

# **The Root Cause Protocol: Achieving Better Health Through Better Mineral Optimization**

## **A Special Interview With Morley Robbins**

**By Dr. Joseph Mercola**

**Dr. Joseph Mercola:**

Welcome everyone. Dr. Mercola helping you take control of your health again. And I'm delighted to have Morley Robbins with us, who has had the reputation in the past, for many people I know, as being known as the magnesium person, but, and he certainly is, he hasn't stopped embracing magnesium as I haven't either, but he's really gone deep on it and he has integrated some new passions that really revolve around copper, but actually integrate some of our really other important nutrients, like copper – oh wait, I just said that, copper, iron and vitamin D, and vitamin A in the form of retinol. I'm delighted, because he – let me give you a little background, his history. And correct me if I'm wrong, Morley, but at least from reading your book, it appears that you were a hospital executive preceded by the fact that you had started medical school or were a med student.

**Morley Robbins:**

Pre-med.

**Dr. Joseph Mercola:**

Pre-med. Okay, sorry. Pre-med, but didn't start med school. So you've been passionate about health for a long time, probably as long as I have, but never really formally trained in it, and actually had really pretty much adopted a conventional medical model until about somewhere between 10 or 15 years ago. I don't recall, specifically.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

And then you got a shoulder injury, I believe, and then that started you down the path.

**Morley Robbins:**

When I think of all the things you've got in your mind, that you remember all that, it's amazing. So thank you.

**Dr. Joseph Mercola:**

Well, I just read your book.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

So I have an unfair advantage.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

And I'm really enthralled with the work that you're doing, so I've listened to a lot of your podcasts and there's some interviews which are piece of cake, because I just, for whatever reason, there's no preparation time, but for yours I felt a strong need to really get prepared and understand what your work is because I think it's significant. And I'm impressed with the fact that you're pretty much a typical guy, like 10, 15 years ago, didn't really understand much about natural health, and then you just dove deep and you spent hours every day studying the literature, which is probably one of the best ways to learn. I mean, it's not the best, but it's certainly a powerful way.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

And if that wasn't enough, you combine that with essentially a photographic memory that you have, and you start to put together some really interesting compilations. So it's all about a journey. My journey's been a little bit longer than yours in natural medicine. And we've seen people more recent, like Peter McCullough, and Robert Malone, Steve Kirsch, all who have essentially been conventional medical models for up until a year or two years ago, Steve Kirsch less than a year.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

But they got it and they went deep, and now they're putting on information that is just very powerful and compelling and they understand the truth. They've been hit by the COVID bat. So, fortunately, you started that journey much before they did, but it's all a journey and we're all learning, each and every one of us is learning. And so we're going to have a nice, wonderful dialogue about what I believe are some tremendously important topics that address the foundational cause, which is the title of your book, "The Root Cause." Is it "The Root Cause" or "The Root Cause Protocol?"

**Morley Robbins:**

"The Root Cause." Yeah.

**Dr. Joseph Mercola:**

Root Cause. Yeah. The Root Cause. So The Root Cause Protocol is an implementation of what you found. And in my view, you hit pretty much every basic cause. I mean, there isn't one that is excluded, which is odd, because most people who write about health miss a few of them, and you've got all of them. And from my perception, I mean, there's probably some missing ones that both of us don't know about, but the issue is it's a journey and it's just fun to connect with someone who's as smart, intelligent as you are, and put it all together and given us some insights. So what I'm hoping that our listeners will get is the really dramatic importance of copper and how it plays into all this, and how it's not just something you supplement with, but it's a far more complicated and foundational approach to optimizing copper in your system. Because no one has really exposed this area of health and biology as well as you have. So I'm convinced of that. If they have, I have not seen and encountered it. So congratulations for that and thank you for joining us today.

**Morley Robbins:**

Absolutely. Well, this is sort of, it's a surreal moment, but you may not recall, we met on my birthday weekend in 2010, at the Weston A. Price meeting.

**Dr. Joseph Mercola:**

Is that how long it's been since I went to Weston Price? And then I offended Sally and she kicked me off her board because I disagreed with the cod liver oil.

**Morley Robbins:**

Well, that could be [crosstalk 00:05:00]

**Dr. Joseph Mercola:**

I'm sorry?

**Morley Robbins:**

That could be a badge of honor.

**Dr. Joseph Mercola:**

Yeah. Well, I don't know. It just depends on your perspective.

**Morley Robbins:**

No-

**Dr. Joseph Mercola:**

Because Weston Price has done a lot of good. I mean obviously-

**Morley Robbins:**

Oh, absolutely. And I think if Dr. Price had had more time, I think he would've gotten to the minerals. I mean, he nailed vitamin A and the X factor, he absolutely understood the importance of fat, but I think what he missed, and it's no criticism, it's just a matter of time, I don't think he understood the role that minerals play to really activate enzyme pathways. And it's just a very

fundamental, as you're noting, it's the very essence of metabolism. Are the enzymes working? Are they doing their intended job? And I'm laughing about the fact that I like used BMWs, they're very well-engineered.

**Dr. Joseph Mercola:**

Yeah, but they break down all the time. They're worse than Ford.

**Morley Robbins:**

Yeah. Okay. You're going to get a kick out of this. I was going to go run an errand and I put my key in the ignition, as I click, the battery was dead. And I said, "Oh, well, this is just to get me ready for the conversation with Dr. Mercola." Because that's what the whole problem is with the world now, the batteries aren't working right.

**Dr. Joseph Mercola:**

Yeah. And I think we should expand that, because by battery, I'm assuming you're referring to the mitochondria.

**Morley Robbins:**

Absolutely. Yeah. And if they don't have the minerals that they need to do their work, they're not going to function. And I think, probably a good starting point is to clarify what the mitochondria is really about.

**Dr. Joseph Mercola:**

Yeah. Definitely, because that's the crux of the issue. I mean, everything we're talking about is really pointing to improving the quality and the functioning of the mitochondria.

**Morley Robbins:**

Right. And the whole essence of The Root Cause Protocol is, and I'm sure we'll talk about this more as we go forward, but ignore the enemies, let's ignite the energy. Let's really focus on how do we create energy? And the mitochondria are usually referred to as power plants. It's not a power plant. One author, just an amazing reference, talks about it as being a biological microchip, which is a completely different idea. And then you're suddenly left with this idea of, "Wait, it's not a power plant, it's a factory." And what goes on in a factory? A lot of activity that depends on energy, but there's a lot of movement of raw materials and end products, and people don't think about that and the fact that the mitochondria are connected to both the endoplasmic reticulum and the lysosomes. Well, suddenly you've got lysosomes being the recycling center and the endoplasmic reticulum being where the proteins are going to get made. It's like a completely different idea.

**Morley Robbins:**

And then we get to the idea of, we all have this image from our high school biology class, what the picture of a cell looks like, and it has one or two mitochondria. Well, I've come to realize that that picture was drawn by Walt Disney because it's a complete distortion of reality. The average cell has 500 mitochondria. The average liver cell, 2,000 mitochondria. Kidney cell, 4,000

mitochondria. Heart cell, 10,000 mitochondria. Then let's get to the mature eggs in a woman's body, anywhere from 100,000 to 600,000 mitochondria. And then the brain region, that I think is the most fascinating, is the substantia nigra, it has 2 million mitochondria per neuron. See that's a game-changer, when you begin to understand the concentration of activity.

**Dr. Joseph Mercola:**

Is that what goes defective in Parkinson's?

**Morley Robbins:**

Absolutely.

**Dr. Joseph Mercola:**

Yeah. So, making dopamine.

**Morley Robbins:**

Making dopamine, but it's also just the whole energy process. And the key is that, in order to get the diagnosis of Parkinson's, 66% of those neurons need to be dead. So that 66% times 2 million mitochondria per neuron, we're talking about a massive loss of energy. And that begins to put everything in a different frame of reference. When you think about it in an energy paradigm, the whole concept of health and disease is completely different at that point.

**Dr. Joseph Mercola:**

Yeah. And when you think about a drug paradigm, treating that, conventional physicians would prescribe L-DOPA, which actually makes it much worse in the long run, and in no way, shape, or form, addresses these dying neurons with all these mitochondria.

**Morley Robbins:**

Well, and the other part that, and again, I don't know how I happened into this process, this is a divine assignment, I think, and I've been guided over the years and I've been blessed to meet some amazing research scientists and have conversations like this, so this is just a peak experience. But this whole concept of energy production is so essential and it's overlooked. Well, what's another way of describing lack of energy? It's called inflammation. Inflammation is poor energy production. Why? Because the mitochondria, it's a two-stroke engine, and there's two copper centers, as you probably know, Copper A and Copper B. Well, Copper A is the easy stroke, it gets us to hydrogen peroxide. But then we've got to turn hydrogen peroxide, H<sub>2</sub>O<sub>2</sub>, into two molecules of water, 2 H<sub>2</sub>O. That's very different than H<sub>2</sub>O<sub>2</sub>, right? And so, if the body keeps defaulting into H<sub>2</sub>O<sub>2</sub>, it's a clear sign of lack of copper, both from the standpoint of the active side, the cytochrome of c oxidase enzyme is not doing its job.

**Dr. Joseph Mercola:**

Okay. You and I know this really well. And sorry to interrupt, but I just wanted to break it down, so that people without molecular biology background or even high school biology understand this. So when you introduce a term like cytochrome c oxidase, I think, probably it's best to identify what that is.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

And maybe even while you're doing that, just mention how the fact that this peroxide is a source of oxidative stress, and when you're producing too much of that, you're going to cause lots of free radicals of secondary damage.

**Dr. Joseph Mercola:**

We just want to keep it simple for people.

**Morley Robbins:**

That's fine. No, that's great. So we live on a planet that has two very active elements, oxygen and iron, and we know they don't mix well because they create rust, and yet mitochondria are filled with – the terminal destination for both iron and oxygen are the mitochondria. That's an important thing to understand. And so inside these organelles, these factories, if we can call them that, are a series of proteins that are loading electrons onto oxygen and loading hydrogen, and the term that's used in the literatures, we're activating oxygen and we're activating hydrogen to create water.

**Morley Robbins:**

Turns out that the mitochondria are water wheels, they're the source of water in our metabolism. And when minerals are in optimal levels, we can make water. And once we make water, which implies the pH of 7, because that's when water exists, once we make water, that releases the precursor to energy, called ADP (adenosine diphosphate), and it goes over to another complex to become ATP (adenosine triphosphate), very important. And as many people might know, those proteins, ADP and ATP, actually have magnesium in them to give them structural integrity. It's a very important aspect of energy dynamics. And so, what I was referring to just a minute ago, I was talking about complex four, so there actually are five complexes.

**Dr. Joseph Mercola:**

In the mitochondria. In the electron transport chain in the mitochondria.

**Morley Robbins:**

Right. And the complex one, complex two, and complex four – excuse me, complex one, three, and four, work together, they're a very important unit. Complex two is kind of off to the side and may get involved, but for the most part, one, three and four. And complex four has multiple elements of copper in it. In fact, it turns out they will often say there's three atoms of copper.

**Morley Robbins:**

Well, turns out, complex four is a dimer, so there's six atoms of copper. That's an important jump in our understanding, it's like, "Oh wow, complex four has got more copper than I realized." And what's its job? Its job is to turn oxygen into water. And here's where I think it gets really fascinating. We've all been in kitchens, we've all been to fancy restaurants and seen kitchens, and

every kitchen that we've ever been in has a stove, right? And they're usually made of what, iron, steel, and they're cooking something. But does the stove run itself? Does the stove know what food to put into the pot? What temperature? How long to keep on? Of course not, it needs a chef. I call them cuisine artists, so we can see the symbol for copper, CU, I for iron.

**Morley Robbins:**

And so again, this is where I think it's so fascinating, inside the complex four, there is a stove, and it's called heme a<sub>3</sub>, and it holds oxygen. And then copper B comes along and slices and dices, it lets the electrons and hydrogen flow through, and voila, we have water. I think that's amazing. But then you think about how frequently it's happening and then that releases ADP to go over to complex five, which is called the ATP synthase, and it's a rotor, it's a little motor inside the mitochondria. And these are actually, Dr. Mercola, they're stacked like pancakes. We don't really know how many complex fives are in one mitochondria, it could be hundreds, it might be thousands, but they're each spinning at 150 revolutions per second, and every time it goes around-

**Dr. Joseph Mercola:**

That's 9,000 RPMs per minute.

**Morley Robbins:**

Yep. And every time it goes around, it's releasing three magnesium ATP. And just think of the vortex of thousands of these little rotors inside one mitochondria, much less thousands, hundreds of thousands, millions. And then we get to just the sheer elegance of the design of human physiology, it's absolutely amazing.

**Dr. Joseph Mercola:**

Is complex four cytochrome c?

**Morley Robbins:**

Cytochrome c oxidase. Absolutely.

**Dr. Joseph Mercola:**

That's the oxidase. I thought that was the enzyme.

**Morley Robbins:**

Well, the enzyme is the oxidase. The cytochrome c is the electron shuttle.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

But what's real important about that shuttle is it needs retinol. There's a four-part component, it's called the Respiratory Chain. Hüttemann, H- Ü -T-T-E-M-A-N-N, 2015, 2019, wrote some amazing articles about it. And the complex, it's four parts, but if retinol isn't there in adequate levels, it's

going to set the stage for what's called the Warburg effect. And that's going to take us down a whole different bunny trail, but whoever knew about retinol being critical for energy production? That's not something that's typically discussed in clinical circles.

**Dr. Joseph Mercola:**

Yeah. So maybe we can take a little tangent here, because retinol, you're one of the few people who really dive deep into retinol too, and why don't you expand on what retinol is? It's not beta-carotene. And as far as I know, maybe you can correct me, there are no plant sources of retinol, it only comes from the animal.

**Morley Robbins:**

Yeah. There are differences of opinion. I think the mainstream agreement is that retinol is from animal sources. There are some plant physiologists who will say that early plants might have produced retinol, I don't have any way to prove that one way or the other. But the important point that you're making there is that beta-carotene is not retinol. I happen to be reading a fascinating master's thesis, from a student at Oregon State University from 1987, he is that kind of a nerd. I was fascinated by it yesterday. And she had some striking insights, she absolutely confirmed that you cannot make retinol from beta-carotene unless you have adequate copper in the tissue.

**Dr. Joseph Mercola:**

Oh, that is interesting. That is another connection.

**Morley Robbins:**

That's a big game-changer. And so again, the retinol, and again, I know we'll get into discussions about fat-soluble vitamins, but I think another important thing for people to understand is that sunlight is real important for making vitamin D, we absolutely agree on that. But sunlight's also critical for breaking down retinol into its component metabolites, they're called retinoids, and turns out there's things like nuclear receptors and there are what are called retinoic acids, well, they're hormones. These are incredibly important, the nuclear receptors are what make the thyroid work, what make vitamin D work, it can go on and on. But the important thing is, for people to realize is, that when we go out in the sunlight, we're doing two things: We're activating D and we're breaking down A, so that the regulatory functions that A is responsible for, begin to take effect, and not a lot of people talk about that. I think Lawson, from 2013, is probably the only author I've seen explain the distinction of light for both A and D, and I think it's really of paramount importance for people to understand that. And then we find out that-

**Dr. Joseph Mercola:**

Well, before we go on, let me just take a little tangent here, because there's so much information to cover and I think this is a good point to make yet another little tangent on vitamin D and sunlight because this is one where we're absolute perfect synchrony on. And I've been always, always recommending that people get their vitamin D from sun exposure. And the reason I want to stop and emphasize that is because, I knew that was the case, but I also knew there were other reasons why that was important, and you mentioned just now another really vital one, that I



didn't really appreciate until I started reviewing your work, and that is the activation of vitamin A.

So, you can swallow vitamin D, in some cases you don't really have another option if you're going to increase your levels, but that is far, far, far inferior to getting sun exposure. And the other thing that you didn't mention, but you do in your book, is that 95% of the melatonin in your body is not produced in your pineal gland, it's produced in your mitochondria when you're exposed to sunshine or infrared radiation.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

On your skin. So, three reasons why sun exposure on bare skin is absolutely essential and vital to your life and part of The Root Cause Protocol.

**Morley Robbins:**

But again, we are energy and light beings. It doesn't get any more basic than that. And what's really interesting is, one of the most fascinating conversations I had was with a noted marketing consultant for the natural food industry. His name is Michael Fishman. Guy's brilliant.

**Dr. Joseph Mercola:**

Sure. I know him.

**Morley Robbins:**

Yeah. And he told me, we had a daylong conference together and he said, "I'm always asked, 'Hey, Michael, what's new, what's new?'" He said, well, I've learned to ask the other question, "What's enduring?" And that conversation about what's enduring got me to look back and go back to the very beginning of time, when oxygen was first appearing, and then finding out that retinol was the first hormone on the planet, which is like, "Wow, that's significant." And according to the astrobiologists, and how they know this, I don't know, but they claim that 700 million years later, vitamin D shows up.

Well, what is retinol? What is vitamin A? It's a light sensor. "Oh, we've got light. Let's work with it. Come on, we can take those photons and do something." And what is vitamin D? It's a light filter, it's sunglasses. "Let's dampen a little bit of that light, because we don't need so much." And it's a fascinating concept to think of those as in parallel yin yang functions. And I think that's the most important thing for people to realize, is that we shouldn't be focusing on one at the exclusion of the other, they are Frick and Frack, they're yin and yang, and they need to be considered together.

**Dr. Joseph Mercola:**

Yeah. And a lot of people struggle with optimizing their vitamin D. It's a point that I haven't mentioned frequently enough, is that it really is vital that you get vitamin A, and as you mentioned and reinforce, that's mostly animal foods or you can take a supplement to get it, too,

like things like, I think, in your book you recommend cod liver oil, that I think is one of the ones you advise.

**Morley Robbins:**

Grass-fed beef liver, cod liver oil.

**Dr. Joseph Mercola:**

Yeah. Beef liver too. Yeah. How could I forget? That's probably the densest source of minerals that you could possibly get too.

**Morley Robbins:**

Yeah, exactly. And so the thing is, our ancestors didn't struggle with this. I mean, they go back a couple hundred years ago and I think we tend to glamorize their lifestyle, I think it was pretty rugged, but they didn't have the food processing issues that we have, they didn't have the agricultural issues that we have. And so I think the environment's very different today than it was back in the day, back when Dr. Price was doing his research, it was a different world, completely different world. And so I think we need to put it in that context that there is value in having that ancestral understanding. And I really think that's, at the base of it, we need to be eating an ancestral diet, whatever our ancestral origin might be, we need to understand that that becomes code for our body and how it performs.

**Dr. Joseph Mercola:**

Yeah. And lifestyle too. It's not just a diet. I mean, diet is obviously a big portion of it, but your sleeping patterns, your EMF (electromagnetic field) exposures.

**Morley Robbins:**

Absolutely.

**Dr. Joseph Mercola:**

Sunlight exposure. All of that. Exercise too, huge.

**Morley Robbins:**

Absolutely. Yeah.

**Dr. Joseph Mercola:**

We don't realize that we spend a relatively small amount of our time gathering food, at least in the Western world.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

But historical times, I mean almost 75% of their energy was invested in finding food and getting it.

**Morley Robbins:**

Well, whatever the process has been, Dr. Liz, my wife, who allowed me to get my arm back, she and I have been doing work with the Amish in Pennsylvania, and actually now we're doing work with folks in Indiana and Ohio and Michigan. It's absolutely fascinating, but it's given us a chance to see what earlier life was like, see what the agrarian society was really based upon, just to your point that these are hardworking people and they have a very different lifestyle. But the beauty is, they understand these concepts from the get-go, because they know how important minerals are to farming.

And it's just magical to get their perspective on it. And that's what's lost in the world of convention is, again, I don't think doctors understand, there are really four things that I think they're missing. I don't think they have a strong enough background in mineral metabolism, they don't understand oxygen metabolism, they don't understand the whole process of what parasites represent, and I don't think they really understand energy metabolism.

**Morley Robbins:**

And so those are four really – they're the four quadrants of lack of awareness, they don't even think about those concepts, but they're actually integrated. And what's playing in the background of all that is iron, they're not aware of the fact that we add iron. Iron accumulation is a daily event on this planet, that we, as older adults, have more iron in our body than we did when we were in our 20s, or when we were first born. And all the iron biologists know this, I mean, it's the cornerstone of their understanding. And what I think is probably the biggest gap is realizing that, I think it's the Chinese that first came upon this idea, is that copper is the general and iron is the foot soldier. And so generals have a lot of sway over the foot soldiers.

Well, turns out that's exactly how our body works, iron serves at the pleasure of copper enzymes. And I think it was Elvehjem and Sherman, in 1932, were the first to prove that if you don't have copper in your diet, you can't make hemoglobin. Well, that's a long time. What is that, 80 years ago, 90 years ago? I don't know if that's taught in doctor school now, that the copper is central to it. And so I think one of the great points of this information is the idea that we're anemic, and we're copper toxic, that this idea that-

**Dr. Joseph Mercola:**

Well, we are anemic, but we're not necessarily iron-deficient.

**Morley Robbins:**

Exactly. It's not iron deficiency.

**Morley Robbins:**

Exactly. It's not iron deficiency. It's iron dysfunction, it's iron dysregulation. And that is a very important nuance. I think it's treated pretty fairly in the book, but it's not central to clinical education. [[crosstalk 00:28:18](#)]

**Dr. Joseph Mercola:**

Let's take a side step for a moment, too, to emphasize the importance of iron toxicity. This is an area I've been familiar with for over three decades. I actually diagnosed my father with hemochromatosis because he has a genetic – had – he passed away not too long ago, a genetic anemia called, hemolytic anemia, called thalassemia, which predisposes to that. But thanks to Bill Sardi who just recently passed away himself, I think last week or two weeks ago. But he's the person who first helped me understand the iron toxicity issue and once your eyes are open, they never get closed on this.

It's so dangerous and reading your work reminded me of how critically important it is. I've essentially neglected reminding people what I already knew for 30 years and you reminded me of is that this is a big, big deal. Now, I've held back up in my talks to mention it every time because it's massive. Maybe it does, I want you to explain in detail why it's so dangerous. My guess is because it absolutely increases excessive oxidative stress.

**Morley Robbins:**

Absolutely [crosstalk 00:29:34].

**Dr. Joseph Mercola:**

Free radicals damages your body, but it's massive so why don't you walk us through this? Because this is a big one, folks. It's probably one of the top three things for health.

**Morley Robbins:**

Yeah. Iron dysregulation is the elephant in the room. It is front and center. Why we have the level of dysfunction, metabolic dysfunction. When we go back into the mitochondria, again, they're not just making energy. They are in very critical recycling centers. Again, if iron has a terminal destination in the mitochondria, that means it needs to be recycled and what's it's supposed to be recycled into? It's either going to become a heme group or it's going to become iron-sulfur clusters. Those are the two principle sources of using iron in the body, beyond the dominance that hemoglobin plays in our body. It turns out that to make heme and to make iron-sulfur clusters. Well, gosh, we've got to have copper. Four of the eight enzymes to make heme are copper-dependent and the rate-limiting variable in making iron-sulfur clusters requires copper.

**Morley Robbins:**

If in fact there is a deficiency in copper, which I would argue exists because the world of farming and the world of food processing has lowered copper's presence in the soil, in the food and in our body and by virtue of that, the concentration of copper in the mitochondria has changed. It is lower today than it was 90 years ago. It's been the number one nutrient deficiency on the farm for 80 years. Copper has been the number one nutrient deficiency, but at the same time, what the World Health Organization (WHO) will tell you is that, well, iron deficiency is the number one nutrient [crosstalk 00:31:29]. It's like, wait a minute, those are two connected and they don't know that.

**Dr. Joseph Mercola:**

Got a quick question, wanted to ask you for a while is what's the best way to supplement copper back into the soil so it gets into the food? Is it copper sulfate?

**Morley Robbins:**

Yeah. One of my students is an award-winning farmer in Northern California, up in Redding. He grows barley and radishes. He's just amazing guy. I asked him, I said, "What's the best way?" He said, "Well, Morley, it's actually really easy." He said, "Before I plant," he said, "I just spray the soil with copper sulfate, 10 to 15 pounds per acre," he said. And that what that does, Dr. Mercola, is it enhances the brix content of the food.

**Dr. Joseph Mercola:**

Wow.

**Morley Robbins:**

And the connection between copper and sugars is just, it's absolutely amazing. That is the magic sauce that is not well-understood in farming circles. A lot of farmers don't want to take the additional expense and time to do that. It's like, well, gee, if you're trying to produce [crosstalk 00:32:35] crop and [inaudible 00:32:37] the animals, that would be a good thing to focus on.

**Dr. Joseph Mercola:**

It's not just organic, I mean, it's great not to have pesticides, but you want the minerals in your food. That's why you're getting it ostensibly, because it's healthier soil and it can provide you with those minerals but most of the soil's depleted.

**Morley Robbins:**

Yeah. We eat food to get nutrients, right? So if we don't have the copper in our tissue, and that means we're not going to have copper in our mitochondria. Again, it's probably useful for people to know that again, we're back to, there's a lot of mitochondria in the bodies. They say it's 40 quadrillion. So that's 15 zeros. It's a number we can't even relate to.

**Morley Robbins:**

But ostensibly inside each mitochondria, according to Paul Cobine, Ph.D., in Auburn University, and he's a real sharp guy in 2004, 2006, he proved that there's 50,000 atoms of copper in each mitochondrial matrix. Well, that's a big deal. If the copper's not there, then the heme enzymes are not going to work right and the iron sulfur cluster enzymes are not going to work right. Iron is going to start to build in the mitochondria and then ultimately into the tissue.

**Morley Robbins:**

It's going to go into what's called Mitoferrin, that's a storage locker in the mitochondria and then it might spill out into the Ferritin inside the cell itself. But when that starts to build, it's called the labile iron pool, LIP and labile does not mean "happy." It does not mean "free." It means "really reactive." It's important to understand what that word means. As that iron is rising, there can be a 40% loss of energy, a 60% loss, 80% loss up to a 94% loss of energy as iron is rising and the concentration inside the cells.

**Dr. Joseph Mercola:**

Is this because it's actually damaging the ETC (electron transport chain).

**Morley Robbins:**

Exactly. It's damaging the ETC. Absolutely. But it's also affecting the ability to work with oxygen.

**Dr. Joseph Mercola:**

As specific complex or generally or I mean, what way?

**Morley Robbins:**

Just complex as one, three and four.

**Dr. Joseph Mercola:**

Okay.

**Morley Robbins:**

There's just a wholesale breakdown. Again, we've got to think of it in simple terms – it's rust. If the oxygen is not going to be activated properly at complex four, most important enzyme activity on the planet, I would argue complex four, got to turn oxygen into water. If that doesn't happen, you're going to create superoxide. That's an oxygen molecule with an extra electron. It's not super, it's actually hyper-oxide. You're going to create hydrogen peroxide. You're going to create the hydroxyl radical.

**Morley Robbins:**

Well, these are violently reactive, and they have varying degrees of half-life, but what it does is it begins to increase the acidity inside the cell. When the cell begins to become more acidic, it can't make energy. And that's ultimately what iron is doing is it's causing this increased acidity because of its reactive nature with oxygen and these proteins in the ETC that you're talking about.

**Dr. Joseph Mercola:**

Yeah. I think you also have a counterintuitive perspective on nitric oxide, which is generally perceived to be a very helpful nutrient in its respect to modulate vascular tone and optimize blood pressure, but in the context of molecular damage, if you're increasing super oxide, which isn't that potent an oxidative stressor, relatively minor, but you have that, and you combine that with nitric oxide, you get peroxynitrite, which is a free nitrogen species. That thing is not as dangerous, acutely, as a hydroxyl free radical, but it lasts like – it's either 1,000 or 1 million times longer, hydroxyl free radicals only [[crosstalk 00:36:47](#)].

**Morley Robbins:**

Very short.

**Dr. Joseph Mercola:**

-a billionth of a second. I mean, it can only travel a distance of one protein, that's it. So it has a very limited radius of where it can cause damage, but peroxynitrite goes and can actually go in and out of the cell and still last so long.

**Morley Robbins:**

It's more like the steel ball and a ping pong machine, that's peroxynitrite. I did not know that about the lifespan of the hydroxyl radical, billionth of second. That's not [crosstalk 00:37:12].

**Dr. Joseph Mercola:**

Billionth of a second. At the speed of light, you can't travel that far, right?

**Morley Robbins:**

Right. But I think that-

**Dr. Joseph Mercola:**

It doesn't travel at speed of light.

**Morley Robbins:**

But what's important is again, begin to get a frame of reference about, we're not talking about the Disney cell, the cells have a lot of mitochondria, and if they start to accumulate a lot of iron and again, the key is there's big difference between iron deficiency in the blood versus iron dysregulation in the mitochondria and in the cell. That's not adequately understood in clinical circles that they're not one and the same. It was Bruce Ames and his colleague Cara.

**Dr. Joseph Mercola:**

He still alive or he passed?

**Morley Robbins:**

I think he's still alive, yeah.

**Dr. Joseph Mercola:**

Okay. Good.

**Morley Robbins:**

At one point he was the most quoted scientist on the planet. That's a big deal. I actually had a chance to meet him. He's a fascinating guy. And the thing is, he's the one, I think it was 2004, figured out that there's 10 times more iron in the cell than shows up in the blood.

**Morley Robbins:**

Well, that's a watershed event. It's like, that means that the blood tests that we're relying on are not accurate. They're not revealing the whole story of iron metabolism. I think that's one of the most important things for people to realize is that if they're basing judgements on strictly a ferritin test or strictly a hemoglobin test, that's not adequate. You need to be able to understand

what's going on with my zinc, by copper, my ceruloplasmin, I've got to have multiple measures of iron activity, transferrin percent saturation and I need to know about the fat-soluble vitamins, A and D because their ratio is really, really important to this overall dynamic that we're talking about.

**Dr. Joseph Mercola:**

Yeah. So where is most of the iron in the body? Is it in hemoglobin? Is it in bone marrow? Is it in storage iron? Where does it hang out and what is the most accurate reflection of that?

**Morley Robbins:**

That's such a great question. I love that question. Folks, I did not pay him to ask that question. I love, [crosstalk 00:39:16]. Let's talk about it at the body level. The ratio of iron to copper at the body level is, on average, is about 5,000 milligrams of iron in the body and about 100 milligrams of copper so about 50-to-1 ratio, that's a big difference.

**Morley Robbins:**

Let's go inside the blood. To your point, where's the highest concentration? Highest concentrations in hemoglobin, that's 70% of the iron is in the hemoglobin. So inside the blood, we have a concentration of iron, 3,500 milligrams of iron, 1 milligram of copper. Big difference. Now let's keep going down.

**Morley Robbins:**

Let's go inside the bone marrow, because that's where it's at, right? Because it's the bone marrow that decides, "Am I going to make bone or am I going to make blood?" And how much of the blood is going to be in the immune system? Really important decisions, 24 milligrams of iron, 47 milligrams of copper.

**Dr. Joseph Mercola:**

Wow.

**Morley Robbins:**

Big difference, right? Suddenly we have a completely different understanding of how important the bone marrow are and how dependent they are on copper to make blood. And that's why the work of Elvehjem and Sherman back in the '30s, is so important because they knew intuitively. They couldn't prove it from a biochemical standpoint, they didn't have the technology then, but they knew intuitively that when they pulled copper out of the diet, hemoglobin levels collapsed. And when they reintroduced it, they perked right back up.

**Morley Robbins:**

This research has been going on and actually the most fascinating study that I came across recently, which you'll get a kick out of, Kim and Gonzalez, January 2021. What they decided to do was focus on 10 genes. Four of them dealt with iron. Four of them dealt with zinc. Five of them dealt with copper and they withheld copper from the diet of the mice to see which gene changed, if any.



**Morley Robbins:**

They weren't sure what was going to happen. It's absolutely, it's like, "Wow, they actually pulled it off." They withheld copper and there was only one gene that changed, and it's the ferritin light chain that really pretty much rules the liver. It went off like a rocket and in 1928, that same team back at the University of Wisconsin in Madison: Hart, [inaudible 00:41:53], [inaudible 00:41:54] and Elvehjem. 1928, they figured out that when they pulled copper out, iron loading took place in the liver and we come forward almost 100 years later, Kim and Gonzalez figured out the very gene that's affected by a loss of copper in the diet. There's a big difference between ferritin light chain, which is loading and ferritin heavy chain, which is like an ATM machine. Put it in, take it out, put it in, take it out.

**Morley Robbins:**

Light chain is it's just going there. And eventually the light chain is going to become hemosiderin and people don't – "What's that?" Well, hemosiderin is like a bank vault and you got to have a combination and a key and the manager's missing.

**Morley Robbins:**

The hemosiderin is 10 times more iron and think about the amount of reactive activity that iron has, will multiply times 10 and we're back to the very questions you were asking, why is iron so dangerous? It's just this highly reactive element that has been, I think, glossed over again, this idea that we're anemic, as you say, it's like, well, let's pull the curtain back more and understand what does that mean? What does that really mean from a physiological and metabolic standpoint? Where is the iron? Well, the iron stuck and if the iron's stuck because it can't properly recycle, which is what iron needs to do. Again, the mindset of the modern physician today is "iron needs to be stored."

**Morley Robbins:**

No, iron needs to be constantly recycled in the body. All the clinicians knew that from 1860 to 1972, that was the whole basis of measuring hemoglobin, it's being recycled. Then in '72, Jacobs et al, all famous hematologist in London said, "Well, let's focus on the ferritin protein." What? That doesn't make any sense. It's a storage protein. People don't realize that protein isn't supposed to be in the blood. But I had a very poignant conversation with Douglas Kell a number of years ago. And I asked him, I said, "Dr. Kell, what's the ideal ferritin, serum ferritin for a human?"

**Morley Robbins:**

He said, "Zero." I said, "What?" I thought he was kidding at first. He's about my age, very affable guy. He's like you, he's got this big wall of books behind him. He said, "Morley, I want to make sure you understand this." He said, "Rising ferritin is not a sign of iron vitality. It's a sign of organ pathophysiology. Do you understand what I just said?" I said, "Yes, sir. I do." And it's again, the average person doesn't understand that, and certainly the average person's practitioner doesn't understand that. I think that's where the epicenter of the confusion is.

**Dr. Joseph Mercola:**

Well, I think that's an important point. I want to come back to it, but after we inspire people and give them some tips that they can actually take home into the bank, I mean, literally this week and put on their calendar to do, to radically improve their health. This isn't going to cost you anything, for most people, and that is to do something altruistic and donate your blood. Now in my mind, I mean, and you can review this, the statistics, I think you quoted in your book where people who donate blood a few times a year, wind up living a lot longer because we know it reduces their iron involved-associated pathology you just mentioned. In my view, it is the single best way to lower your iron. There's nothing that outcompetes that, because as you mentioned, 70% of the iron in your blood or in your body has a hemoglobin, which one [crosstalk 00:45:51]

**Morley Robbins:**

In the body.

**Dr. Joseph Mercola:**

In the body, 70%. That clearly is the best way. Just move it out of the body.

**Morley Robbins:**

Hands down.

**Dr. Joseph Mercola:**

That should be true for every adult man, unless they have some acute blood loss and most all postmenopausal women. I want to table the discussion for menstruating women and children, because that's a special group that I think we have to be careful and not necessarily universally make that recommendation, but let's go for that group. Every adult, male, men, 18 and older or 16 and older, and they'll all postmenopausal women. Let's talk about the blood donation is the single best way that you could inexpensively improve your health.

**Morley Robbins:**

Absolutely, hands down and all the iron biologists agree on that. See the thing is that there is no active mechanism. There's no enzyme, there's no hormone, there's no active mechanism to deal with excess iron, other than gravity. Blood loss allows it to leave the body. It's a profoundly basic principle. And there was a famous iron biologist at the Indiana University, Ed Weinberg. In 2010, he wrote this famous article. He said, "At the first onset of not feeling well, I go to the blood center, donate a pin of blood and invariably I was fine."

**Morley Robbins:**

Again, it's not to overplay it, but it's an important principle, particularly as we age. Again, the gerontologists, I think they tend to put an elephant skin over a mouse. What is aging? It's iron accumulation in our eyes, in our hearing, in our hair, in our ticker, our liver, our joints, all these conditions of old age is just iron accumulation. Why is it accumulating? Because it's not being recycled.

And what's falling as we age? There's some really critical minerals, magnesium's dropping, copper's dropping and what I just learned this weekend, retinol. Retinol is not available in our

metabolism. Why? Because it gets stuck in our liver because it's not being attached to the retinol-binding protein so it stays as retinol esters in the liver and it has no function then, it's just-

**Dr. Joseph Mercola:**

I bet that retinol-binding protein is dependent upon copper?

**Morley Robbins:**

I'm looking, I have not found that. Some authors will tell you it's zinc, but there're clear indications. The relationship between copper and retinol is magical. The other connection that people need to know about, is the connection between iron and sugar. So there's two axis that run the body copper and fat, iron and sugar and never the twain shall meet.

**Morley Robbins:**

I was reading a very interesting article this morning from 1925 by a famous – I'm not sure what his specialty was. He was brilliant. Went to Hopkins in 1909, graduated and then worked at the Rockefeller Institute, let you connect the dots. He's talking about when you get into the cell – he was studying, he was studying the origin of cancer. It's fascinating. They knew exactly what caused cancer in the '20s and it was cellular and chemical irritation. It's fascinating. But the thing is, if you are dealing with the cell, he said there are only two elements that it works with: proteins and fat. There wasn't any mention of sugar in that. This was a very sophisticated article. I was reading from the '20s and it's like, I've read a lot of articles as you probably know, how many have I found that actually talked about the metabolism of fat in the mitochondria? How many would you guess?

**Dr. Joseph Mercola:**

Handful?

**Morley Robbins:**

One.

**Dr. Joseph Mercola:**

One. Okay.

**Morley Robbins:**

And I think the mitochondria actually are fat organelles. They really, they prefer fat, but we've been crowd into a diet based on sugar and it has this really toxic with iron and most people don't know that it's amazing what it does to the chemistry of the cell.

**Dr. Joseph Mercola:**

Well, let's veer back to the assessment of iron toxicity, I guess. Since you mentioned some of the things and started to talk about ferritin before I interrupted you and asked you to go over the phlebotomy and actually if you can't donate your blood and some of the people out there can't, and you're convinced that you need to remove or reduce your iron content, which I think almost all of you do. There's a pretty strong reason to do it. You can get what's called a therapeutic

phlebotomy. You need have to pay a small fee for that because they don't recycle your blood and put it back into the circulation, into the population. They actually dispose of it, it's called – and your doctor can write a description for that. Or if you're a phlebotomist, you can do it yourself.

**Morley Robbins:**

That's right. But you also have options. There're products like iDetox, IP-6, lactoferrin, apo-lactoferrin and you-

**Dr. Joseph Mercola:**

So far [inaudible 00:51:17].

**Morley Robbins:**

No, question.

**Dr. Joseph Mercola:**

And there's a cost to that, I mean, lactoferrin can be really expensive.

**Morley Robbins:**

Yes, that's true. The thing is, when they changed milk, they changed our ability to regulate iron. I mean, when you kill 50 enzymes and some of the big ones are ferroxidase, lactoferrin, things like that, because of the heating process, well then you've just changed the physiology of our metabolism.

**Dr. Joseph Mercola:**

Yeah. I'm not a huge fan of milk for adults, but certainly if they're going to have it, it needs to be raw milk, there's no question about it, from ideally grass-fed, organic cows, but I'm a huge fan of butter, huge fan of butter and I have nearly a half a pound a day. I, literally, 75% of my diet is fat.

**Morley Robbins:**

Whoa.

**Dr. Joseph Mercola:**

There's very few populations in the world that have more than 50% saturated fat. My current is about 46% saturated fat. Big believer because saturated fat doesn't have those unsaturated bonds that could be oxidized and damage and spin off free radicals.

**Morley Robbins:**

That's exactly right. You no doubt know about the desaturase enzymes and what the [crosstalk 00:52:36].

**Dr. Joseph Mercola:**

Yeah, too.

**Morley Robbins:**

The copper battery there. I think what's intriguing is so much of our metabolism does, in fact, rely on copper, but there's not one handy reference. It's like they took this knowledge and they blew it up into a thousand parts and there are just many gifted scientists who've been studying it, but there isn't really this composite body of [crosstalk 00:53:04].

**Dr. Joseph Mercola:**

Okay, I'm sorry. We went back again. Because I wanted you to do this issue with the ferritins. How do we differentiate between a menstruating woman and a child, if they have a really large blood loss, which could be related to copper deficiency because they're not utilizing iron properly. How do we make the distinction? Because typically and you'd mentioned a pretty astounding factoid that this expert in ferritin says the ideal ferritin is zero in clinical medicine though anyone with a ferritin of 20 is assumed to have iron deficiency. Help us resolve that dilemma, at least diagnostic dilemma and the minds of almost any conventional medical physician.

**Morley Robbins:**

Great question. Here's how I explained it to the Amish farmers to make sure they understood it. I said, "If you want to know how many bales of hay you have in your barn, would you go out in the field and start counting them?" And they went, "No," well, that's what they're doing with blood tests. The ferritin protein is designed to be inside the cell. What Dr. Kell was pointing out is that under intense inflammation, there's a change in how the lysosomes work to break down the ferritin protein and then allow for the recycling of the iron. We're getting at some really esoteric physiology and I'm going to try to keep it real simple. But the important thing is the narrative is that serum ferritin is an accurate indication of ferritin in the cell, no.

**Dr. Joseph Mercola:**

That's not true. Okay. That's the assumption?

**Morley Robbins:**

That's the assumption.

**Dr. Joseph Mercola:**

It's somewhat similar to what you know for magnesium and that serum magnesium is relatively a poor indicator of the more important one, which is cellular magnesium, which we [crosstalk 00:55:10] RBC magnesium.

**Morley Robbins:**

Exactly. This idea that looking inside the blood is going to be an indicator of what's happening inside the cell, that's a leap of faith. That is not [crosstalk 00:55:23].

**Dr. Joseph Mercola:**

Are those levels in some type of equilibrium where you can make an estimate so that there's some type of correlation that if you do get a level single-digit ferritin levels, which ring off

massive red bell alerts, that there may be something else going on because it's so unusual to see a ferritin of 20.

**Morley Robbins:**

Right. My sweet spot is between 20 and 50. When Dr. Kell said zero. I said, I don't think people would believe me if I said zero. So I went back into the research and 20 to 50 seems to be an acceptable tolerance. What I've learned is that in the blood testing, when the serum ferritin for a woman gets above 150, that's when the red flag goes off for women. And when it gets above 300, that's when the red flag goes off for men.

**Morley Robbins:**

So that's easy side and it usually correlates with liver inflammatory activity. And there's some dysregulation, some stressor. It might be diet, it might be just environmental stress, it could be a number of factors. So, that's the easy side.

**Morley Robbins:**

It's taken years to get a better understanding of, "What does low ferritin represent?" And probably the best understanding of it is, there are two authors, Arossi, A-R-O-S-S-I, and Worwood, W-O-R-W-O-O-D, in two separate publications and then Kell has also written about it, Douglas Kell. That when serum ferritin drops below 20, it's a sign of parasites.

**Dr. Mercola:**

Interesting.

**Morley Robbins:**

And the biggest – I'm trying to think of how can I get us a notch deeper without overwhelming people.

**Morley Robbins:**

But there's a protein or peptide that many people probably heard of called hepcidin and it's called the iron hormone. Well, I think that's being really generous. It comes from the HAMP gene. What does HAMP stand for? Hepcidin Antimicrobial Peptide. So it's really responding to excess iron and it's trying to stop the availability of iron to the pathogens. That's really what it's trying to do.

**Morley Robbins:**

And what is important for folks to understand is that in a state of vitamin A deficiency, and that would be most people who are eating a low fat diet, that hepcidin takes off like a rocket. Well, what does hepcidin do? It shuts down iron recycling and the biggest impact it has is in the spleen. Hepcidin is always talked about with enterocytes in the intestine, hepatocytes in the liver and then the splenocytes in the spleen. Well, 95% of its impact is in the spleen. That's a big deal. That's a major big deal.

**Morley Robbins:**

And so we need to understand the subtle nuance of what kind of diet is this person eating? What kind of stressors are they under? What are their macro-minerals? What are their micro-minerals that we can pick up in the blood?

**Morley Robbins:**

And when ferritin starts to go down, what it's actually doing is it's affecting the ability of the tissue to make ferritin protein and that's usually from parasites and it's in the literature. And not a lot of people are familiar with that aspect of the literature.

**Morley Robbins:**

And so this idea that low ferritin is a marker for low iron. Well, it's a marker for iron dysregulation. It's a marker for low iron possibly in the blood but it doesn't necessarily mean that iron isn't jammed and stuck in the mitochondria and in the labile iron pool of the cell. And that's where I think people need to broaden their thinking is that there's more to the story.

**Morley Robbins:**

The classmates that I had at Denison who got into medical school, really smart people, they all got A's in calculus to a person, every one of them. And now they're using rulers to make measure iron status.

**Morley Robbins:**

And I would argue it's the most complicated, most sophisticated and least understood part of human physiology. It is not a dipstick function. Iron is not low or high. Iron is dysregulated or it's functional. And if it doesn't have adequate supplies of copper, back to Elvehjem and Sherman, if you don't have copper, you don't have iron metabolism.

**Morley Robbins:**

And the fact is these two metals don't have separate metabolism. They are joined at the hip of the master antioxidant protein, ceruloplasmin. And that's what gives the metals their integrity is ceruloplasmin and its ability – what is its gift? It expresses many enzymes but the most important ones are the ones that regulate iron and oxygen.

**Morley Robbins:**

Copper's the only element on the planet that can manage the two most reactive elements in our body. Copper's the only one, all the others are kind of the observers, if you will. And so copper is central to the process of keeping oxidative stress at a moderate level but optimizing energy production. That's the magic sauce, is making sure that there's a healthy balance between energy and exhaust, just like there is in our car. When we drive a car, we're going to produce exhaust. And so it's like we've got to be able to optimize both the energy and the exhaust.

**Dr. Joseph Mercola:**

I want to get back to the low ferritin but the fact that you mentioned ceruloplasmin, the copper enzyme, is the master antioxidant, reminded me there was a question I had for you. And the

question is how would you compare ceruloplasmin with two other antioxidants which are frequently given that attribute, which would be melatonin and glutathione?

**Morley Robbins:**

No, they're very important. Glutathione I call the master greeter. It's the component in the cell that is going to grab the reactive elements, not the least of which is copper. But it plays a very critical goal in keeping oxidative stress at a minimum inside the cell. Melatonin, master antioxidant inside the mitochondria. Really, it's in-

**Dr. Joseph Mercola:**

Okay, so inside the mitochondria, that's where it reigns?

**Morley Robbins:**

Exactly, absolutely.

**Dr. Joseph Mercola:**

Okay.

**Morley Robbins:**

The thing with ferritin is it's very frustrating, Dr. Mercola, because we have 50 years of disinformation that started in 1972. And we've been pummeled with messaging that ferritin is an indication of iron status and it's like, it's a lot more complicated than that.

**Dr. Joseph Mercola:**

Okay, so I don't want to go too deep because – and you can go deep, it's obvious. I mean, you've already quoted at least a dozen if not more studies and I can assure you folks, no cards he's reading from in front of him. That they are in his brain embedded because he has a photographic memory. So I know you can go deep but we have a-

**Morley Robbins:**

I understand.

**Dr. Joseph Mercola:**

So the key point is though, that I wanted to understand that I think is really a crucial one, is that in your mind is there ever an indication or a case where you can use it especially with the clinical history of iron loss, like an acute blood loss for some reason or chronic GI (gastrointestinal) bleeding or heavy menstrual periods? I mean, in that context would a low ferritin at least be in the realm of a consideration of correlating with iron deficiency?

**Morley Robbins:**

Low ferritin would be one factor. But I think there have been so many mistakes made on just, ferritin-only testing, that I've renamed it “errortin” because it just too fraught with problems.

**Morley Robbins:**



But the thing is we need to have the broader context. We need to understand low ferritin in the context of normal hemoglobin. Well, that's a different discussion, isn't it? And low ferritin with normal serum iron, that's a different discussion. And more often than not, I see people who have normal hemoglobin, normal serum iron and maybe some kind of dysregulation in their ferritin. But that's telling me there's more organ pathophysiology particularly around the liver.

**Morley Robbins:**

And what I think is important for people to understand, there's actually four different types of ferritin. I've referred to two of them earlier. We have ferritin heavy chain and ferritin light chain. Heavy chain only work with copper. You got to have ferroxidase enzyme function for the heavy chain to work, for the ATM back and forth to work, got to have copper.

**Morley Robbins:**

Then we have light chain. Then we have something called mitoferrin, that's inside the mitochondria. It's a heavy chain, got to have copper. And then we have a fourth kind called serum ferritin.

**Morley Robbins:**

And technically what's happening is the ferritin is coming through the liver and it's going into the lysosome to be broken down and there's not enough juice there. There's not enough energy to do that. And what happens is the iron in the ferritin protein inside the liver gets dumped. The iron is discharged, 10 amino acids get cleaved off of that ferritin and then it's secreted into the bloodstream. And so I talk about it as being empty shotgun shells. And so this idea that serum Ferritin-

**Morley Robbins:**

And again, this isn't me making stuff up. This is me reading the literature and saying there's a wow factor to this. And having conversations with people like Douglas Kell to say, "I really do understand what you're saying." And yet I don't think it's properly taught in doctor school, at least with the totality of factors that you and I have had the opportunity to discuss today, that's what's missing.

**Morley Robbins:**

There's a very carefully scripted education that doctors get. What's high or low? And just give more iron if you need it. And wait a minute, there are a lot of variables here. It's not like it's infinite. Maybe there's 10 or 20 that we ought to be mindful of and if we don't-

**Dr. Joseph Mercola:**

Include 10 or 20 that we don't even know about.

**Morley Robbins:**

Exactly, absolutely. And this idea that it's a dipstick, "Oh yeah, you need more oil, you need more iron." Like, "Wait, whoa, let's talk about why is my iron not working properly?" That's the real question that people need to be asking.

**Dr. Joseph Mercola:**

All right, so just to summarize it because it can go down the rabbit hole real quickly and become very confusing. Generally, you're okay with using ferritin as an assessment tool as a primitive one and crude one and reflective of not the more important status of intercellular iron stores.

**Dr. Joseph Mercola:**

But as long as you're in the 20 to 50 range, you're probably in the ballpark. Yes, there are other measures you can use or blood tests like serum iron, total iron, binding capacity and some transferrin.

**Dr. Joseph Mercola:**

But typically if you follow that without going deep, you're okay. If you're under 20, possibly it could be some serious issues. But you need to see someone who knows this at a deeper level like you were mentioning to really sort out the details and not to jump to iron deficiency, start taking probably one of the most potentially toxic nutrient supplements that we have, which is iron.

**Morley Robbins:**

And I would just build on that to say, I would never use ferritin alone as an assessment of iron status.

**Dr. Joseph Mercola:**

But if you were just to use one, would it be accrued? Would it be safe to say that you're an agreement with just using that to monitor like your levels? I mean if you're in that range that you don't really need to get more aggressive, that you're probably okay? No, do not agree with that.

**Morley Robbins:**

No, less than 10% of iron is in ferritin inside the cell. Not in the blood; inside the cell. Seventy percent hemoglobin. Again, that's what was used for over a hundred years. I think that's a more powerful indication. Why? Because it's a bigger pool of iron and it's constantly being recycled, which is what I-

**Dr. Joseph Mercola:**

If you have higher hemoglobin would that be suggestive of higher iron content?

**Morley Robbins:**

Absolutely. Oh, absolutely does. Yeah.

**Dr. Joseph Mercola:**

Okay.

**Morley Robbins:**

When I first really understood this, what happened was I was beginning to get into this work about six years ago as it relates to the iron side. And my wife asked me a really important

question. She says, "So how is your iron?" I went, "I don't know, I've never checked." This was in December of 2015 and my hemoglobin was 18.3.

**Dr. Joseph Mercola:**

Oh my gosh, that's crazy.

**Morley Robbins:**

I know, I know and my ferritin was 267 and-

**Dr. Joseph Mercola:**

Oh, you were iron-toxic on steroids.

**Morley Robbins:**

Absolutely, and what do you think inspired me to dig deeper to find out what's going?

**Dr. Joseph Mercola:**

Oh geez, you were-

**Morley Robbins:**

And when I found out about the hemoglobin, 18.3, I was at a blood center. And it's a good thing I was wearing brown pants. She said, "You're a lucky guy." I said, "What do you mean?" She said, "The threshold is 18.5." If you-

**Dr. Joseph Mercola:**

And you were 18.4?

**Morley Robbins:**

18.3.

**Dr. Joseph Mercola:**

Okay.

**Morley Robbins:**

And that next year at 2016 I donated six times.

**Dr. Joseph Mercola:**

Yeah, you could. Yeah, that type of hemoglobin. Most people can't because their hemoglobin drops so low that-

**Morley Robbins:**

Exactly. But the thing is for my whole life I'd had high bilirubin. And I had an internist for 25 years, great, just a gifted internist. And he would always see my bilirubin and it was like between 2 and 3. He says, "Are you not taking iron, are you?"

**Dr. Joseph Mercola:**

Two and three, oh my gosh.

**Morley Robbins:**

And you know what? My bilirubin today is perfectly normal because of regular blood donation and The Root Cause Protocol.

**Dr. Joseph Mercola:**

Now, how often are you doing them now?

**Morley Robbins:**

Quarterly.

**Dr. Joseph Mercola:**

Wow, so four times a year. Wow. How long do you think it takes the average – I mean, you were in the 60s when you had this assessed. So how long do you think it's going to take to deplete your iron stores? What's your guess?

**Morley Robbins:**

Probably the rest of my life.

**Dr. Joseph Mercola:**

Really, really?

**Morley Robbins:**

Here's a rule of thumb, this is fascinating. On my 65th birthday I called up Robert Crichton, who is the dean of iron biology. There's no one bigger than Robert Crichton on the planet. And I said, "Dr. Crichton, I just want to thank you for your body of knowledge. And oh by the way, today's my 65th birthday, would you send me a signed copy of your latest textbook?" He said, "Really, I'd be happy to."

**Morley Robbins:**

And so we started having this conversation and he said that, "Now you know that we accumulate one milligram of iron every day we're on the planet." I said, "Yes sir, I've read your text books and your articles." He said, "Good." So here's a good exercise for you, Dr. Mercola. Get out your calculator, take your age and multiply it times 365 and what's the number?

**Dr. Joseph Mercola:**

So this accumulation is in your tissues?

**Morley Robbins:**

Exactly, it's in your tissue.

**Dr. Joseph Mercola:**

Wow.

**Morley Robbins:**

So mine's 25,000 and it's supposed to be 5,000. So I'm somewhere between 20-

**Dr. Joseph Mercola:**

Oh, so your earlier statements were the ideal. They weren't what typically occurs in populations.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

So I didn't understand that. You know that's an important differentiation.

**Morley Robbins:**

And the whole field of gerontology misses that completely and this isn't just Robert Crichton. This is Robert Crichton, Douglas Kell, Guttridge [[crosstalk 01:11:55](#)], Weinberg, Zarkowski at Dartmouth, all these big iron researchers, all agreed on 1 milligram of iron added to your frame every day.

**Dr. Joseph Mercola:**

So how much iron are you losing when you donate a pint of blood?

**Morley Robbins:**

Let's assume we have 50% saturation, you're going to lose 250 milligrams.

**Dr. Joseph Mercola:**

Wow. So that's basically, no, three quarters of a year. So you're knocking off three years every year from – so that is the rest of your life unless you're going to live a long, long time.

**Morley Robbins:**

And we all have challenges that were born with. Well, my mom was an alcoholic and a smoker and my dad was a manic-depressive with schizophrenic tendencies. Well, trust me I researched those conditions. Iron toxicity rules those conditions. So I was born to an iron-toxic lineage. It goes back many generations and so I'm working regularly in a very methodical way to-

**Dr. Joseph Mercola:**

God, this is fascinating and this is going to save a lot of people's lives if they have a deep appreciation and understanding of the importance of just simply donating your blood. I mean, it's going to go such a long way. You can't even compare this to almost taking any supplements except for copper.

**Morley Robbins:**

Well, no, that would be the only thing I would say. Is that if people understand the importance of lowering the iron footprint and increasing the copper footprint, that produces this access of vitality and longevity that very few people talk about. And I think I'm just so grateful to have this conversation because it's rare to have someone embrace it and say, "Oh my gosh, now I see what you're saying." It's like, "It's amazing," so I appreciate that.

**Dr. Joseph Mercola:**

Yeah. Well, then another thing that you're unusual with in respect to appreciation and understanding is there's almost no clinician that I'm aware of that doesn't acknowledge, at the minimum, that vegetable seed oils are dangerous and should be avoided. But it's the rare person in that community group that really understands the seriousness of how damaging they truly are and you're one of them. You really get it a deep level. Although, I think you could have been a little more aggressive in your book and just harping on these things-

**Morley Robbins:**

Honestly, I was giving you the room to pick up the slack.

**Dr. Joseph Mercola:**

Yeah, no. And it's not that I'm brilliant but I'm working with a clinician, Chris Knobbe, who's actually written a definitive book on this and we're going to publish it in a few months. And right now I'm in the process of reviewing the draft manuscript and some of the data he's compiled, it just blows your mind, absolutely blows your mind. So anyway, but you understand.

**Dr. Joseph Mercola:**

So the reason I'm mentioning this is I'd like to get your take on your perspective on the importance, and I know they're synergistically toxic and pathologic but if you could pick which was worse, iron overload or PUFA (polyunsaturated fatty acid) overload, which would it be?

**Morley Robbins:**

I had this conversation many times. Iron is the match that lights the lipid peroxidation key.

**Dr. Joseph Mercola:**

Oh, so if you had the PUFA and there's no iron is not going to be as much of an issue?

**Morley Robbins:**

See, the part that people don't know and I think you probably do, but just to amplify it. Eisenhower has his heart attack, we get put on a low-fat diet, Ancel Keys flexes his muscles and so they were taking cholesterol out, right? Well, actually what they were taking out was retinol but no one told you. So, then I came across an amazing study, it was in – they started adding iron filings in 1941, a great book. If you haven't read it is-

**Dr. Joseph Mercola:**

Is that in all processed foods or just cereals?

**Morley Robbins:**

All processed foods.

**Dr. Joseph Mercola:**

Wow.

**Morley Robbins:**

And there's nine different forms of iron being added and only nine of them are carcinogenic. But the thing, in 1941 they started adding-

**Dr. Joseph Mercola:**

Adding insult to injuries bad enough as it is and then they go and add this on top of it.

**Morley Robbins:**

So they're adding iron. And I came across a study from Tulane University, 1951, 10 years after they'd been adding iron to the food system and they were shocked at how high people's cholesterol were. They couldn't understand it. Well, now we do understand it because of the work of like Leslie Klevay and others that began to say, "Wait, if you don't have copper, your cholesterol is going to spike." But it wasn't the whole issue. There's a nuance to high cholesterol.

**Morley Robbins:**

Cholesterol's supposed to be in the liver. It's not supposed to be in your blood. We're back to serum ferritin again, cholesterol is in the liver because it needs to be made into what hormones and other factors. And the part that everyone missed is, it isn't just the cholesterol, it's that the cholesterol gets rusty. And the part that's very important, number one cause of death on the planet, heart disease. That hasn't changed in almost a century now or more than a century. And so-

**Dr. Joseph Mercola:**

Well, interestingly, I'm sorry to interrupt you but this is important point. It's not only not changed but prior to 1900, it was a very rare disease. There was literally like less than 10 documented cases of heart attacks in the history of the world, below 1900, as far as I know and Osler was renowned for mentioning this. It was an unknown disease and it's not that they didn't... Some people address or concerned with the fact that maybe they missed the diagnosis. Now these guys were sharp clinicians. They knew what they were seeing, it wasn't there.

**Morley Robbins:**

What changed? Farming changed. What did they add to farming? NPK. What does NPK do? It blocks copper uptake.

**Dr. Joseph Mercola:**

That was the after World War I, right? The first-

**Morley Robbins:**

Yeah, right, absolutely. And so the key is – people are always wondering, where did this plaque come from? Well, the endothelial cells inside the arteries they need to make energy. They got to make ATP, they've got to create water. And if they can't do that, one of the functions that starts to break down inside their mitochondria is cholesterol recycling.

**Morley Robbins:**

And then what happens is macrophages come to try to clean up that mess and what do they do? They turn into foam cells. And then the foam cell, that's the origin of the cholesterol plaque, is from an energy breakdown inside the cells because there's too much iron and the body can't recycle it properly and then the whole thing begins to cause the block in the artery. It's absolutely fascinating when you begin to look at it from an energy paradigm and not from a disease paradigm.

**Dr. Joseph Mercola:**

Well, and the seed oils are really important too because they came up about the same time, literally in the 1860s or so, at least in the United States. In some countries it's interesting, like China, they really were not prevalent. And there's a lot of confusion on this and that people associate high carbs, especially natural medical clinicians or physicians. A high carb diet is what's causing all the sugar, is the issue.

**Dr. Joseph Mercola:**

But if you look at this, China, they were close to where the United States was in as recently as 1966. They had virtually no seed oils and very little sugar and literally they have virtually no carbs. I mean, they have a very low-sugar diet. It's like they have 5 grams, 1 teaspoon of sugar a day. So they don't have a high carb diet. Yet when you look at their ingestion of seed oils which start in '66 and going up, it directly correlates with the massive increases of obesity, cancers and heart disease. So it's definitely the seed oils but that's a tangent.

**Dr. Joseph Mercola:**

The point I wanted to make is that as the seed oils started to penetrate the population, they get integrated into lipoproteins. And the lipoproteins are, of course, is what carries the cholesterol and that gets susceptible to oxidation because they have these unsaturated bonds in which the iron is a huge reason that they're oxidized.

**Morley Robbins:**

Yeah, and the article I was reading this morning from 1925 by Burroughs, they were using corn oil to cause cancer. It's absolutely arresting to say, "Oh my gosh, they really understood what was going on and they knew how toxic those seed oils were but they just kept on plugging." It was amazing.

**Dr. Joseph Mercola:**

Yeah, so exchanging convenience for health is what they've done. And we are doing it in different ways with technology to exchanging convenience for physiological damage like EMFs (electromagnetic fields) and surveillance and privacy and all those. But anyway, it's a whole different topic.



**Dr. Joseph Mercola:**

So we want to get back into the health because that's where we're both really passionate about and have really insights that most people don't and we can share them with people that can make a dramatic difference in their lives. So I'd like to really focus on some of the ways-

**Dr. Joseph Mercola:**

I mean, you've made a magnificent case for the importance of copper so people are beginning to appreciate they need to do this. So I think we need to help them understand how they can increase one of them and there's an interesting point that you make in your book. You have the first step is to stop supplements.

**Dr. Joseph Mercola:**

And I don't agree with all of the recommendations but some of them I certainly do, at least in general. Because the disagreement resolves more in subtle details which you don't have time to dialogue about.

**Dr. Joseph Mercola:**

But one of them that I want to address is stop vitamin C and that's not generic. It's actually stopping ascorbic acid, which most people perceive as vitamin C. Because in fact, taking whole food vitamin C is the answer because it has an enzyme tyrosinase, which has lots of copper in it that can help restore your copper levels and actually provide vitamin C in its necessary form and some of the bioflavonoids like this ferritin and bilirubin. So why don't you expand on that? And I want you to take that as a platform to dive in all the other ways that we can increase our copper levels.

**Morley Robbins:**

Sure. So a lot of confusion about ascorbic acid versus whole food vitamin C, as you note. And again, the vitamin C complex is like the cars we drive. There's an engine, there's a steering wheel, there's four wheels and there's a cover and that's the structure and makeup of the vitamin C complex. Ascorbic acid is the cover of the car and no moving parts and this is missed by a lot of scientists and clinicians.

**Morley Robbins:**

And when you get into the subtlety of the research, you find out that ascorbic acid is actually pro-oxidant, vitamin C complex antioxidant. Again, anything that has copper is going to be antioxidant. The antioxidant enzyme capacity is really dependent on bioavailable copper and so food based forms, very, very important.

**Morley Robbins:**

And the challenge we've got Dr. Mercola is – we're back to your earlier question, how do we re-mineralize the soil and what are we going to do about this copper thing? If the farmers are not actively thinking about restoring the mineral status of the soil, the regenerative farming that's beginning to take hold now but again it's in its infancy. That's our challenge, is finding the committed farmers that really want to do that. So then we have to turn to supplemental forms and

there are maybe a handful, maybe more of whole food vitamin C complexes that are available. That's very important. That's a very important source.

**Morley Robbins:**

But another source is bee pollen. You can't pollinate a flower, and you can't pollinate an animal, if you don't have pollen. And you got to have copper. Copper is essential in that process. And a lot of people don't realize, that there's a lot of oxidative stress to bring egg and sperm together. And if there isn't copper there to diffuse that, you're not going to get the union, it's so critical. And so, when people are having trouble conceiving, it's a copper issue. And where did I learn that? Australian sheep farmers. If they're not getting the offspring that they want from their herd, there's only one mineral they add to the feed, it's called copper. And like that, they start to populate their herd.

**Morley Robbins:**

Bee pollen is not just a source of copper, it's got many nutrients, but B vitamins, especially, which is very good. And we've talked about the importance of beef liver, again, we're back to, when copper is in the soil, it's going to produce grass. It's going to have both vitamin C and beta-carotene. A unit of healthy grass is going to have 14 times more beta-carotene, than a comparable unit of carrots. And a unit of grass is going to have 18 times more vitamin C, than a comparable unit of oranges. So that's a good thing to know, is that the grass that our ancestors' animals used to graze on, used to be a very rich source of copper when the soils weren't being abused by farming chemicals.

**Morley Robbins:**

I just had a podcast the other day, with someone who told me that glyphosate is actually the 10th most toxic chemical in the farm. I'm like, "There's something worse than glyphosate?" That's scary to even think about. The changes in farming have altered the availability of copper in the soil, in the plant, in the animal and in the human. That's a significant topic that maybe, that's another conversation.

**Dr. Joseph Mercola:**

Yeah. Because glyphosate is particularly pernicious for copper, because it's a mineral chelator.

**Morley Robbins:**

Absolutely.

**Dr. Joseph Mercola:**

That's how it works.

**Morley Robbins:**

Right. Yeah.

**Dr. Joseph Mercola:**

It sucks the copper right out.

**Morley Robbins:**

Absolutely. Down to a pH of 1, which is devastating.

**Dr. Joseph Mercola:**

That was its original application. It was originally done to remove the minerals from the inside of these tanks.

**Morley Robbins:**

And the pipes, industrial pipes. Yeah.

**Dr. Joseph Mercola:**

Right.

**Morley Robbins:**

Do you have a problem with that?

**Dr. Joseph Mercola:**

Crazy. But I want to get back to vitamin C for a moment.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

And I think, you'll be very pleased to know, that I had the intuitive insight to plant. I like cherries and I live in Florida. So obviously, Bing cherries don't work too well down here, because you have to have it cold. So I planted Barbados cherry, which is otherwise known as Acerola cherries, and I have several bushes.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

So I could, literally at harvest time, which is actually – we have about an eight-month harvest time. It is unbelievable. It continuously produces throughout the year. And in peak harvest, I might be getting a gallon of these cherries a day. A gallon. And each cherry has 80 milligrams of whole food vitamin C.

**Dr. Joseph Mercola:**

But you've inspired me, because I realized that, I've done a lot of soil amendments, but I haven't specifically addressed copper. So I'm going to not put copper on the soil. I'm actually going to put a foliar application of copper, and I've got to figure out the concentration to do that with. But that should radically improve the quality of the copper in these Acerola cherries that are being generated.

**Morley Robbins:**

And you might-

**Dr. Joseph Mercola:**

Go ahead.

**Morley Robbins:**

You might, I'm thinking real quick. The copper concentration, as I understand it, again, one of my Amish farmer friends has looked into this very carefully. The copper concentration is highest in the stem. You might do a little digging around that and see if there's some-

**Dr. Joseph Mercola:**

The stem of the cherry?

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

I didn't know.

**Morley Robbins:**

Even moreso in the fruit.

**Dr. Joseph Mercola:**

It's interesting. Normally, you always spit those out.

**Morley Robbins:**

I know.

**Dr. Joseph Mercola:**

Do you think there's value having that stem?

**Morley Robbins:**

He just brought it up the other day. I was absolutely flat-footed. I said, "Seriously?" So I got interested, myself.

**Dr. Joseph Mercola:**

Yeah. Yeah. It's interesting. But I think the foliar application's going to be really helpful.

**Dr. Joseph Mercola:**

But the point I wanted to make is that, taking vitamins, and I recommend it even, because we sell vitamins. And I said, "This is not the supplement you want to take on a regular basis." And I

certainly, don't take it. But it's valuable and useful, at least, from my perspective. It's what I want to discuss with you.

**Dr. Joseph Mercola:**

As a therapeutic adjunct, it's far, safer alternative as an intervention for acute infections than drugs, and the antibiotics, or even antivirals. And we have diseases like septic shock. And obviously, COVID, where – the mortality rate in septic shock is like, 80%, 80%. So the people who get it, die. It's shocking. Kills a shocking number of people every year. Yet we know that if you get them early, you inject intravenous ascorbic acid, not whole food vitamin C, they recover, and are able to live the rest of their lives. So I think, as a therapeutic intervention, acutely, almost like a drug, is probably very useful. But for long term-

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

-get your butt down to Florida, and grow some Acerola cherries. Because you can't buy them at the store, anywhere. You can buy it processed, this whole food vitamin C, but ideally, you want to eat the whole food.

**Morley Robbins:**

But let's take that up a notch.

**Dr. Joseph Mercola:**

Yeah. Okay.

**Morley Robbins:**

One of the most important studies I came across was from 1958 by Martens, M-A-R-T-E-N-S, et al. And they were studying how to cure people of schizophrenia. Which is, for people who don't know, schizophrenia is when iron affects adrenaline, who are in a schizophrenic state, are very fear-based, and it changes the chemistry of adrenaline. We'll just leave it at that. And so in this study, they had 34 patients that were administered one shot of ceruloplasmin protein. How many people were cured of schizophrenia with one shot?

**Dr. Joseph Mercola:**

You can use ceruloplasmin as an injection? That's available?

**Morley Robbins:**

Back in the '50s.

**Dr. Joseph Mercola:**

How can you do that?

**Morley Robbins:**

Back in the 50s.

**Dr. Joseph Mercola:**

Oh. Is it available now? No.

**Morley Robbins:**

Of course not.

**Dr. Joseph Mercola:**

It's a huge protein, isn't it? It's massive.

**Morley Robbins:**

Yeah, 1,066 amino acids.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

But 30 of 34 patients, cured of schizophrenia. So I would suggest, I think, there may be even more powerful alternatives than ascorbic acid. I get your point. Absolutely. If we're forced between, if we're on the train tracks with "Sophie's Choice," and we've got to choose between this and this. Yeah. I would go with ascorbic acid.

**Dr. Joseph Mercola:**

Yeah. Because most of the people, they're not even doing the basics, so they're in between a rock and a hard place. So yeah, it's not the optimal, but it's better than dying, and it's better than being submitted to these drugs, which will ruin your microbiome for months or years.

**Morley Robbins:**

But I would say, that I think it's time. Again, we've been through two years of rather protected insanity. We all, I think can agree on that. But I think it's time for this copper message to get out. That's what this conversation is introducing. And I think, there are forms of bioavailable copper via ceruloplasmin. You can actually buy it, if it's for research. You can actually test the ferroxidase assay. It's called, the ferroxidase color metric assay.

**Dr. Joseph Mercola:**

Mm.

**Morley Robbins:**

It costs a whopping \$4.

**Dr. Joseph Mercola:**

Really?

**Morley Robbins:**

But it's barred by the FDA (Food and Drug Administration). You're not allowed to do it. Unless, you're studying four-legged rats, and mice, and rabbits, and things like that, but not humans. And it's the most-

**Dr. Joseph Mercola:**

What supplier provides that?

**Morley Robbins:**

It begins with an A, and I'm blanking. I apologize.

**Dr. Joseph Mercola:**

Okay. Well, maybe you can, with your brain, you'll come up with just-

**Morley Robbins:**

I'll remember. But the thing is that, this is a whole – basically, doctor education is like Hogwarts Academy, and there's one word you can't say in Hogwarts Academy, Voldemort. And copper, and ceruloplasmin, and ferroxidase, are the Voldemort of medicine. And if we had access to these really powerful and natural forms of bioavailable copper, we would be having a very different conversation on this planet, and in this podcast.

**Dr. Joseph Mercola:**

So just curious. Obviously, it's not commercially available, and could be obtained, but with some challenges. Do you think that would be an intriguing biohack, is to inject some ceruloplasmin? Because especially, if you've been on a lifestyle that has really radically reduced it, and you have massive stores of iron, and you've got PUFA up the wazoo, and PUFA is almost as bad as iron.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

It takes you seven years. I think the half life is seven years, after it's-

**Morley Robbins:**

I've heard that.

**Dr. Joseph Mercola:**

-integrated into your cell membranes.

**Morley Robbins:**

Again, I think it would be the ultimate biohack. But I think really, what ceruloplasmin does is, it takes us back to factory settings. Mother Nature never designed us to be the way we are today. Mother Nature never thought we would have food the way we have today, or the medications

that we're using. But what the ceruloplasmin protein, it goes back. The construct of it is, they're called, plastocyanin enzymes. Well, those go back to the very beginning of time. And there's six to eight of them in ceruloplasmin. I think that's significant.

**Morley Robbins:**

Photosynthesis depends on plastocyanin. I don't know whether you know that or not. You have photosystem II and photosystem I, and the electrons have got to get from II to I. And what shuttles it over? Plastocyanin enzyme. It's a copper enzyme that enables photosynthesis to work. Well, people don't like to talk about that. But anytime we've got to move electrons, and we've got to deal with oxygen, and we've got to deal with iron, and we've got to deal with these really reactive components of our environment, we better have bioavailable copper to grease the skids of the transaction.

**Dr. Joseph Mercola:**

So what are your other favorite, other than bee pollen, liver, whole food vitamin C, and reduce your iron content? Because that free iron is going to just radically deplete your copper levels.

**Morley Robbins:**

I think, it's really important for people to have lots of fat in their diet, I think we've talked about that. You want to make sure that-

**Dr. Joseph Mercola:**

Saturated fat.

**Morley Robbins:**

Saturated fat. Yes. Thank you.

**Dr. Joseph Mercola:**

Or, monounsaturated.

**Morley Robbins:**

Yes. And people need to understand, that the organ meats, again, what happened? Our ancestors used to eat organ meats, and feed the muscle meats to the dogs. Now we flipped it. And now, we eat muscle meats, and feed the organ meats to the dogs. Organ meats are where all the energy is. That's where all the minerals are, especially the copper. Liver, kidney, tongue, brain. People don't understand what the role of that particular mineral is, particularly as it relates to making energy. And there's no part of our anatomy that's more important than the brain.

**Dr. Joseph Mercola:**

The question I would add though, is that, especially in America, where a little is good, and more is a lot better, is that, yes. I couldn't agree with you more wholeheartedly that we need organ meats, but you need them in moderation. You can't go and have, like a pound of liver-

**Morley Robbins:**



Absolutely.

**Dr. Joseph Mercola:**

-and think you're going to be, go to the races. No. Because, there's a toxicity. It's about the balance. There's a Goldilocks dose that you want.

**Morley Robbins:**

Exactly. And I think, our ancestors knew that. I grew up, my mom was from the country, and she wasn't a five-star chef, but she knew how to cook, nose-to-tail. We had very basic food. So I was, at least, raised with that.

**Morley Robbins:**

But you're absolutely right. We've got to be careful. And I think, the mistake that a lot of people make, who don't feel well, again, what's the origin of all diseases? Fatigue. It's the number one reason why people go see their doctor. And what do people want to do? They want to get well, yesterday. So they want to do it overnight, and the body doesn't work that way. And so we need to be very careful and very disciplined, about how we introduce that. And that's really what the Root Cause Protocol is trying to do, is introduce people to the right components. What are the stops? What are the starts? And let's introduce them in a phased fashion, so that people can begin to build up this copper in a very appropriate way. Try to restore that, as Mother Nature would've intended.

**Dr. Joseph Mercola:**

That was great. Now, in your book, you address all, from my perspective, as I mentioned earlier, the really major, heavy hitters, like optimizing sleep, light exposure, sunlight, specifically, to opt to improve the version of retinol, that's going to be activated, essentially, and get vitamin D, and mitochondrial melatonin. So why don't you highlight some of the other ones that support increasing the copper, and decreasing the iron, which is so crucial?

**Morley Robbins:**

Well, the key is that, copper is a fat-soluble mineral.

**Dr. Joseph Mercola:**

That's interesting. How is that? Can you help us understand that? Because, that's an odd term. You would think them as being relatively neutral.

**Morley Robbins:**

Exactly. But it is lipophilic. It loves fat. And again, there's this incredible access between copper and fat, especially retinol. Again, it's no accident that they put us on a low-fat diet. And so suddenly, if you don't have fat in your diet, your ability to absorb, especially copper, is going to plummet. Well, if you don't have copper, you begin to have more fatigue, you're going to have more symptoms. And so fat becomes a very, and again, it's got to be the right kind of fat, but the key is, if you don't have that fat in your diet. I spent many years doing my research at Starbucks, and I would listen to what people would drink, what the order was. It's always skinny latte. I'll

have that with a skinny latte. Like, no, you really want, breve, that's really what you want. And I'm not pushing homogenized dairy, but the point is, people don't understand the fat issue.

**Dr. Joseph Mercola:**

Butter would've been better.

**Morley Robbins:**

Well, of course. I always have butter in my coffee. But-

**Dr. Joseph Mercola:**

You're not interested in the protein, you want the fat.

**Morley Robbins:**

I want the fat.

**Dr. Joseph Mercola:**

And a lot higher fat percentage in butter, than there is milk, even whole milk, or grain, even.

**Morley Robbins:**

But we have Amish butter, which is 90% butter fat, and Land O'Lakes is 10% butter fat. Big difference.

**Dr. Joseph Mercola:**

Really? Really?

**Morley Robbins:**

Yeah. Big difference. And so, and-

**Dr. Joseph Mercola:**

That's dramatic. I had no idea it was that much of a – what is the other 80% in Land O'Lakes butter? It's not butter fat.

**Morley Robbins:**

Water. Again, we have to be really discriminating when we're choosing our food. Right? And again, Kerrygold is somewhere in the middle. Once you begin to learn how important the fat is, as you are really emphasizing, it begins to change the whole metabolism of the body. The other side of it though, is if you can't absorb copper without fat, the flip side is, you cannot metabolize fat without copper.

**Dr. Joseph Mercola:**

I'm still perplexed. Because that's quite an astonishing claim, that Land O'Lakes is only 10% butter fat. Because it, I mean, they'd be violating label claims. Butter has a caloric density of 9

calories per gram. So, if it's water, it's zero. They have a label claim that suggests, it's butter, that it is fat.

**Morley Robbins:**

I just know that it's a much lower concentration. It's 10% to 12% for commercially available butters. It's much lower than you think.

**Dr. Joseph Mercola:**

Send me the article, or the study on it, because I'm sure you've got it. You're just a wealth of knowledge there. That is very, I mean, that deserves like, a whole article. That's like a scam.

**Morley Robbins:**

Mm-hmm (affirmative).

**Dr. Joseph Mercola:**

Because we're pushing people away from PUFA into butter, primarily, that's far better. I suspect, even Land O'Lakes butter is better than safflower, or sunflower or canola oil.

**Morley Robbins:**

Again, the challenge we've got is that, when we go to a restaurant, what color is the butter?

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

The restaurants have butter the color of your shirt. Right? And it's supposed to be the color of this tulip, really deep yellow. That means it has more beta-carotene in it that got made into retinol.

**Dr. Joseph Mercola:**

Even the eggs, too.

**Morley Robbins:**

Exactly. Absolutely, the same principle. And it turns out, there's basically three cows that are used in dairy. You've got the Holsteins, the Guernseys and the Jerseys. It turns out, there's a genetic difference between Holsteins and the other two. The Holsteins cannot take up beta-carotene at the same rate that the Guernseys and the Jerseys can. And that's why their butter fat content is dramatically different than, the Holsteins. Well, where's most butter coming from? Holsteins.

**Dr. Joseph Mercola:**

Holsteins. Yeah.

**Morley Robbins:**

And again, it-

**Dr. Joseph Mercola:**

We did basics.

**Morley Robbins:**

Yeah. It's just the nuance of understanding the nutrient content of the food that we're depending on.

**Dr. Joseph Mercola:**

I'm assuming, that if the cows are grazed on grass that has had an application of copper sulfate to the soil, at the 10 to 15 pounds per acre, that grass is going to be a lot higher in copper, and providing much far superior butter.

**Morley Robbins:**

And I was just in a meeting in Middlefield, Ohio, and Joel Salatin was there. It was a lot of fun. I gave him a copy of my book. He was so excited to see it.

**Dr. Joseph Mercola:**

Joel's a good guy. I was at his farm, at Polyface Farm.

**Morley Robbins:**

Oh. Yeah, no. It's amazing.

**Dr. Joseph Mercola:**

Years ago.

**Morley Robbins:**

He didn't get into the mineral side of it, but he talked about how important it is, to make sure that the grass is at its optimal nutrient value. And we understand what that means.

**Morley Robbins:**

But the key is, it's not comfortable for people to say, "Wait a minute, my life is already complicated. Now you're telling me I've got to go to farmers markets. I've got to do a drilldown with each farmer to find out what they're doing." Well, that's kind of where we are. We need to, if you're really trying to manage your health. You were talking about exercise, EMF exposure, sleep, things like that. But if the food you're eating isn't being carefully grown, you're working against yourself.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

And the whole idea is to get to nutrient density, so that we have the minerals and the vitamins that Mother Nature designed for us to have in our metabolism, so we get peak energy production. That's really what it comes down to.

**Dr. Joseph Mercola:**

Yeah. And a question on exercise. Is that somehow connected to ceruloplasmin? So that, when you're exercising, engaging in ideal strategy, does that upregulate the enzyme that produces it?

**Morley Robbins:**

Well, you're certainly going to, the piezoelectric effect is going to make more energy. And I think that's going to work to your advantage to make the protein. So yeah. I've not seen a lot of articles about exercise and ceruloplasmin, but you've now sparked my curiosity. I wonder what it would-

**Dr. Joseph Mercola:**

It seems like it makes sense.

**Morley Robbins:**

No. Of course, it doesn't. And the thing is-

**Dr. Joseph Mercola:**

It's another hidden thing in medicine. It's stealth. Almost all doctors ignore it, and that's why sarcopenia and frailty are such huge-

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

-reasons of causes of death in the elderly.

**Morley Robbins:**

Absolutely. But again, with the elderly, especially people who are in an institutional setting, more and more, they're being labeled anemic, and guess what they're getting?

**Dr. Joseph Mercola:**

Oh, iron supplements. They're killing them off prematurely, 100%.

**Morley Robbins:**

Absolutely.

**Dr. Joseph Mercola:**

And what they need is a therapeutic phlebotomy, or a regular phlebotomy for blood donation.

**Morley Robbins:**

Regular phlebotomy. And they need more nutrient-dense food that has more of a copper bias to it.

**Dr. Joseph Mercola:**

Yeah. They definitely got to get rid of that copper. So this is huge, huge, huge. I thought I understood, and our discussion today confirms it. That obviously, copper's important, but unless you lower that iron content-

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

-you are in deep, deep weeds. I've listened to your podcast, and read your book, but I didn't have an appreciation of this storage. I heard you say, 1 milligram per day before, but I didn't understand that stayed there. And unless you've had some massive blood loss, but even a massive blood loss, you only have 5 liters. Right? If you donate all 5 liters, you're dead with blood loss. So you can probably only lose two liters, which is probably not much, maybe double of a blood donation. So you really need to do this on a regular basis, to optimize your health.

**Dr. Joseph Mercola:**

I can't thank you enough for helping, for your commitment to learning about this, and spreading the message, and putting it together. So what I'd like you to do is, tell all about the resources that you have available, so that people want to know more. Because we've only touched the tip, the tip of the iceberg, of the knowledge that you have, I can assure you. There's no question in my mind. We can go on for hours and hours. We probably have to be back on again, to go even deeper into some of these other topics.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

But why don't you tell people where they can find out more about what you have to offer?

**Morley Robbins:**

Yeah. Well, I look forward to the additional conversations. But the resources are, there's a couple Facebook groups. There's a magnesium advocacy group, that's a Facebook group. There's a Facebook page called "The Root Cause Protocol." Then we have a community. There's RCP123.org, and you can join the community. It's like, \$9.97 a month. And be part of an interactive forum. We meet every other week, a very active group.

**Morley Robbins:**

And then, the capstone event is, the Institute, the RCP Institute's 16-week training program. It teaches people how the body really works. And there's a mixture of practitioners, people who

want to be health advocates, if you will. Like myself, I don't have any formal certifications, other than the basics, but no licensures. But then, just people who want to learn. And there's a lot of interest. We've had a ground swell of activity in the last couple years, of people wanting to learn this. So those are probably the biggest.

**Dr. Joseph Mercola:**

The book, too.

**Morley Robbins:**

And then, we've got the book. It's now available in physical, eBook, and now, audio. It's available in all three platforms.

**Morley Robbins:**

And we're also beginning to look into developing targeted supplements that we're going to get into. But I'm not going to get into all that right now because I think, we're still in formative stages, but I think it's going to be very exciting. We're clearly going to focus on, the copper's going to be a priority, a focus.

**Morley Robbins:**

But at the end of the day, if people can just lower their iron footprint, and increase their focus on nutrient-dense food, with a special bias towards the copper, as we've discussed it today, it's going to have a significant change in how your body generates energy and how you feel.

**Morley Robbins:**

And if you want to get into the real depth of it, both the book and the website, have the stops and the starts, go into more detail. And that might be the basis of some of our additional conversations because I think people would appreciate us having an opportunity to explore that deeper.

**Dr. Joseph Mercola:**

Great. Well, thanks for all your work, and I'm sure you helped save a lot of people's lives, by inspiring them to get rid of the iron and remove it. And reminding me of this, and I've been negligent. Because you get so caught up in, what, the urgencies, especially the last two years, you forget about the basics, but this is so profoundly important. And unless you're guilty of FTI, or failure to implement, then you're going to gain the benefit. So get out there and donate your blood. It's altruistic. You're going to help. I think in your book you quoted that for every pint of blood you donate, you help three other people, or four, including yourself. Right?

**Morley Robbins:**

Exactly. That's exactly so.

**Dr. Joseph Mercola:**

It is a noble thing to do, but you're really helping yourself more than everyone. But isn't that an interesting commentary on life? When you attempt to help others, almost always, you help yourself even more. That isn't your primary motivation.

**Morley Robbins:**

Yeah, exactly.

**Dr. Joseph Mercola:**

Yeah. Yeah.

**Morley Robbins:**

And what's really fun about this is the ripple effect. I hear from people every day. It's very humbling to be in that position. You, no doubt, experience it on a regular basis. But it's like, there are people looking for this knowledge. They're looking for a solution, and they appreciate the simplicity of this, but also the enormity of its reach. So we're very, very fortunate.

**Dr. Joseph Mercola:**

Yeah. You and I both get it. That the more you study and seek to learn, the more you realize, it really is pretty simple. It's pretty basic.

**Morley Robbins:**

No, that's just it. Yeah. No, it's like-

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

-at first, you think, "It's not possible." That was my first reaction. But then, as I got into it, I surrendered to the simplicity of it.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

It was like, this is amazing.

**Dr. Joseph Mercola:**

Yeah. That's the sign of someone who is wise on their journey. So congratulations. At least in my estimation-

**Morley Robbins:**

Yeah.



**Dr. Joseph Mercola:**

-you've reached it. So it's been a great, distinct pleasure. And I look forward to connecting again.

**Morley Robbins:**

I look forward to it. Thank you so much.