, great content, to help you transform your life. Thanks for tuning in.