The Salt Fix: Why the Experts Got It All Wrong – and How Eating More Might Save Your Life: A Special Interview With Dr. James DiNicolantonio

By Dr. Joseph Mercola

JM: Dr. Joseph Mercola
JN: Dr. James DiNicolantonio

JM: Is salt really bad for high blood pressure? Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by an expert, Dr. James DiNicolantonio, who wrote an entire book about this – *The Salt Fix: Why the Experts Got It All Wrong – and How Eating More Might Save Your Life*. It's going to answer not only that question, but many more and provide you with a wealth of information you probably weren't aware of about this issue of salt being healthy or not. Welcome and thank you for joining us today.

JN: Thanks for having me on.

JM: You are actually a doctor of pharmacy (Pharm.D). I'm wondering if you could share your personal history and what inspired and catalyzed your journey to write this book and help us understand better about the proper perspective of salt in our diet.

JN: Yes. So really, what sparked my interest in salt was actually being a community pharmacist. I was having patients coming up to me. They were put on this low-salt diet, and they were saying they were having all these symptoms like muscle fatigue, muscle spasms, cramps and heart palpitations. They said their doctors ordered them to not add salt to their food, because they have high blood pressure. Yet they were suffering from all these new symptoms. Really, I kept seeing patients over and over again put on these low-salt diets for high blood pressure and complaining of all these symptoms of salt deficiency.

What I ended up doing is kind of pushing back and telling my patients, "You know, you really need to go to your doctor's office. Tell them these symptoms that you're having, and even get your blood-sodium levels drawn, because you might be deficient in salt." Sure enough, these people were severely dehydrated. They had low sodium levels in the blood. Within a few days of just upping their salt intake, all of these symptoms went away. Right there, I knew that this low salt advice was just not panning out in the real world.

JM: Excellent. Were you challenged by some of the other practitioners where you seem to appear to be going against their recommendations? It seems like that might be a particularly troublesome scenario for many clinicians.

JN: Yeah. It was, until those lab results and the symptoms went away. They couldn't really ignore their patients coming back to them and saying, "Oh my gosh. All my symptoms. I decided to just start adding salt for a couple of days and all of these symptoms went away."

I had a few doctors who actually drew blood. The sodium levels were so low they actually ended up even cutting their patients' diuretics either in half or totally getting rid of their diuretics for high blood pressure, and told their patients to start adding salt back to their foods. It took kind of being smacked in the face for those doctors to kind of say, "You know what? Maybe this low salt advice isn't working for you."

JM: Good. That's what brought you to write this book. In the book, you provide a historical perspective about the use of salt. I'm wondering if you could comment on those now, of the usages of salt in ancient times and even more recent times.

JN: Yeah. That's one of the more eye-opening parts of my book. I mean salt use throughout history. We have used and consumed over 10 times the amount of salt that we consume today, because salt was our main food preservative. We didn't have refrigerators. For literally the last 10,000 years, we mainly preserved our food in basically bucketloads of salt.

Basically in China, this is where it really began. Back 8,000 to 10,000 years ago, they would drill into the ground for the salt grind. They would use that salt to preserve real foods. We even know that the Japanese and South Koreans live the longest, and yet they consume the highest amounts of salt. We know, even from a population perspective, it never made any much sense to cut salt intake.

But even in the 1600s in Sweden, it was estimated that the average person was consuming 100 grams of salt per day. We don't even consume 10 grams of salt per day. When you look at it from that perspective, when we didn't have all the chronic disease that we have today, and yet we consume up to 10 times the amount of salt that we do nowadays, it really doesn't make much sense that salt is contributing to this new rampant increase in hypertension that began really in the early 1900s.

If anything, the rise in hypertension, obesity and diabetes beginning in the early 1900s actually parallels a reduction in salt intake, because you had the refrigerator actually becoming very prevalent in the 1930s and '40s. Salt intake has actually gone down while all these chronic diseases have gone up.

JM: Can you provide us with translations of the amount of salt that one consumes as a supplement or an additive versus the amounts of sodium in a diet, what the current existing American Health Association recommendations are, and how those compare to the teaspoons or fractions of teaspoons that people use in their diet?

JN: Sure. Basically, one teaspoon of salt is 2,300 milligrams of sodium. If you wanted to find out how many milligrams of sodium are in grams of salt, you divide salt – 10 grams of salt divided by two and a half – to give you the amount of sodium.

The average American is consuming about 3,400 milligrams of sodium. They're consuming about 8 and 10 grams of salt. Throughout the world, almost every population is really consuming a very narrow range of salt. That's because our bodies control its intake. There's never been any evidence that an increase in salt intake has ever paralleled any rise in any chronic disease.

JM: Maybe you can address the question that we initially opened up with, which was the association of salt and high blood pressure, which I believe was primarily popularized from one major study – the DASH study that lowered salt intake and got dramatic improvements. But not only did they lower salt, but they lowered processed foods and sugar intake. Perhaps you can talk about the way the association between salt intake and high blood pressure was established.

JN: Yeah. Actually even going back further than that, there was a man named Lewis Dahl. He was basically the Ancel Keys of salt. He did virtually the same thing that Ancel Keys did in 1953, where he used five populations to draw a linear line saying that hypertension problems rose as salt intake increased. We know that Ancel Keys did six countries back in 1953 and showed this right-curving linear association with fat intake and deaths due to coronary disease.

I don't know what was in the water in the 1950s, but these doctors seemed to just pick five or six populations that fit their hypothesis, plot it out and show their association, basically finding what they wanted to find. But inner salt is one of the main studies published in 1988, where there were 52 populations. Four of these populations that were included were basically these primitive cultures. They consumed virtually no salt, like the Yanomamo Indians and a few other types of unacculturated civilizations.

When you remove those four tribal populations, you look at just the 48 civilized countries. There was actually a reduction of blood pressure as salt intake increased. But that didn't get highlighted. What actually got highlighted was the reduction in blood pressure as salt intake was lowered, but only if you included those four primitive cultures that also ate a ton of potassium, a ton of magnesium, they exercise more than us, they're lean, they don't drink alcohol, they don't consume sugar. But when you remove those cultures, we actually found the opposite. The more salt we consume and inner salt, actually there was a reduction in blood pressure.

Back to the Dietary Approaches to Stop Hypertension (DASH)-Sodium study you had mentioned, it's true that blood pressure did go down when you cut your salt intake. The problem is that the total cholesterol to high-density lipoprotein (HDL) ratio, which is a much better predictor of heart disease than even low-density lipoprotein (LDL), was worsened on the low-salt diet. Triglycerides increased as well.

Because when you cut this essential mineral, you actually become insulin resistant, because that's one of the body's ways of preserving salt. It's by upping insulin levels, because insulin helps the kidneys retain more salt. They were looking at these minuscule reductions in blood pressure with lowering salt and actually not looking at all the harms and not publishing and really highlighting those harms.

JM: It's not surprising. In fact, it's almost predictable that they would do this. Clearly the best endpoint would be some type of cardiovascular mortality, but in fact, they measure the midpoints, which was a lowering in your blood pressure, and not looking at the whole picture.

The other component though is that there is a pernicious villain here. It is white. It looks like salt, but it's not salt at all. It's the other one. It's sugar, which is the real evil thing that needs to be eliminated or avoided, at least processed sugar. Perhaps you can touch on that.

[-----10:00-----]

JN: Yeah. So I mean there's definitely some food industry at play here, right? Because if the sugar industry could blame the other white crystal – salt – it got a free pass. If salt was the cause of kidney disease, heart failure, high blood pressure, then sugar wasn't. What ended up happening is there were definitely scientists who were getting paid by the sugar industry, showing that sugar didn't cause all these things – high blood pressure and things like that.

But really, when you look at the data and you look at studies that didn't have any conflicts to the food industry, there was one systematic review published a few years ago. It literally showed the opposite results. The studies that didn't have any conflicts, basically over 80 percent of them showed that sugar is associated with obesity and gaining weight. Of course the 80 percent of the studies that had conflicts of interest to the sugar industry showed the exact opposite, which literally goes to show you that absolutely conflicts to the sugar industry and the food industry can affect scientific results. That's what's going on here.

People were basically being told sugar was just energy. It wasn't harmful to your body. Yet, salt was the addictive white substance. Really, it was sugar all along.

JM: Yeah. Sugar can definitely crash your metabolism, especially when it's refined and processed. One of the ways that I believe – I actually wrote a book on it called *Fat for Fuel* – that people can help improve their insulin resistance, which seems to be at the metabolic core of most disease, is to go on a low-carb, high-quality fat diet, sometimes called ketosis or targeted cyclical ketosis.

But in the process, one of the side effects of that is something called the keto flu. Interestingly, you discuss this in your book. Almost invariably, if you follow this program and you neglect or fail to understand what happens to your sodium levels, you will wake up with severe, incapacitating muscle cramps, typically in your legs, at night, because of the sodium loss. I'm wondering if you could comment on that, because I think it's a really important fact for people to know, especially if they're intrigued enough to adopt a ketogenic lifestyle.

JN: Yeah. I'm really glad you brought up that point, because it is a really important topic and there are so many people out there trying to go on ketogenic diets. They're trying to lower their carbohydrate intake. Literally, the one barrier stopping them from doing that is the dramatic amount of salt loss that occurs when you try and cut those carbohydrates.

What ends up happening is when you are consuming 400 grams of carbohydrates every day and then you decide to cut your carbohydrate intake to less than 100 or less than 50 grams of carbohydrates, your insulin levels dramatically go down. Glucagon goes up, and then you start producing these negatively charged ketone bodies. All three of which deplete the body of salt.

These negatively charged ketone bodies are pulling positively charged sodium ions out in the urine, at least for the first week when you cut your carbohydrate intake. Most people are losing an additional 1 to 2 grams of sodium per day when they cut their carbohydrate intake for about two weeks. But the other issue is that the loss of exogenous glucose is now reducing your absorption of sodium. Glucose helps us absorb sodium. When you are no longer consuming high amounts of glucose, you are also not absorbing as much sodium.

There are a few things happening when we cut our carbohydrate intake, why people get these – like you said – debilitating cramps, especially in the legs. What's really interesting is that your salt status directly controls your magnesium and your calcium levels in your body. Because if you do not get enough salt, the body starts pulling sodium from the bone, but it strips it of magnesium and calcium as well to maintain normal sodium levels.

Numerous metabolic studies have shown that when you go on a low-salt diet, in order to maintain normal sodium levels in the blood, the body's pulling sodium from elsewhere, but also stripping magnesium and calcium. One of the worst things people can do for their bone health is to go on these low-sodium diets, because your bones are going to be stripped of magnesium and calcium at the same time.

JM: That's a really, really important point, probably for reasons that you may not appreciate at this point, but I'm going to expand on them.

I'm sure you understand that magnesium is probably one of the most important mineral deficiencies that we have as humans. I mean, in general, by sensitive assays, we're finding that 80 percent of people are deficient in magnesium. If you're going on the low-salt diet, it's going to make it even worse. But magnesium is especially important because there's this pretty strong supporting evidence that it may mitigate some of the negative impacts that EMFs have on us through the voltage-gated calcium channels and them being a calcium-channel blocker in appropriate consents.

This is a radically important concept to understand that when you go on a low-salt diet, you are lowering your magnesium and calcium levels. But you know, for most of us, calcium is not an issue. It's the magnesium that's going to get us into trouble. Big, big issue.

JN: Yeah. Huge issue. The body's smart. When it doesn't get enough sodium, what ends up happening is the body will protect itself by decreasing the amount of sodium lost in sweat. What ends up happening is it increases the amount of magnesium and calcium lost in sweat. You are going to literally sweat out more magnesium and calcium if you're following a low-salt diet. And then there's a third hit to magnesium when you cut your salt intake.

Aldosterone is a sodium-retaining hormone, but most people don't know that aldosterone also reduces magnesium. It kicks magnesium out in the urine. Low-sodium diets are elevating aldosterone levels and reducing magnesium in the body by increasing its urinary excretion.

JM: When you refer to low-sodium diets, can you be more specific? Is this American Heart Association recommendation, the conventional medical models? Will you give us some specific numbers?

JN: Sure. Basically every guideline when I refer to a low-sodium diet, that is basically 1 teaspoon of salt or 2,300 milligrams of sodium or less. The American Heart Association actually goes even further. I challenged one of their recommendations. I published a paper in the American Journal of Hypertension kind of saying the problems with their advice of extremely low salt intake. We're talking about less than 1,500 milligrams, which is basically less than two-thirds of a teaspoon of salt.

One of the ways you can easily challenge these recommendations is that 90 percent of Americans are consuming caffeine in some form or another. If we consume just four cups of coffee – Coffee is much more than just a diuretic. It's a natriuretic. We lose a tremendous amount of salt in the urine when we consume caffeine. Just four cups of coffee can cause us to lose over a full teaspoon of salt in the urine in just four hours. Yet, we're being told all these guidelines to consume less than that. It makes no sense.

Exercise is a huge salt resistor as well. As you know, when we sweat, the average amount of salt that we lose per hour of exercise is actually half a teaspoon of salt per hour. We're supposed to be exercising to be healthy. We're supposed to be going out in the sun, getting vitamin D and sweating. We're supposed to be eating real foods. Salt helps us eat real foods. Really, this low salt advice is going against the two things that people need to be doing to improve their health. That's eating healthy foods and exercising more. Salt allows us to do both.

JM: Yes, indeed. Let's get into some practical recommendations. I initially was using a very precise nutrient tracker analysis program called CRON-O-Meter. [I] accurately weighed and measured my foods and entered it into this nutrient tracker. It could tell, within literally a few milligrams, how much sodium I was getting for the most part.

When I was eating real food, virtually no processed foods, except for maybe some canned sardines, my sodium levels were like in the dirt. They were less than a gram. This was assuming I was not applying any added salt. I definitely qualified for the American Heart Association qualifications for the low-salt diet.

We talked earlier about the dangers of doing that and getting leg cramps. I'm wondering if you could comment on how much would be healthy and the general advice to give with respect to how much salt should you use. I think it's between 8 and 10 grams. That's what your recommendation was. But I mean what does that translate to with respect to seasoning your food and the process to go about doing it? Also address any concerns about over-salting.

JN: Okay. Great questions. I think what you said right at first is probably the most important thing. When you start eating a real food diet, your sodium intake is going to dramatically go down. The reason is we're not consuming the whole animal anymore. We used to get a ton of salt from blood, interstitial fluid, lymphatic fluids, skin and bone marrow. Now we're not getting

that. We're just getting, let's say, a dried piece of muscle meat that doesn't have any salty blood around it.

JM: Unless you're eating processed foods, which is a whole different issue, because then they're going to salt it like crazy. That's the follow-up question.

JN: Right.

JM: Is that salt better than nothing or deleterious because it's a processed salt?

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JN: Yeah. I definitely think that processed salt is not the salt that we should be aiming to consume. But really the problem with processed foods is really everything about the salt, right? It's the refined carbs. It's the sugar. It's the vegetable oils and artificial sweeteners. Don't blame salt for what the sugar did. It's kind of what I always go back to when referring to processed foods.

Then you made a good point about what stoichiometry people will be consuming per day. We all have different physiologies. Luckily, we have this built-in safety mechanism. We have a salt thermostat that controls how much salt we should be eating. Basically, it's kind of listening to your own salt cravings, because some people exercise more and lose a lot of salt and drink caffeine and some people cut carbs more than others. Everybody's different.

Luckily, if we actually don't follow these guidelines and listen to our own bodies, in general, that will drive us to consume the optimal amount of salt. Like you said, the kind that sits around 8 to 10 grams of salt is about 3,000 to 4,000 milligrams of sodium per day.

JM: Okay. The general advice is to salt your food to taste?

JN: Correct. Then you had the third question. That was can you get too much salt? As we briefly discussed, for the last 10,000 years, we've consumed at least two to three times, but up to 10 times the amount of salt versus what we consume today. We didn't have the chronic diseases that we have today.

The reason is because the kidneys can flush out any salt they don't need. If you have healthy kidneys or you're a normal person, you can consume at least 86 grams of salt. Certain studies have shown it just gets flushed right out in the urine.

The problem is not getting enough. We can't manufacture an essential mineral. That's why all the studies show the highest risk of cardiovascular events and early mortality at a low salt intake, even versus a high-salt intake, even if you look at really high amounts of salt. I'm talking 7,000 to 8,000 milligrams of sodium per day. The rise in cardiovascular mortalities maybe only needs 20 percent versus 3,000 to 4,000 milligrams. If you go low-salt, the chronic heart disease mortality can be two-fold.

Even at the higher end – we know this through Japan and South Korea – these people consume 4,000 to 5,000 milligrams of sodium and actually live the longest and have the lowest risk of chronic heart disease mortality.

JM: Yes. In ancient times, in fact, salt was considered a very valuable commodity. So much so that I believe the etymology – maybe coming from Latin – of the word salary comes from "salt." I believe it does, because it was an essential commodity that people needed. If they didn't get it, they were going to be in serious [trouble]. This has been treasured since ancient times, but has been really vilified within the last century or so.

JN: Yeah. You also brought up a good point too just a few minutes ago. What type of salt should people be consuming?

JM: That was the next question. Right.

JN: Yeah. My recommendation in the book is this Redmond Real Salt. It's actually from an ancient ocean. If you're getting sea salts from modern day oceans, you can get modern day pollution, including microplastics, nanoplastics, and even traces of heavy metals. When you get and you source yourself from an ancient ocean, you don't have to worry about that.

But the other great thing about Redmond is that it has good amounts of calcium and iodine. Regular sea salt has basically no iodine in it. A lot of people are confused and actually think that sea salt has the highest amount of iodine because everybody knows seafood is high in iodine. But for some reason, the salt from modern day oceans, that sea salt does not have iodine in it.

JM: Very good points. I'm glad that you've incorporated the recent findings that, to my understanding, were just published in the last week or two – the microplastics in the sea salt. Big issue. I was going to bring it up, but I'm glad you did. Conventional sea salts, you really want to avoid. They're not much better than processed regular salt. I'm wondering if you could comment or compare the Redmond Sea Salt versus one that we typically recommend, the Himalayan salt, which is also from an ancient ocean up in the Himalayas.

JN: Yes. If you look at the actual amounts of iodine in Himalayan salt, it can vary anywhere from less than 100 micrograms per 10 grams of salt to up to 1,000 micrograms. Redmond seems to come in at about 170 micrograms of iodine per 10 grams of salt, which is just a little bit over what most people consume in a day. You can basically get the recommended dietary allowance (RDA) for iodine by consuming those types of salts. That's what's good about Himalayan and Redmond. It's that they do contain good amounts of iodine.

What Redmond contains more of than Himalayan salt is calcium. You get about 40 milligrams of calcium and about 8 milligrams of magnesium. Himalayan salt has virtually no calcium and only about 1 milligram of magnesium. Also, Himalayan salt actually gives you some radioactive elements in very small amounts, like plutonium, polonium, rubidium and all these other things that Redmond doesn't have. It's much cheaper. That's why I kind of prefer Redmond over Himalayan salt.

JM: Okay. Thanks for those. I'm not sure that the calcium-magnesium are major issues, because milligrams in magnesium is not going to put a dent in the bucket. With respect to the radioactive elements, as long as they're in small amounts – I'm sure you've heard of this – there's this process called hormesis, where actually very tiny amounts of dangerous substances – at least dangerous in larger amounts – can actually be very beneficial, because it activates these antioxidant pathways, like nuclear factor-like 2 (NRF2) to upregulate your internal antioxidants.

JN: That's a good point.

JM: Alright. We talked about how the other white crystal is the issue – not salt – that's contributing to heart disease, which is the core of the problem, not really changing your blood pressure, but actually increasing the risk of the consequences of high blood pressure, which is heart disease typically or other cardiovascular diseases, like stroke. But I'm wondering if you could talk about how low sodium actually contributes to insulin resistance, which you mentioned, and an increase in sugar cravings.

JN: Yeah. That's a great point. There are a few things going on when we cut our salt intake. One of the body's defense mechanisms of allowing the kidneys to retain more salt is by elevating insulin levels. When we go on these low-salt diets, the body becomes insulin resistant as a defense mechanism.

Literally, I've seen studies where going on low-salt diets are actually just as harmful as adding high amounts of sugar, in regards to the spikes in glucose levels that you can see after an oral glucose tolerance test. I mean you can get 60 to 70 percent, even 100 percent increase in the area under the curve (AUC) of an oral glucose tolerance test by cutting your salt intake. This is a key mineral that we need to make sure that we're getting enough of. Otherwise, that could be contributing to insulin resistance and increase in fat storage.

The other aspect of not getting enough salt is the body is very smart. Somehow, animals know to go to a salt lake if they don't have enough salt. How do they know to do that? They know to do that by an upregulation in our reward center in the brain, when we don't get enough salt. That actually protects us.

As humans, as animals, we get these cravings for salt. It's more rewarding once we consume it in the diet. The problem is that your sugar is now more rewarding when we're not getting enough salt. The sensitization of our reward system and people who are suffering out there from sugar cravings and dependency can be driven by not getting enough of the other white crystal – salt.

JM: Thanks for explaining that in more detail. Another question I have that I think you address in the book is regarding some subpopulations. You had mentioned that for most people, the extra salt isn't the issue. But are there any subpopulations, maybe with endocrine disorders or people who are salt-sensitive, so to speak, who really do need to pay attention to this? Some of the advice that were discussed may not be appropriate for them.

JN: Yeah. When we're referring to should certain subpopulations follow this low-salt advice, less than 2,300 milligrams, the reason why I think virtually no one should is because we're

supposed to be exercising every day. We can lose half a teaspoon to a full teaspoon of salt per hour of exercise. Even if people are sensitive, they're still going to be losing half to a full teaspoon of salt per hour of exercise. Most people are still consuming caffeine and they're being flushed out of salt.

Anyone who's consciously restricting their salt intake, I don't think there are any subpopulations that should go against what their own cravings are telling them. But, as you pointed out, there are certain people who are more salt-sensitive. I do cover those aspects in the book.

The three main subpopulations that seem to be salt-sensitive: people with high aldosterone levels, generally there's either a benign tumor where you're secreting more aldosterone, or you can just give someone a medication of spironolactone, rather than cutting any essential mineral out of the diet. Cushing's syndrome or there are elevations in cortisol, which of course can be treated with medications.

There's a very rare disease called Liddle syndrome. It's about 1 in a million people where they retain too much salt. We can give those patients a medication called amiloride. Don't take away that white substance that's allowing people to eat healthy bitter foods. Really, that's why I really believe very few people should be consciously restricting their salt intake.

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JM: Good points for sure. I think I want to mention another issue that I think you typically don't address with most of the audience that you're discussing this with. Those who are passionate about health will frequently – like myself – use far-infrared saunas as a form of detox on a regular basis.

With personal experience, I typically run and crank mine up to 150 and 170. I'm in there for a half hour. I've been doing long-distance endurance running. I did it for over 40 years. I know how much I sweat during that, even in a hot temperature versus a sauna. The sauna is at least two to three times more sweat coming out as you do when you exercise. That's another one that you really want to add to your regimen of being aware of your sodium loss and your engagement in that healthy practice.

JN: Yeah. No. That's a great point.

JM: Yeah. Something to consider. Can you discuss some of the diseases that actually contribute to sodium loss?

JN: It's interesting. Back in the 1970s when we were originally told to cut salt intake, we didn't have all these disease states and medications that deplete our body of salt. Because salt is an extracellular mineral, we can be flushed out of that mineral very easily, much more than even an intracellular mineral.

It comes down to "Are you losing salt?" One of the disease states that can cause us to not absorb salt for one is inflammatory bowel diseases, like Crohn's and ulcerative colitis. These people do

not absorb salt well. Also, patients with celiac disease and inflammatory bowel syndrome (IBS), they also are not absorbing salt very well.

Of course people who have bariatric surgeries, they can't absorb salt well. And then there are people who've had their intestine and colon removed, for instance colon cancer and other things that don't absorb salt well, because we absorb salt in both the intestines and the colon. Those are definitely some populations that need to be wary of they're not absorbing salt very well.

There are other people with adrenal deficiency as well. There was a child back – It was published in The Journal of the American Medical Association (JAMA) in the 1940s. This child was consuming loads of salt to the point where the parents actually hospitalized this child. They strapped the child down because he was raiding the hospital cabinets of salt. He ended up dying a few days later from salt loss, from adrenal insufficiency. They didn't realize then. That's just a good example of we should really be listening to our salt cravings. But yeah, there are people with adrenal insufficiency who don't absorb salt well.

The other disease states that cause salt loss are hypothyroidism. Our thyroid hormones, beyond just controlling our metabolism, actually allow the kidneys to reabsorb salt. There are 22 million Americans who have some type of thyroid dysfunction, mainly being hypothyroid. Those people need more salt.

There are 20 million Americans with undiagnosed sleep apnea, who are losing twice the amount of salt at night. That's why they're up at night peeing all the time. There are other disease states as well that affect the kidneys – polycystic kidney disease, glomerulonephritis, interstitial damage to the tubules that causes salt loss, all these other disease states that people need to be on the lookout for.

JM: How does sleep apnea induce sodium loss? Is it through exhalation? Basically if they're sweating, are they losing it and volatilizing it through their mouth?

JN: What ends up happening is the lack of breathing increases and causes blood to go into the thorax. It increases central blood pressure. It tricks the body into thinking it's overloaded in salt. The mechanism that the body does to fight that is to lose about 3,000 milligrams of sodium at night in undiagnosed sleep apnea. It has to do with not breathing at night and the increase in the central blood pressure that occurs because of that.

JM: Interesting. I would have never guessed that was the mechanism. Thank you for explaining that. I also wanted to make a comment on the bariatric surgery, which I didn't realize was associated with sodium loss. I wanted to comment that it is, in fact, indeed, a very highly effective way to combat morbid obesity. That doesn't mean I recommend it, but it works.

It works, in a way, similar that fasting does, which doesn't cost any money. It's actually free and gets the same results, except it's better because when you're fasting – many people may not realize this – but the body upregulates this process called autophagy, which is eating yourself at a cellular level.

The people who lose weight fasting as opposed to very low calorie diets actually don't get that massive skinfolds that have to be surgically excised after they lose their 100, 200 or 300 pounds. Because the body takes care of it and just needs to eat it. Then you don't have to worry about the sodium loss either, and other things. Bariatric surgery, if you know anyone who's considering it, please have them reconsider fasting.

My favorite resource for that is another guest I interviewed, Dr. Jason Fung, F-U-N-G, who wrote the book *The Complete Guide to Fasting: Heal Your Body Through Intermittent, Alternate-Day, and Extended Fasting,* which is just one of the most powerful metabolic interventions I know.

I'm sorry I went off on a tangent, but I thought it was an important one, not really related to the weight loss. Although when you do fast, make sure you have to get enough salt, because you do not want to wake up with debilitating leg cramps at night.

JN: No. I think that's a good point.

JM: But going back to inputting that, let's take this as with someone who's fasting where the only food you have is water – I'm talking about a water fast, not a dry fast, a water fast. In that case, how do you recommend doing that? I actually have read your book, and after that had started a four-day water fast. I knew that it was really important to get my sodium in. But if you're not eating food, it doesn't taste very good in the water. What I want to do is I just pour it in my palm and just licking my palm as a way to increase my salt. I'm wondering if there's an easier way to do that.

JN: Yeah. No. You can do it that way. It's certainly not a bad way. I agree with you when you try to add salt to liquid, like water, it can sometimes taste really bad.

JM: Not good. Not a good thing. Do not do that.

JN: It's not. What I do is I take – Let's say I'm going to work out for an hour. Before exercise, I always dose myself with salt. Tremendous benefits when you do that.

JM: Wait. Stop there and expand on that.

JN: Sure.

JM: Just don't fly above that one.

JN: Yeah. No. I call salt the sixth factor in fitness. Ancel Keys actually discovered some of the benefits of salt in exercise. We all don't necessarily like some of his publications in the past. He had a great one in the 1940s. He literally showed that when you exercise or you work out in the heat, there is a ten-fold increase in heat stroke if you follow a low-salt diet, so less than a teaspoon of salt, versus following a normal- or high-salt diet.

The benefits of salt are – Everyone's trying to look for a way to increase blood circulation. Nothing's going to beat salt. When you dose yourself with salt, what I do is I do about half a teaspoon of a Redmond Real Salt. I use about just enough lemon juice to cover the salt, and then I'll use about just 2 ounces of water and take it. It tastes like a lemon shot when you do it that way. You can even create like a keto-aid where you fill up the salt with lemon juice, lime juice and water. You're creating like this lemon-lime Gatorade without the sugar. That's how some people get their dose of salt before they exercise.

The benefits are you're acutely increasing blood volume, you're increasing your blood circulation, you're reducing your heart rate, which is important in order to run longer, faster and harder. Also, salt is a vasodilator. It's one of our best vasodilators. That allows heat to escape the body.

Literally, Keys showed in the 1940s that more salt actually decreased core body temperature because of this dissipation of heat and the vasodilation that occurs. What's interesting is over-training syndrome is literally salt deficiency in the tissues.

JM: Wow.

JN: When you are constantly exercising, your muscles are just losing salt. That's why you get the muscle spasms and twitches. If you just add salt back to the diet, you can completely eliminate over-training syndrome.

JM: That is beyond profound. Thank you for sharing that. That is powerful information. I've been a lifelong advocate of exercise. I didn't really fully appreciate the importance of sodium before it. To just make sure that I understand what your recommendation is for this lemon shot, it's 2 ounces of water, a half teaspoon of Redmond salt or Himalayan. How much lemon or lime do we put in them?

JN: Just enough lemon juice to cover the salt, and then you add about 2 ounces of water.

JM: Okay. Just enough for taste. Okay. That makes perfect sense. I'm assuming this recommendation is for aerobic exercise where you're sweating. Would it be similar for strength training where you're not sweating as much?

JN: Yes. Similar for strength training. There are several reasons why. But the acute load of salt is going to up blood volume and also increase blood circulation, so that the muscle pump in the improvement in blood flow to muscles, which is so important for heavy weightlifters.

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It also completely eliminates that headache that a lot of weightlifters get because of the increase in blood circulation. That's a great point. That dosing is for both, not just aerobic exercise, where you're losing a lot of it in sweat, but also to improve muscle pump function and reduce that weight lifting headache.

JM: What about timing? Do you do this right before, a half hour before, an hour? What's the best recommendation for that?

JN: Yeah. That's a huge point. Preloading with salt seems to work much better than trying to catch up or even doing it right at the beginning. What I do is prior to about 20 minutes before my workout, I will kind of preload with that half a teaspoon of Redmond Real Salt.

JM: Wow. That is profound. I'm actually going to integrate that into my workout schedule now. Interestingly, there is a technology – you may or may not have heard of this – called Vasper, V-A-S-P-E-R, like vascular performance. Have you heard of that?

JN: Yeah. I have.

JM: Yeah. Okay. Good. So then you're familiar with it. For most everyone who's listening to this or is watching this who hasn't, it's a very expensive machine. It's about 50,000 or 60,000 dollars. It's designed for elite athletes. It essentially uses blood flow restriction training where they have these compression cuffs in your arms and in your legs. You're also sitting on this pad. In the compression cuffs is a cooling fluid, usually typically almost as cold as ice water.

Essentially, it decreases your core body temperature, allowing you to perform at a more intense regimen without causing metabolic disperformance. The reason I'm mentioning this – one of the clear strengths of that and the hormonal benefits it has – is that it keeps your core body temperature lower, but it sounds like you could do something similar, maybe not quite as extreme, but something similar with the salt addition.

JN: Yeah. You're 100 percent right.

JM: Yeah. So, man, that's a winner. Most people watching this don't have 50,000 dollars to spend for a Vasper, so that's great. Hopefully by this time, people are enlightened and starting to dissipate some of the fear that's been inculcated from the media and the public health officials for the last five decades.

Interestingly, as an aside, Ancel Keys was also funded by the sugar industry. You probably knew that. But that was in the '50s. I'd like to go now – If your fear of salt is starting to diminish, I want to focus on the positive, which is highlighting some of the benefits or the utility that sodium and chloride has in the body. Maybe you can enlighten us in that area.

JN: Yes. Most people kind of understand inherently what sodium does. It gives us a blood pressure, which we need. It increases blood circulation. Some of the functions, though, of salt that a lot of people don't know is that sodium actually allows and helps us absorb vitamin C. It's extremely important. It actually drives vitamin C into the brain and the bone. This is why low-sodium diets and low-sodium in the blood is associated with brittle bones, falls and fractures.

If you want good vitamin C in the bone, which is important for collagen and bone strength, you need to have adequate amounts of sodium to bring in vitamin C. There's that transport where

they are required for each other coming to the brain and the bones. But a lot of people don't realize the benefits of the other essential mineral in salt, which is chloride.

Chloride literally makes up hydrochloric acid. That's how we break down our food, absorb nutrients and fight off bacterial infections. Literally, low salt diets have been shown to increase the pH in the stomach. There are a lot of people suffering with gastroesophageal reflux disease (GERD) and with acid reflux, potentially because they're not consuming enough salt to have the hydrochloric acid in the first place to break down the foods, which is why it's coming up into the esophagus.

JM: Yes, indeed. All again, highlighting the importance of making sure you're getting enough salt. The longer I study medicine, the more I'm impressed with how simple things are. This salt is one classic example. You just need to salt your food. It couldn't be much simpler than that. It's to salt your food liberally until you feel satiated.

It's almost as simple as the other one. I can't thank you enough for that recommendation on exercise and preloading with the salt. I'm definitely going to be using that. It amazes me. Another, perhaps even superior aid to improving athletic performance, is just making sure you're sleeping enough and getting high-quality sleep. How much more simple does it get than sleep? That's another radically overlooked aspect of how to optimize your health, enough sleep. I just finished this book, *How Do We Sleep,* that was just amazing. It's just amazing what the lack of sleep does.

These simple strategies, like sleep and salt, can have profound benefits on your health. I really deeply appreciate your taking the time to put together this book that really crashes some of the myths that so many of us are under, with respect to understanding the importance of not avoiding salt.

JN: I appreciate that. Thank you.

JM: Yeah. You've done a good job. The name of your book again is *The Salt Fix,* right?

JN: Yeah. *The Salt Fix.* Yeah.

JM: A simple title. It pretty much can be obtained anywhere. Any other resources you have or follow-up recommendations?

JN: Yeah. People can get the book at TheSaltFix.com or on Amazon. It's in Barnes and Noble nationwide.

JM: Perfect. Alright. Have you got any big plans coming up after this book or any new topics you're going to tackle?

JN: Nothing as of right now, but you know? But don't count me out yet.

JM: Alright. You've still got a lot of time to stay in the game and enlighten us in other areas. We appreciate you taking the time to do this. It really is an important topic and piece of information that you're providing to help us take control of our health.

[END]