

Debunking Myths in Iron Deficiency

A Special Interview With Morley Robbins

By Dr. Joseph Mercola

Dr. Joseph Mercola:

Hi everyone, Dr. Mercola, helping you take control of your health and a major, major treat for you. Because, we have a repeat guest and he's back again, because it is physically impossible to condense the wisdom that this man has, into an hour and a half, or two hours. So, we've got to have him repeatedly, just to – and the concept is so foreign to almost every natural medicine clinician. I'm convinced and perhaps, Morley Robbins is our guest. And he can perhaps comment, because he's better able to do that than me, as a percentage of really astute natural medical clinicians who understand his work. My guess is, it's about 1%, or less.

Morley Robbins:

Yup.

Dr. Joseph Mercola:

I've only encountered, personally, one other physician who gets it, who's a really good physician, Dr. Leland Stillman-

Morley Robbins:

Mmm-hmm.

Dr. Joseph Mercola:

Who-

Morley Robbins:

Oh, yeah.

Dr. Joseph Mercola:

You almost have to take his courses to get this.

But, so what? Well, it's because he's going to talk about the importance of copper and iron and what the connection is and how really, it's just stealth and it's obscured for a wide variety of reasons. And it is just not appreciated. But, it's one of the most important elements to understand, if you're going to optimize your health. And it's even worse than that, because there's this incredible confusion about iron and it's perceived as this panacea supplement that almost everyone should have, when it's actually one of the worst things you could take for almost everyone. There are isolated cases where some people may need it, typically with acute blood loss. Large volumes of acute blood loss.

Morley Robbins:

Mmm-hmm.

Dr. Joseph Mercola:

But, that's about it. Almost everyone has too much iron. So, we're going to dive deep. Definitely, put links to the previous two interviews I did with Morley, but he's back here with some more exciting things and you got to love these conversations because there's no idea to predict where we're going to go. But, we're going to cover some really important topics. So, with all that intro, welcome. Thank you for joining us again, Morley.

Morley Robbins:

Well thank you. Very happy to be here, looking forward to our exchange as always. And I would agree with you, it's probably – it might even be less than 1%. And so-

Dr. Joseph Mercola:

Yeah, that was my guess. Yes, my experience. But, your experience is much broader, so-

Morley Robbins:

Right. So, let me stimulate your neurons with an article I just found this weekend, which I think is relevant to our conversation. And it's by-

Dr. Joseph Mercola:

Oh wait, before you share that-

Morley Robbins:

Okay.

Dr. Joseph Mercola:

Let me give another bit, because some people may not [inaudible 00:02:24]. He's just found an article. This man is finding articles all the time. And not only does he find the articles, he'll spend three to four hours a day doing it, but he has a mind that is like a camera. It just remembers things and he doesn't lose it. I mean, sometimes he misses a few little details, but he remembers things. And so, with a massive memory and a commitment to learning new things, he puts all the pieces of the puzzle together and comes up with stuff that no one ever has. So, that's why you're going to be interested in hearing this. So, I just wanted to explain it because a lot of people may have not heard that, or forgotten.

Morley Robbins:

This article, I'm going to cheat. But, it's by Professor Denis Medeiros, Ph.D. at University of Missouri, in Kansas City. Very talented guy, he's a copper expert. And in this particular study, he was looking at what happens when we deny copper to rodents? What genes turn off? And what genes turn on?

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

It's really pretty cool. And this is from 2009. But, I think that the genes that turned off, that downregulated is very relevant to our conversation, that's why I thought it'd be fun to just start with this. Because, I think people go, "Oh, well maybe there's more to the story." Because really, I think that's the foundation of our conversation, is there is more to the story and it's important that people take the time to consider that, as they are reflecting on their symptoms and the situation that they're in. But, in this particular case, the copper-deficient group had a decrease in a series, it was six different genes that downregulated. One was beta-enolase.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

Second, carbonic anhydrase. Well, carbonic anhydrase, is very much involved in, excuse me, carbon dioxide, right?

Dr. Joseph Mercola:

Yeah. I think, it increases carbon access, doesn't it?

Morley Robbins:

Yeah, yup.

Dr. Joseph Mercola:

That's what I thought, yeah. So, that may seem like, intuitively, "Oh, that's a bad thing." No, increasing your carbon [inaudible 00:04:30] is a really powerful strategy to improve your health.

Morley Robbins:

Exactly, exactly. And it's billed as a zinc enzyme and it's not, it's a copper enzyme. And I've got other research that can back that up. But then, we've got aldose reductase-1, very esoteric enzyme. It's the first step in breaking down fructose.

Dr. Joseph Mercola:

Mm, that's right, yes.

Morley Robbins:

So, what people need to understand, is that there's a lot of fructose in their diet. We know that, we've talked about that. But, the book that's just tantalizing me, is by Dr. Richard Johnson, "Nature Wants Us to Be Fat."

Dr. Joseph Mercola:

He's a good friend, I've interviewed him a few times. Yeah-

Morley Robbins:

Pretty cool.

Dr. Joseph Mercola:

He's actually been to my house, yeah.

Morley Robbins:

Brilliant guy. Nephrologist.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

He understands fructose. But, in his book, he points out that when we're under stress, the body flips to making fructose.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

That's an important thing to know. It isn't just, the fruit that we eat, or the carbonated drinks that we're drinking that are sugar-laden and things like that. We have this natural ability to flip to a fructose metabolism, which is not our friend.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

It's very hard. And this aldose reductase-1 is critical in being able to metabolize fructose. Which, the dynamic is, and this is the pioneering work of Myra Fields, she was a famous copper researcher at USDA. She, for 40 years, was studying the impact of high-fructose corn syrup on human metabolism. And she was alarmed at what fructose was doing to lower copper status in rodents and other models.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

And of course, in humans. So, we've got aldose reductase, then we have glutathione peroxidase. That's one of the master antioxidant enzymes in the body that's copper-dependent. Most people don't know that. Initials are GPX. And it's a major process by which the body deals with oxidative stress. Number five, muscle creatine, kinase. Well, that's really important. And so, suddenly we're up against the fact that we're not going to be breaking down the creatine the way we're supposed to if we're copper-deficient. And then, mitochondrial aconitase, which is involved in iron metabolism in the mitochondria. So, that's a rather sweeping series of genes that are not working right, because copper's missing in the diet and missing in the tissue. And-

Dr. Joseph Mercola:

This is related to fructose metabolism?

Morley Robbins:

Yeah.

Dr. Joseph Mercola:

But, what's a total number of proteins, or genes, that are dependent upon copper to function properly? I mean, it's a pretty high number. It's in the hundreds. Isn't it 300, or something?

Morley Robbins:

Oh, it's at least 300. I think, it may be even higher than that, but I've never really found a credible source to say, "Yes, definitively." I would think that someone like, Leslie Clovey would know, or Myra Fields, or even Denis Medeiros or some of the – what's his name? Garth Cooper, Ph.D., at the-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

University of Manchester. I've never seen any of these really preeminent copper biologists and copper clinicians... No one's shared that number. I think it's a much higher number than we realize.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

And again, when we think about the 40 quadrillion mitochondria in our body and they all need copper, it's absolutely essential that they have copper. And it's just, they don't know that, they're not aware of it. And it's not just the public, it's their practitioners.

Dr. Joseph Mercola:

Okay, well let's stop there. Because, I think, it's nice to identify these half a dozen enzymes in the fructose metabolism path and I'm sure you have more to share.

Morley Robbins:

Yeah.

Dr. Joseph Mercola:

But, you just made a really, really powerful point, because it almost is maybe, not irrelevant, but close to irrelevant when you compare it to the mitochondria. Because, if your mitochondria stop functioning, you are dead in seconds. Seconds. If they're partially impaired, you're going to be

craving energy and tired all the time. So, really, and I believe, optimized mitochondria function is the absolute finest and most effective and efficient way to improve your health. And it doesn't have to be a lot.

I mean, there's only five cytochromes in electron transport chain. And there's, I think, only a dozen genes in the mitochondrial DNA. So, just need a little bit off and you're a goner. So, I think, the reason I'm using it as a preface is – before I ask you the question, which is, can you help us understand how copper is important at this? I think, specifically you're going to be pointing to ceruloplasmin, in facilitating the iron implementation into the cytochromes.

Morley Robbins:

Absolutely. And so, yeah, copper and its master protein, ceruloplasmin, are instrumental. It was interesting, there was a famous metal biologist, Earl Frieden at-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

Florida State University. He was very prolific, from the '60s to the '90s. And very insightful about copper and iron dynamics. And he made an assertion in 1975, that ceruloplasmin was a choo-choo train for copper to get to the mitochondria. And there was just this groundswell of resistance to that idea. And well, 2017, Zach Baker found out, "Yeah, Dr. Frieden was right, back in the '70s." And so, there is this misunderstanding about how the mitochondria are being supplied with the copper that they need. And there's a whole network of chaperones involved as you can well imagine.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

Probably, the most lucid mind on that would be Svetlana Lutsenko, Ph.D., at Johns Hopkins Medical Center, she's very, very talented. She studied it very, very carefully. But, I think what's important for people to understand, is that it was Paul Cobine, Ph.D., at Auburn University in 2004 and 2006-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

Using a yeast model. And again, yeast are mini mammals, it's a fun concept. But, he asserted that each mitochondria needs 50,000 atoms of copper, in order to do their work. Well, that's very different than what people think. And if you read some literature, they'll say, "Oh, you have one, or two copper atoms inside your cells." No, that's not true at all. And so, as I've dug into the mitochondrial side of the process, complex I, complex III, complex IV, and complex V are

copper-dependent. And if given enough time, I could probably prove complex II is copper dependent.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

But, just once you learn that the bulk of it is copper-

Dr. Joseph Mercola:

It would make sense, yeah.

Morley Robbins:

Yeah, it does make sense. And so, complex I and complex III and complex IV, creates what's called, the respirasome, they work together as a unit. And what are they really hooked up to, is cardiolipin. Well, cardiolipin is the fat that's needed to support, that enables the copper and the dynamics of the electron transport to take place. And then, we find out that, in 2016, [Ulrich] Hammerling, Ph.D., discovers that, "Wow, retinol is critical for moving electrons, from complex three to complex four." Well, that's an outstanding discovery and it totally changes the dynamics. And so. I think it's important for people to step back from the narrative of mitochondrial dysfunction.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

And it's a significant area focus-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

But, I think it's more a nutrient deficiency, than it is some mysterious, esoteric dysfunction. I really think that our environment-

Dr. Joseph Mercola:

Yeah.

Morley Robbins:

Outside our body and inside our body, has become so depleted of copper that, that's the secondary effect. It's affecting mitochondrial function.

Dr. Joseph Mercola:

Yeah. And you mentioned cardiolipin, which I'm really passionate about. It's a very specific fat. It's my understanding, it's only present in the body in a mitochondrial membrane.

Morley Robbins:

That's my answer- [crosstalk 00:13:22].

Dr. Joseph Mercola:

Yup.

And unlike a triglyceride, triglyceride means three. Glycerides, three fatty acid molecules, attached to glycerol backbone. Cardiolipin has four fatty acids.

Morley Robbins:

It does.

Dr. Joseph Mercola:

And the composition of those fatty acids are completely dependent upon what you are eating.

Morley Robbins:

Mmm-hmm.

Dr. Joseph Mercola:

And if you are like most people in this country and 20% to 30% of the fat that you eat is omega-6 linoleic acid, the high percentage of those fatty acids in the cardiolipin are going to consist of linoleic acid. If you eat a lot of saturated fat, or monounsaturated fat, then it's going to be that.

Morley Robbins:

Mmm-hmm.

Dr. Joseph Mercola:

Oleic acid, or palmitic or stearic. That's what the chains will be. Now, why is that important? Because, these unsaturated fats, they're predisposed to oxidation. And when you have oxidation in cardiolipin, you are destroying that structure, absolutely destroying it, decimating the ability of the mitochondrial to function well because they form these super complexes. And that means that these complexes, as you mentioned, you see them in illustrations, linear along the cell membrane, in the mitochondrial membrane. But, actually it's a three-dimensional thing. And actually, the cardiolipin forms the fold, where you can see this-

Morley Robbins:

Right.

Dr. Joseph Mercola:

Picture, the folds are the cardiolipin.

Morley Robbins:

Yup.

Dr. Joseph Mercola:

So, that cardiolipin, that fold, that crista curve is destroyed, and then the complex has become more distant and they can't transfer those electrons as efficiently. And it destroys mitochondrial function, or it [inaudible 00:14:58] destroys, but seriously impairs it. So-

Morley Robbins:

I'm absolutely delighting in your understanding of the problem because you're the only other person I've ever known that could describe in very specific detail what happens.

Dr. Joseph Mercola:

Yeah.

Morley Robbins:

And thank you for that. And I think, it's also important for people to know what's the match causing the oxidation.

Dr. Joseph Mercola:

Yes. Yeah, that's it. That's the other part of the equation.

Morley Robbins:

That's the iron. And what happens is when people get the global dynamic that's affecting health on this planet, is that people are told they have low iron in the blood, the practitioner doesn't know that iron is high in the tissue, and then they give them more iron and what's the iron going to do? It's going to find its way to the cell, and then it's going to find its way to the mitochondria. And then, there's this collapse in energy production and that's the dynamic that's driving the excess intake of iron throughout the planet, in my humble opinion.

Dr. Joseph Mercola:

I couldn't agree more. I couldn't agree more. So, the only thing I would like to expand, we have discussed, I believe, in our last interview. But, just to give people – because, this concept is so important. And you said it, so quickly that, I strongly believe and suspect that maybe 95% of the people didn't appreciate what you just said. Because, I certainly didn't, for the longest time, that the ferritin typically used by almost all clinicians, to identify the iron levels in your body. Now, clearly they use other iron test parameters, but that's the most potent one people are using. But, it's only measuring the iron in the blood, they say. And you said, in previous podcasts, I think it was 50% to 75% of the iron in the body is stored in the hemoglobin.

Morley Robbins:

70%.

Dr. Joseph Mercola:

Is that? 70%? Okay, so 70%. So, that's a lot, that's a lot. But, this is the point that's confused me and it confused me and I just didn't get into it in our last interview, is that understand that the red blood cells are not in the serum. They're independent of that, they're essentially outside of the serum. So, the ferritin and all the other parameters are not measuring the iron in that blood, or in your other tissues, like your liver, or brain, or heart. So, maybe expand on that. Because, that is just a crucial, vital piece of the puzzle, to understand before you get seriously confused, like almost everyone else with these iron numbers on the tests that are being done, typically.

Morley Robbins:

Very confusing, because for over a century, hemoglobin was always identified as the marker for measuring iron status, from-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

I think, the time of the Civil War, up until 1972. And then, in 1975 there was this sudden change of focus. It was like, "Well, we need to be focusing on serum ferritin." It's like, Jacobs et al, [The New England Journal of Medicine]. They totally shifted the focus to ferritin. Well again, when you get into the real sophisticated research, you find out that ferritin, it's showing up in the blood, as opposed to the ferritin in the cell, right? So, when ferritin's showing up in the blood, it's being secreted by organs who are dealing with pathophysiology. Principally, it's the liver, but it may be the kidney.

But, what's important is that Worwood, W-O-R-W-O-O-D, a colleague of Dr. Jacobs, Aroseo, Dr. Kel are three world-renowned iron biologists, who've all said, "Well, those proteins in the blood are empty. They have no iron." The protein is there, they're measuring the protein, but it's considered an iron depleted protein. It's not a source of iron in the blood. And the iron, that's the third marker that's measured in the blood. So, we have hemoglobin is 70%, protein in the cell is 10%.

Dr. Joseph Mercola:

Ooh, in the cell? Intercellular protein is 10%.

Morley Robbins:

10%.

Dr. Joseph Mercola:

Wow.

Would that be the protein in the cytochromes? Really?

Morley Robbins:

No.

Dr. Joseph Mercola:

Or, are there others?

Morley Robbins:

A lot of it, it's the ferritin in the liver, which is-

Dr. Joseph Mercola:

Okay.

Morley Robbins:

-and it's building in the liver, when there's not enough copper in the diet. But, the ferritin protein is about 10%, and then one-tenth of 1% of the body iron, is in what's called serum iron. And that's supposed to be attached to transferrin-

Dr. Joseph Mercola:

One 10th of 1%.

Morley Robbins:

One 10th of 1%. And it's working its way back to the bone marrow, where it's going to be turned into new red blood cells. Well, a great source of confusion in clinical practice is thinking that the measure of iron in the blood is equivalent to the measure of copper in the blood and it's not. So again, if we're focusing on hemoglobin, we have this bolus of iron that's showing up in the hemoglobin. Well, the copper that shows up in the blood is only 1%. 47% of a copper in a healthy human body, is in the bone marrow, 27% is in the muscle. So, there's 74%-

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

Your copper is outside of the blood. But, what happens is practitioners have been trained that when they see, what looks like, high copper, "So let's chelate it." Not knowing that, it isn't just going to affect the copper in the blood, it's going to affect the copper in the tissue.

That's where the real disconnect is. And so, the ferritin protein, they put bigger spotlights on it and there's more attention focused on it. And I think it's misleading because the ferritin, the loading of iron in ferritin that takes place inside the cell and the recycling of ferritin inside the cell, is entirely copper-dependent. Copper goes into the ferritin, as a result of ferrous-oxidase enzyme function, which is copper-driven. And then, copper's needed to recycle that ferritin protein, break it down, let the iron out. It's a copper-dependent process. And then, people don't realize the role that copper chaperones are playing to move that iron where it's needed in the body. And the principle chaperone for iron, in the blood, the serum iron is transferrin. Well, what did we learn from Dr. Medeiros? That, in the face of copper deficiency – it's quite a surprise.

I didn't share with you the nine genes that are firing out, but one of those nine genes is the

transferrin gene. Well, transferrin is rising in the face of copper deficiency. Why? Because, it's [inaudible 00:22:31]. We've got to get this iron in a copper-deficient state. We've got to get the iron out of the blood, get it back to the bone marrow, sequester it, because in a copper-deficient state, it's very likely there's going to be a pathogenic attack. And that's the magic of this study, is it's revealing, it's pulling the curtain back to say, "Who's going down? Who's going up?" And all triggered by iron-deficient diet. And then, we can sync this study up with Kim-

Dr. Joseph Mercola:

Well, it's not iron-deficient diet. Most people are having too much iron.

Morley Robbins:

Copper-deficient diet, I apologize. Copper-deficient diet. And then, we sync that up with the research of Kim and Gonzalez from 2021.

Dr. Joseph Mercola:

Mmm-hmm.

Morley Robbins:

There was a different model, they were using rodents, denying copper. They were looking at 13 different genes. Not the genes in this study, but the only gene that fired up in the face of copper deficiency was ferritin light chain. It's very different than ferritin heavy chain, which is copper-dependent, because it relies on ferroxidase. And where is ferritin light chain found? It's found in the liver and iron is building in the liver, in a copper-deficient body. And we've known that since 1928, with Heart, Steinbach, [inaudible 00:23:55] at Wisconsin. But, what Kim and Gonzalez did, was prove it genetically. And that syncs up with what Dr. Medeiros finds in 2009. Again, I think what's important, the big macro for everyone in this conversation, is to see the profound interaction that copper and iron have in our metabolism and that there is no iron metabolism, there's copper-iron metabolism, and you can't make conclusions on iron status, measuring just ferritin.

It's a significant mistake, that's made clinically. And you need to look at all of the containers of iron, so hemoglobin, serum iron and ferritin. But, you need to look at the non-iron markers, like what's going on with zinc, copper, ceruloplasmin, and let's look at vitamin A and D, because they influence the bioavailability of the copper side of the house. And so, that's where the focus of the Root Cause Protocol, is to get people to step back from just that single ferritin marker and get a more holistic view of, "What are some of the other dynamics that are at play?"

Dr. Joseph Mercola:

No question. And it typically, has to do with iron recycling program, which you alluded to, that when you see-

Morley Robbins:

Absolutely.

Dr. Joseph Mercola:

-clinical markers of low iron, suggestive of low iron-

Morley Robbins:

Right.

Dr. Joseph Mercola:

It almost hardly ever is. Would you say, it's fair to estimate that, when that is seen clinically, that likely 99 times out of 100, it's going to indicate iron recycling dysfunction, most likely related to copper deficiency?

Morley Robbins:

I would say, it's 99.9.

Dr. Joseph Mercola:

Okay. So, I was off by an order of magnitude.

Morley Robbins:

No, no, no.

Dr. Joseph Mercola:

It's that much. I wanted to be somewhat, conservative and thought I was being conservative by saying 99%, but that's crazy.

Morley Robbins:

I think, it's a [inaudible 00:26:00]-

Dr. Joseph Mercola:

One out of 1,000, it's not going to be. So, just bet your bottom dollar, you're rarely ever going to be wrong. If you're you able to pick up a clinical history of acute blood loss, which would probably be what comprised the majority of the exceptions, I would suspect.

Morley Robbins:

I think you're right about it.

Dr. Joseph Mercola:

You're going to be golden. This contradicts almost every medical authority in the world, so this is big. This is huge. This is a major claim stating that iron deficiency virtually doesn't exist outside of acute blood loss. Unless you have a history of acute blood loss, you are dealing with iron recycling dysfunction, more than likely related to copper deficiency.

Morley Robbins:

But let's-

Dr. Joseph Mercola:

Put that in and I've got a comment. We shared you were gracious enough to allow me to send two clients to you. Consult with and that there are anomalies that, because there's even more complex than we just said.

Morley Robbins:

But let me highlight something that you're alluding to with heavy blood loss. There's something called, I'd never heard the term until about a week, maybe 10 days ago. But a group of clinicians in India were studying dysfunctional uterine bleeding.

Dr. Joseph Mercola:

[inaudible 00:27:19]

Morley Robbins:

I'd never heard that term, but again, people know what heavy menstrual blood loss. What they discovered is that the women who had this dysfunctional bleeding had a thicker endometrium in their uterus, which you would expect. But they correlated it with ceruloplasmin level, not activity. I would love it if they had also isolated the activity component to let us know how smart that enzyme was. But ceruloplasmin was low, endometrial tissue or the wall thickness was high. That makes so much sense because what do you find with heavy menstrual flow? You're going to find more estrogen. So estrogen is making up for the lack of ceruloplasmin. Low ceruloplasmin, there's a backup plan. Cause estrogen's an antioxidant. So estrogen-

Dr. Joseph Mercola:

If you're a female-

Morley Robbins:

If you're a female. Thank you.

Dr. Joseph Mercola:

A menstruating female.

Morley Robbins:

But estrogen's going to be higher. But if you have low ceruloplasmin, it's a safe bet as you were noting. You're going to have poor iron recycling and there's a lot of iron that's flowing through the uterine wall, just the very nature of it. Iron is building in that tissue. What does iron and estrogen like to do? Likes to grow things. It's going to get thicker in the face of low bioavailable copper. We have to be careful that I would say that the heavy bleeding that you're talking about would be accident-induced, not necessarily from menstrual loss. I think that's a different, could-

Dr. Joseph Mercola:

Trauma,

Morley Robbins:

From trauma. Exactly.

Dr. Joseph Mercola:

All right. Interesting because that typically, at least clinically, in my experience, which may be an anomaly, is the most common time I would see a low suggestion of iron deficiency would be in heavy menstrual loss. I didn't have a trauma practice so I wouldn't see people who lost lots of blood that way. It would be more in a hospital setting, you see that.

Morley Robbins:

Right, right.

Dr. Joseph Mercola:

That is fascinating. Maybe we can get into some of the complexities. That's a pretty simple concept to understand. If it's confusing to you, I would replay this video a few times so you can get it. It very likely may be confusing. But I think you've profoundly simplified it and if you listen to it a few times, I think you'll get it. Because that is really a foundational principle to appreciate because it's a titanic shift of our understanding of iron physiology.

More important [inaudible 00:30:07] because the end result of that misunderstanding is an acceleration of your life towards death and premature disability. Because iron is the spark. It's going to ignite that linoleic acid that's embedded, most everyone watching this, cell membranes and it's going to cause the oxidative damages just generating, spinning off all these free radicals and just decimating almost all the tissues in your body. You've got to understand this principle and it's very few of your doctors are going to understand this, they just don't get it. We certainly send [this] video to them to help them understand it. They need to understand it.

Morley Robbins:

We have the myth of iron deficiency. We have the myth that iron regulates itself. It does not. It is entirely copper-dependent. When you get into the real deep research, you're going to find that coppers the general, iron is the foot soldier. Now try to picture the Battle of the Bulge without Patton. Very different story there. Then the third is this idea that, "Well I feel so much better when I take iron."

Dr. Joseph Mercola:

That's a confounding variable for sure.

Morley Robbins:

People need to track down Dr. Robert Hodges, 1978. Did a masterful job of explaining what the deception is of iron supplementation. It's a six-week hit.

Hemoglobin does go up, people are going to feel a little bit better. But it's only going to last for six weeks. He was able to document it meticulously in the three-year study that he did with humans. He was able to show exactly why they respond with this. But again, the key is any

heavy metal, iron is a heavy metal. You name it. Cadmium, right? Lead, any heavy metal is going to force increased red blood cells. I'm not entirely sure why, maybe you know. But there is this dynamic of heavy metals driving more red blood cells to, I guess, deliver more oxygen to trying to deal with the toxicity.

But the point is the increase of iron and the feeling "better" is short-lived and deceptive. When did all of the blood marker dynamics change in Dr. Hodge's study? When he introduced retinol, which makes copper bioavailable and hemoglobin took off and then retinol followed. Again, over the course of a three-year study, he was able to really meticulously show exactly what's happening inside people's body. Again, it was not iron reinforcements or iron supplementation. It was medicinal levels of iron. He was not holding back and it had no lasting effect for the subjects in the study. It was the introduction of retinol that allowed-

Dr. Joseph Mercola:

Well, I would counter that claim. It had no lasting beneficial effect. It hadn't clearly continued indefinitely and it absolutely unequivocal everlasting pathologic of benefit or of fact.

Morley Robbins:

Fair enough. Right. Yes. Again, it's like you're moving from hit to hit to hit, but you're not seeing the metabolic devastation that's taking place inside the mitochondria. I think the term is, it's like it's resistant to the iron or a refractory resistance.

Dr. Mercola:

[inaudible 00:33:41]

Morley Robbins:

It's just the body doesn't know what to do with the iron because it doesn't have the general. If the general's not there to direct it and make sure that it's being chaperone properly. Being metabolized properly and recycled properly, that's where all the complications of the symptoms begin to ensue.

Dr. Joseph Mercola:

Well let's expand on that comment you just made. The body doesn't do it all, doesn't know what to do with all this iron. Because many people, and they may have heard it on a previous interview that we did, but don't understand or realize that the body has essentially zero, zero, no way to effectively routinely eliminate iron excess. It just doesn't, it's not built for that. I suspect it's related to the fact that in ancient times it was a reserve mechanism, sort of lifesaver that we had, in case we got acute trauma. That was common. They didn't have ERs and trauma centers back in ancient days of course.

You had to have stored iron to rebuild your red blood cells and if you didn't have it you'd be dead. I suspect that's the reason why, but the end result is we don't have a way to eliminate it. Maybe you can expand on that. We can talk a little bit about therapeutics that is essential to anyone who understand this if they're interested in optimizing their life, what they need to do.

Morley Robbins:

Again, it would be another myth. The myth is that, “I’m losing blood all the time.” It’s like again-

Dr. Joseph Mercola:

Yeah, right.

Morley Robbins:

Right. I've read a lot of articles on iron metabolism, copper iron metabolism, and every one of them, at some point in the article. It's usually in the first couple paragraphs say there is no mechanism, hormonal, enzymatic, metabolic pathway. There's no way to get rid of excess iron. I think what's really key is for people to realize that the bulk of the iron activity in our body is devoted to making new red blood cells.

Again, every second of every day. We've got to make two and a half million new red blood cells to replace the ones that are dying. In the course of 24 hours, we're going to make 2 billion red blood cells. That's a lot of red blood cells in the course of a 24-hour period. You and I have been talking for 36 minutes times 60, that's a lot of activity in our body. It's really important for people to understand is that in the course of that 24-hour period, to replace all of those red blood cells, we only need 25 milligrams of iron. Average person has about 5,000 milligrams in their body. Only-

Dr. Joseph Mercola:

Is that true? That's the healthy, the ideal optimal. I understood 5,000 is required, but anyone over 60 is probably closer to 25,000 or 30,000.

Morley Robbins:

Absolutely. Again, it's just in the literature, in the textbooks they'll tell you it's about 5,000. Then you talk to the iron biologist and it's a milligram a day times your age. It's a much bigger number. But the important thing is that the amount of iron needed to support daily red blood cell replacement. I think I said 2 billion, it's actually 200 billion. But the point is the daily iron requirement, 24 of those 25 milligrams comes from the recycling system, 95% is coming from an internal recycling of iron that already exists in the body. Only 1 milligram a day is needed from the diet. That's the origin of the “1 milligram a day as we age.”

What's happening, there's total silence about recycling. The reticular endothelium system I think has been expunged from the clinical record and/or clinical training. Now because we live in this copper-deficient environment, the recycling system is not as efficient. The serum iron is going to show low under those conditions. The doctor is going to react with, “You need more iron,” when in fact what you need is more copper. The recycling system is dependent upon one iron doorway.

It's called ferroportin, iron doorway. And ferroportin entirely depends on a copper enzyme. It's called hephaestin. It's a copper protein that expresses the exact same enzyme as ceruloplasmin called ferroxidase. What hephaestin does is make sure that the iron gets out of the recycling macrophages as soon as possible, two-and-a-half times faster than if copper's not present. That's

a big difference. Two and a half times is really fast. Making sure that the transferrin is ready to take that iron to the bone marrow. That recycling system that's occurring all day long, all night long, is never factored into the clinician's interpretation of blood work where they're just seeing low numbers and they're not thinking recycling, they're thinking replacement.

I think that would be a really important takeaway for people, is to question, "Doctor, could it be that my recycling system isn't working right as opposed to my need for new iron?" I think that if people realized that the only way to really have true blood loss or iron loss, excuse me, as you were noting earlier, it is through a blood donation.

Blood loss is the only way to bring iron levels down in the human body. It's a conservative function as you noted. It's something that is not part of our conscious thinking. We worry about – we've been trained to think we're anemic and we've been trained to think we need to replace the iron. When in fact the missing piece of the puzzle is bioavailable copper, which is copper in the presence of retinol so that the enzymes get properly loaded and get properly functioned. It's a central part of our physiology going back to the beginning of time.

Dr. Joseph Mercola:

Almost everyone watching this, especially if you have a high ferritin. That's not really the confusion. There's very little dispute other than ferritin isn't also termed an acute phase reactant. It tends to rise in acute inflammatory conditions. It might be falsely elevated, but assuming you don't have that going on. If it's elevated, there's no question you have iron overload. The question becomes when you have low [iron], because you could have a ferritin level of under 10 strongly suggestive of iron deficiency or anemia. But we're going to talk about two cases shortly, where that was the case and they were the exact opposite. They were iron overloaded. It's almost everyone. Unless you have an acute blood loss from trauma and that menstrual dysfunctional uterine bleeding, then you're going to need to have a program where you're removing your blood. The easiest and least expensive way is donating blood, usually a minimum of twice a year.

I think Morley does four times a year, which is about the most one person can do if you're going to remove a whole unit. The way to remove more is to remove less more frequently which, is what I do. I remove every week. Every week I take out 60 CCs of blood, which is 2 ounces. Over a year that's seven units of blood I am able to get instead of four. It's so slow, your body adjusts and more efficiently and not just drop. Cause when you take a unit of blood that's 500 CCs, that's like 10% of your blood supply, that's a lot. You just can't keep on doing it without consequence. That's the recommendation. At least two units, I mean that's the bare minimum for almost everyone. But most would benefit from four. If you can have the ability to get your blood drawn and done regularly, relatively inexpensively and conveniently, then I would definitely do that.

Morley Robbins:

Well what might surprise you is that in 2016, when I realized I had too much ferritin in my blood was 237, I don't like to see it above 50, I prefer 20. But when it was 237, I donated six times every 60 days in that year. Everything kind of self-correct-

Dr. Joseph Mercola:

You didn't have really severe fatigue or any other dysfunction?

Morley Robbins:

No.

Dr. Joseph Mercola:

That's good to know. That's really good to know. My understanding's four was the limit.

Morley Robbins:

But my hemoglobin when I had the first blood donation was 18.3. So I was,

Dr. Joseph Mercola:

You had a lot of reserve. A lot of reserve.

Morley Robbins:

It was way over the top. I think what's important on the other side, again, the low ferritin. See, I think the high ferritin is a manifestation of liver dysfunction spilling out into the bloodstream, because the recycling center of the hepatocyte of liver cells is called lysosome. That's true of any cell. But the lysosomes in the hepatocytes are really important for turning over the ferritin to make the iron available for use. When that lysosome isn't working right, because copper's missing, ding, ding, ding. You're going to get iron dumped into the liver and then the ferritin protein gets secreted into the cell. That's the work of Douglas Kell and Etheresia Pretorius 2014, about inflammation. It's a very thoughtful and comprehensive study of what is hepatic inflammation all about, especially as expressed by high ferritin. The other side of the house, which is very confusing-

Dr. Joseph Mercola:

Excuse me, if I can interrupt for a moment-

Morley Robbins:

Please.

Dr. Joseph Mercola:

-hepatic inflammation, sometimes known as NAFLD, which is nonalcoholic fatty liver disease, which is interestingly you had started this conversation with talking about the copper deficient fructose enzymes. Well, fructose is one previously thought to be the most common contributor of NAFLD, but also we know linolenic acid will do it too. The two combos that are contributing to design destruction have to be related to the other two pathologic components. Too much fructose and too much omega-6 fat.

Morley Robbins:

Thing one and thing two causing all the problem, right?

Dr. Joseph Mercola:

Yeah, yeah.

Morley Robbins:

The low ferritin is the most vexing.

Dr. Joseph Mercola:

Yes.

Morley Robbins:

I think what it really is, the spleen, which is where the bulk or if not all of the iron recycling is taking place, the red blood cell recycling is taking place in the spleen. The word that I think is missing in this whole dynamic is hemosiderin. Hemosiderin is, it's called denatured ferritin. What does that mean? It means that the oxidative stress, again, it could be iron, it could be the linoleic acid, it could be the fructose, it's like multiple players. But the oxidative stress has altered the conformational structure and function of ferritin and then it's able to hold 10 times more iron. In that situation, I would argue ferritin levels are going to go down in the face of rising hemosiderin.

How many times do practitioners ever think about hemosiderin? I don't think they do. I don't know that they were even trained in its existence or even how to test for it. I think we have a classic example of missing information equals missing truth. If you don't know that hemosiderin is alive and well in copper deficient bodies. That's the work of Welch and Aust at University of Utah, 2007. They present compelling evidence that hemosiderin rises in the face of copper deficiency. Again, it's because the recycling of iron is so critical to copper status. Again, inside the lysosome and the chaperones involved in iron recycling are copper-dependent. Again, that's not common knowledge. I think it's important for people to realize that there are players in this iron metabolism process that are not commonly known in practitioner circles.

It's not a criticism of the practitioners. They just never received the full breadth and depth of the information that was being made aware on the research side of the house. It doesn't make it over to the clinical side of the house. We can certainly have a spirited debate about that. But the effect of the matter is there are missing pieces of the puzzle. That aren't being factored into why someone's iron might be low or why their ferritin might be low. Again, the one that I think is in play in a lot of people is parasites. That, and again, if you have low copper, axiomatically you're going to have high iron. What's going to happen the pathogens are going to take advantage of that situation. A high-iron body is going to have lower energy. Well pathogens are opportunistic, they're going to take advantage of that. I think it's another facet of this discussion that is not openly understood in the public or in the practitioner circles.

Dr. Joseph Mercola:

I want to address two points. One is the hemosiderin and then I want to divert over to one of the clients that we both worked with, actually one as recently as this weekend. The first is hemosiderin, I didn't realize that it was denatured ferritin and actually would result in lowered serum ferritin. Two questions from this. Is there a commercial lab test of hemosiderin either through LabCorp/Quest [Diagnostics] that one can do or is it research an essay? If that's the case,

it would seem that it would be state of the art or really almost malpractice. Not to do a reflex hemosiderin level and someone with low ferritin.

Morley Robbins:

I'm not aware that there is a commercial test available and I could just be lack of awareness on my part. But I have a feeling it's going to be an expensive test if it is available. I think in concert with that, the practitioners and even the public need to start demanding. "Well, okay, let's do the hemosiderin, but let's also test my copper status".

Dr. Joseph Mercola:

Yeah, sure.

Morley Robbins:

Make sure that we have a more holistic perspective of what's going on in my body.

Dr. Joseph Mercola:

So let's jump to the client we took care of this weekend, which is a really powerful illustration of how confusing this whole thing can be. Cause this client has followed your work assiduously and pretty much claims to have listened to every one of your podcasts, which is hundreds. I don't – there's no reason to doubt her. Really aggressive health nut and has implemented most parts of the program, the retinol, the copper levels and understood that what you said, that low ferritin levels are typically associated with parasites. The confusing part of that is that you would think, "Parasites, I'll do a stool test, I'll do a parasite cleanse and I'm off to the races." No, these parasites are in the tissue, not typically in your colon, they're embedded in your liver, in your spleen, and you don't treat them with anti-parasitic drugs. You treat them by correcting the issue and your body eliminates them.

That's the confusing part, but it's important to understand that it is contributed to by the parasites. The other complicated – I'll let you take over because it was just amazing. This woman had done just about everything I said, I was on all the right supplements and her levels were still, and she had been donating blood amazingly well. Yet still had persistent ferritin level of 8, clearly a damaged particular endothelial recycling system.

Morley Robbins:

Right.

Dr. Joseph Mercola:

I mean, I was just astounded at how magnificent a clinician, which is astounded largely because the fact that you have no formal training in this. But you carefully discerned that her issue was due to emotional issues, which is never in the differential for iron recycling dysfunction, any differential I've ever seen. But it was her number one issue. Then she needed an intervention that I was probably the biggest promoter of in my experience, which is EFT or Emotional Freedom Technique.

Not to say it's the only intervention for her emotional dysfunction that would've needed to be healed, but it's clearly one of the most effective and most commonly used. So, why don't you expand on that, because it was just it in my mind, yes, this stuff is complicated enough to begin with, but it gets even more complex. That's where you'll need someone who has been trained in your systems to understand that because you know can do most of this stuff. Just using a shotgun approach as you described, it's going to take care of most people. But there are many others who are going to be really complex.

Morley Robbins:

Yeah. And in this particular situation, this individual had had a history of having low iron. She had been exposed to a lot of supplements, not in the recent past, but historically -

Dr. Joseph Mercola:

She was a vegan.

Morley Robbins:

- and she was a vegan. Right. That only adds to the iron dysregulation. And people need to understand that a vegan diet has no retinol. It might have a bit of beta-carotene -

Dr. Joseph Mercola:

Unless you're supplementing.

Morley Robbins:

Unless you're supplementing. Right. But the average vegan does not. The sickest client I ever took care of was the vegan child of two lifelong vegan parents and she was hurting cowboy. But the point is there was a history of iron issues in her past. And I zeroed in on if she'd had any illnesses, particularly COVID, and that didn't seem to be relevant. But what came up, and I suspected there was something, I said, "Is there any emotional dynamic that's changed in the recent past?" And then the conversation shifted and she brought forward that her mom was not well. In fact, I think her mom, I guess the phrase would be, "My mom was dying." And that is very traumatic for anyone to lose their mother, especially as an adult.

And it wasn't just that she was having to experience her mom's eventual transition, she was having to change her personality within the family to deal with the dynamic of all of this taking place. And that's a lot for someone to process. And what she was focusing on, as you recall from the conversation and what most people do, is they run to physiology and nutrition, "What am I missing? What pill do I need to take in order to correct that?" And I said, "Well, what you need to do is dump your fear." And that was the shift in the conversation because she realized right away what the issue was.

And what people need to really understand is that when we have unresolved emotional issues or we're going through a traumatic experience like losing a parent or a spouse, that there's going to be an emotional response, but it's going to trigger the emotion of fear. We're losing control. And when people with high IQs start to lose control, they get fearful because they're no longer in

control. Well, I spell fear differently, it's FE-AR. So people can see the symbol for iron. Iron rises in an individual who is in a state of fear. It's both, I mean, any farmer will tell you that acidic soil will absorb more iron. Well, when we go into a state of fear, we're becoming more acidic and adrenaline is rising and cortisol is rising. Well, those are going to cause an increase in iron. It's absolutely a physiological response. And in the face of low copper then you're going to have the kind of dysregulation that we witnessed.

And I think it was a very important shift in the conversation when she realized that this was not going to get solved just through changes in nutrition or changes in understanding the physiology, that she was going to have to tackle the emotional side. And a lot of people, a vast majority of my clients, I'm not sure what you experienced, but obviously a huge proponent of EFT, which I think is, it's an amazing modality, but a lot of people don't want to deal with their boogeymen. And I find it's central to the process of healing is to get these unresolved emotional issues out of the way because they become energetic barriers to allow the immune system to do what it knows how to do, which is make energy and make intelligent choices. But energetic blocks like emotional issues invariably are going to get in the way of the process. And I think it was so powerful when she realized what the true issue was. It was like her whole being shifted at that point.

Dr. Joseph Mercola:

Absolutely. And the important distinction here is to understand, because many people watching this are familiar, at least superficially, with EFT, is that there are two ways to do this: One is that you can tap yourself, that has some benefit, but when you have a serious issue, potentially addressing life-threatening conditions, you clearly need an in-person, not virtual, but an in-person, one-on-one, face to face connection with a human being that is really skilled with this. And so that is a key differentiation you need to understand. There's many, many people who do this so you have to find someone and you maybe hit and miss to find the right therapist because not everyone is a superstar,-

Morley Robbins:

Sure.

Dr. Joseph Mercola:

-of course. And even if they were, you may not be able to connect with them and resonate with their frequency.

But you want to find someone you can work with that's effective because it really is, in my view, there was nothing, when I was doing it and we did – we would not see a patient in my office in the 2000s unless they committed to be evaluated by our EFT therapist because we knew that almost every single condition was related to this. What I didn't know at the time is that the mechanism, which it appears that at least in some cases, maybe you can comment on the percentage from your perception, that when you have this fear in these other severe, overwhelming emotional challenges, it could affect the copper-dependent enzymes in your body and once that's gone, then the copper starts to work, and your body starts to function the way it was designed to.

Morley Robbins:

The most powerful article around these dynamics is by Zamin, Z-A-M-I-N, P-I-R-A, it's one word, Zamin [Somayeh] Zaminpira, Ph.D, 2019, talking about when we're in a state of fear, we go hypoxic and we have increased risk of cancer. And what that article does, a masterful job of explaining is how adrenaline rises and how cortisol rises in that dynamic. Adrenaline is a supercharger for oxygen and brings iron into the system to make sure that we're going to get that oxygen that we need to run from the bear. But in an acute situation, adrenaline, it's wonderful. In a chronic situation, it's very destructive.

But the other side of the house is the cortisol. What most people don't know is that stress hormone triggers a four- to fivefold increase in metallothionein, and metallothionein, produced in the liver, binds up copper a thousand times stronger than it binds up zinc. So, basically, what we're doing is in an acute situation you're going to be able to respond. But I think what is at issue now on the planet is a two-and-a-half year chronic state of fear, of uncertainty, where our bodies are being powered with these stress hormones however we try to rise above it, it's physiological because when the body senses there's something wrong, it's going to produce those hormones.

And so, cortisol has a devastating effect on bioavailable copper status. To your point, it's going to start to affect copper enzymes, not the least of which are the enzymes in the mitochondria to make energy. Well, what happens when we're under chronic stress? We start to power down. Well, when we power down, guess who's sniffing for the loss of power? The parasites and the pathogens. They're opportunistic and they all respond to a low-energy environment.

And so, when we're in a state of fear, again, we have to be careful because we're very sophisticated about it, but when we're in a state of fear, we're worried that we're broken, we're worried that we are being punished from on high and we're worried that we did this to ourselves. And that's a very unsettling sensation when you think, "Well, I was following advice and I still got sick." And those are the three hidden emotions that I think are playing in this chronic state of dysfunction that they're so effectively resolved in the use of these techniques.

And the beauty of Emotional Freedom Technique, at least in my personal experience, is it was agnostic about what happened. The history did not change, but my perception and the energetic hold that it had was eviscerated. And it was two sessions. I couldn't believe the difference in my sense of awareness and my perception of what had been a lifelong problem from the age of 6. And it was transformational.

So, I regularly recommend it. And I'm really inspired by the fact that was the cornerstone of your practice, which was pure genius. Because I would argue that every physical dynamic, every physical symptom, has an emotional precursor to it and it's just people don't realize that it's directly related.

Dr. Joseph Mercola:

And your personal experience is very illustrative of the typical dynamic that occurs in that (A), it's almost instantaneous and it's very common to have relief in two, or even one session, even as little as five minutes. I've had patients where their complete symptoms just disappeared. But certainly within one visit I've had many of those and then others takes a longer time because you

have to unpeel the onion, so to speak, and it takes a while. So that was one. And it's just so fascinating how it's just almost instantaneously once it's done. Once you hit that final block, it's gone. It's just like someone turned the switch off. It's crazy good.

Morley Robbins:

So should I share my story? Would that help the audience do you think?

Dr. Joseph Mercola:

Yeah, sure.

Morley Robbins:

Yeah. So, I mean everyone has a cross to bear. I mean, we all have challenges when we're growing up. Well, my dad was a manic depressive with schizophrenic tendencies. I mean, he was a very sick puppy. And when I was four years old he had double pneumonia and enlarged heart and was very sickly. He almost died. Well, two years later, again, those conditions are caused by lack of copper. But two years later he was scheduled to have his second electric shock therapy (EST) session. So, isn't it interesting? EFT versus EST. And so, he was scheduled to have a second session and if anyone's seen the movie "One Flew Over the Cuckoo's Nest," what is involved.

Dr. Joseph Mercola:

Jack Nicholson.

Morley Robbins:

Jack Nicholson. And he said, "That's not going to happen." And he ran away from home. I was 6 years old. My dad runs away from home. For two solid years, nobody knew where he was. And the only reason why I knew where he was, was when I was in my 30s I was doing genealogy research and I contacted the Social Security Administration to find out what the records were on my dad. But the point is, when I was 6, what do you think I thought? Again, the world revolves around a 6-year-old, "Well, I caused my dad to leave home." So I carried that wound for just 55 years and so I did Emotional Freedom Technique with a practitioner. I was actually doing it by Skype. I wasn't even face-to-face, Dr. Mercola. So, it's just – but it was a very-

Dr. Joseph Mercola:

You can't get improvements by Skype. It's just less than ideal.

Morley Robbins:

Okay. No, I get it. I totally agree. But second session-

Dr. Joseph Mercola:

I did it in one visit if you did.

Morley Robbins:

Well, but it was such a profound shift. And, I mean, my world went from black and white to Kodachrome and it was amazing and it became obviously something that I recommended going forward. But here's the part that you may not know: So, this was all happening in 1958. Imagine my surprise when I come across the work of Dr. Martens and two of his colleagues from – he was at Tulane University working with two colleagues from Harvard. In 1959 they're doing research with ceruloplasmin, one shot of ceruloplasmin administered to 34 patients with schizophrenia. And what do you think the outcome was?

Dr. Joseph Mercola:

Good, really good.

Morley Robbins:

Thirty of 34 patients with schizophrenia were cured with one shot. So, what that tells us is that in the dynamic of emotional unrest and all the behavioral disorders, is dysfunctional iron and lack of energy. And that one shot of ceruloplasmin was what it took to get these people stabilized, which I think is really powerful. Now,-

Dr. Joseph Mercola:

Of course.

Morley Robbins:

-would I have found that analytical otherwise? I don't know. But it was a very powerful moment and I'm so glad I found it after I had done Emotional Freedom Technique because I don't think it rattled me as much as it might have otherwise. But I think it's important for people to realize the depth and power of bioavailable copper because I don't think people would argue that there aren't many conditions that are more erratic and irrational than schizophrenia. And yet it was a stabilizing force for these individuals back in '58.

Dr. Joseph Mercola:

It's a remarkable story on so many levels. But you would think that, “Well, let's get some schizophrenics ceruloplasmin.” Well, that would be great, but you just can't do it practically because it's not available. So, don't go looking. We already looked for you. It's not available. Only as a diagnostic assay so it would cost you thousands and thousands of dollars per dose. So, it's just not going to work, sadly.

I mean, I guess – and many of these – ceruloplasmin is protein, but fortunately unfortunately, it's one of the largest proteins in your body so it is not easy to recreate. Many of these peptides clinicians are using, those are easy to spin off unless you've got an intellectual property issue. But you can create them in a protein sequencer, but you can't do ceruloplasmin. You could, but it'd cost just as much, it's just not going to be possible.

Morley Robbins:

Very, very challenging. That's right.

Dr. Joseph Mercola:

Yeah. So now the other point I neglected to mention, I said there was two points and I only mentioned one. The other point of your story that was so consistent, the initial complaint that people come in with is, typically, perceived by the patient to be something relatively acute that just happened that triggered it. But invariably almost in every single case it always goes back to early childhood.

Morley Robbins:

Oh.

Dr. Joseph Mercola:

Six is a little bit old. Typically, my experience was under 5, but it's really, really close.

Morley Robbins:

Okay.

Dr. Joseph Mercola:

So that's where the trauma started. For some reason, childhood trauma is a thing. In fact, in my experience clinically, almost every autoimmune disease has this emotional component. And it was absolutely mantra for every autoimmune patient to do the EFT because then almost invariably we found the trauma below, oh, 7, 6, 5 years old or even earlier because somehow your adult skills are devolved and-

Morley Robbins:

Right.

Dr. Joseph Mercola:

-these traumas are just massively exacerbated. So, the point where a curse word or a look, even just a look by a parent, could be exponentially, orders of magnitudes worse than being assaulted sexually many times-

Morley Robbins:

Exactly.

Dr. Joseph Mercola:

-when you're older.

Morley Robbins:

Absolutely. Yep. No, very powerful. And, to your point, I think back what was really traumatic prior to that, was when I was 4 I went to see my dad in his hospital room at [inaudible 01:08:40] Memorial Hospital and he was in an oxygen tent and he looked really scary. I mean, as a four year old I was really-

Dr. Joseph Mercola:

Sure.

Morley Robbins:

-I was traumatized.

Dr. Joseph Mercola:

Sure.

Morley Robbins:

And maybe that set the stage for what happened.

Dr. Joseph Mercola:

Yeah, that could have been the initial trauma, that, and then the others just-

Morley Robbins:

Just float from it.

Dr. Joseph Mercola:

-exacerbated it.

Morley Robbins:

So I think-

Dr. Joseph Mercola:

So I'm-

Morley Robbins:

-it's important to realize how powerful this emotional cornerstone is for recovery. Everyone loves to pop pills. They don't necessarily like to dump iron and they don't like to dump their fears. But those are the two that invariably get in the way of full recovery,

Dr. Joseph Mercola:

Which is what I want to ask. This is a really important component and I don't ever recall you discussing this. And perhaps you did. I suspect you did because I've not watched all of your videos, previous interviews. But, in your experience, what is the percentage of people with iron recycling disorders and copper deficiency that have this fear, this dysfunction in the adrenal cortical system that's contributing to it? Is it more than half? Is it most? Is it a few? What's your experience?

Morley Robbins:

That's a great question. I've never really thought about it. I would say it's a majority. It's certainly more than half. It might be three quarters.

Dr. Joseph Mercola:

Wow. Okay. So it's up there.

Morley Robbins:

It's a significant piece of the puzzle. And anyone who has what they perceive as iron deficiency, they've been, again, I've talked with a lot of folks as I know you who have this perception that they're anemic. When they're anemic it really plays on their psyche. It means that, "I'm not normal. I'm not healthy. I'm not full." And I think it really becomes this source of erosion of their confidence in themselves and in their body and their body's ability to keep them properly optimized.

And so I think it's a really significant percentage of people who have this history of low iron in the blood. And there are many, many people out there like that, not knowing that it really stems from mineral dysregulation, from the stress from their earlier life or from other stresses that they're experiencing even as adults, it's having a significant impact.

Dr. Joseph Mercola:

Now, you've written a book that describes your process in more detail, which is the Root Cause Protocol. I believe that's the only book you've written, if I'm not mistaken?

Morley Robbins:

That's right. It's called "Cu-RE Your Fatigue."

Dr. Joseph Mercola:

"Cu-RE Your Fatigue." I thought – yeah. I know it was The Root – yeah, "Cu-RE Your Fatigue." I thought that Cu was obviously copper.

Morley Robbins:

Couldn't resist, right?

Dr. Joseph Mercola:

So in that book I don't recall ... And perhaps it's there because it was a few years ago now that I read it, did you discuss the fear and the EFT intervention as being important for the majority of people with this issue?

Morley Robbins:

I did, but it wasn't-

Dr. Joseph Mercola:

[crosstalk 01:11:41].

Morley Robbins:

-a cornerstone. I think if there's going to be a subsequent edition, maybe in a year or two, I'll spend more time really fleshing that out. Only because I think-

Dr. Joseph Mercola:

Because it did impress me as an issue. I missed it.

Morley Robbins:

Well, we talk about the importance of doing EFT. I probably didn't stress enough how significant it is to be a disruptive-

Dr. Joseph Mercola:

Yeah, I would definitely go into the mechanism-

Morley Robbins:

Right.

Dr. Joseph Mercola:

-because the mechanism is absolutely fascinating.

Morley Robbins:

Absolutely.

Dr. Joseph Mercola:

[crosstalk 01:12:05] dialogue. I was very impressed. So, let's transition into our second client that we are working with that you haven't seen yet, but you will be seeing in an upcoming event-

Morley Robbins:

Oh.

Dr. Joseph Mercola:

-but you know her history. Interestingly, same ferritin level as the first client.

Morley Robbins:

Right, right.

Dr. Joseph Mercola:

Serious problems, and actually related a portion of her history prior to our conversation today. And, in my mind, the most significant issue is she had a gastric sleeve and, boy that's all – you need those two words and, boom, that's the cause.

Morley Robbins:

Right.

Dr. Joseph Mercola:

And a lot of – I don't know the number of percentage of people who have these operations. I suspect it's just exploding because obesity and-

Morley Robbins:

It's huge.

Dr. Joseph Mercola:

- is just – It's incredibly common. By the end of this decade they project one out of two people will be obese, not overweight, obese.

Morley Robbins:

Oh.

Dr. Joseph Mercola:

So more and more people are looking for quick fixes and there's not many quicker fixes in the gastric sleeve or some derivative of that. So, well, help us understand why, if you are considering this or you have this, you are almost guaranteed to have iron dysregulation?

Morley Robbins:

Exactly. So gastric sleeves, gastric bypass, it's actually fascinating. If people were to Google gastric bypass and look at the picture associated with it, you'll see very quickly that a very important part of the intestine is, literally, bypassed. It's called the duodenum. The duodenum is the section of the small intestine where the minerals are taken up, especially copper and iron. There are other-

Dr. Joseph Mercola:

Wow.

Morley Robbins:

[crosstalk 01:13:51] but we're talking about these two in particular. And a very noted gastroenterologist, actually I think he's a GI surgeon, he's at Mayo Clinic, his name is Dr. Neeraj Kumar, K-U-M-A-R, and he's written extensively on this dynamic. He sees it regularly in his practice, and he's very aware of copper, copper enzymes, how important it is in the human physiology. And what people don't realize is that, again, we're talking about – when we talk about copper as the general versus iron as the foot soldier, we're talking about a hundred milligrams of copper is regulating thousands and thousands of milligrams of iron.

Well, that, again, the analogy holds. That's what generals do. They tell tens of thousands of soldiers what to do. And so when the general is being restricted in its uptake in the very section of the intestine that knows what to do with it and get it into the bloodstream to get it to the liver where it needs to be activated and mobilized and put into the ceruloplasmin protein, and there's a wonderful article by, again, Earl Frieden, 1968. It's in Scientific American. So it's written for the individual and it's written for the public. And he has a wonderful picture in that article. If people have ever seen pictures of the liver, they know that it's like a triangle and there's a big section and there's a little wall, and then there's this little tiny triangle. Well, guess where the ceruloplasmin gets loaded? It gets loaded in that little triangle. And he explains exactly where it's happening, why it's happening. And that cannot happen if copper can't get into the liver because

it's not getting into the duodenum because it's not getting into the circulation.

And this is – all you need to do is go to any search engine and put in gastric bypass or gastric sleeve copper deficiency and you'll see dozens of articles that describe it. The difficulty, though is they, typically, will talk about this situation as a one-off, "Well, here's a case study of someone who got a gastric bypass."

Dr. Joseph Mercola:

Anomaly. Anomaly.

Morley Robbins:

There's another case study, another anomaly. Yeah. They don't say, "If you're thinking about gastric bypass, maybe you want to really understand what that's going to do because you've got to follow it all the way through." If copper is becoming restricted in its uptake, it's going to affect all of the iron recycling, all of the iron metabolism, all of the iron chaperoning that takes place.

And I don't think the average GI surgeon is aware of that. They just know they've got a client who's presenting with excess weight and this is an accepted procedure. YGB is an accepted procedure. And Y is the name of the French surgeon who invented it. But, YGB, and they just – but what's amazing to me is there's no comment, just like there's no comment when someone has their gallbladder taken out. When was the last time the practitioner said, "Well, when you have your gallbladder taken out, you better start taking choline and you better start taking some additional enzymes to support your digestion." There's no comment about the gastric bypass or the gastric sleeve that this is going to affect your iron metabolism because copper's going to be MIA.

And the part that people need to understand on iron absorption is it's a two-step function. So, the iron needs to get into the duodenum and it can be a challenge because of the sleeve or the procedure itself, but the more important piece of the process, the second step, is getting the iron out of the enterocyte, so enterocyte, it's the cells that allow nutrients to come into the tissue, but they've got to get out of the enterocyte and into the bloodstream and the doorway, we're back to that ferroportin doorway, and that ferroportin doorway, which allows iron into the bloodstream, works with a copper doorman.

If hephaestin is not present to open up that ferroportin doorway, then the uptake of iron is going to be low. Where is it going to be taking place? It's going to get stuck in the enterocyte. That's what leads to conditions like colitis and Crohn's [disease] and irritable bowel and all those iron building up in the digestive tract, and it can't get out because the copper doorman is missing to open up that critical iron doorway.

Dr. Joseph Mercola:

That is fascinating. I never realized that iron pathology was part of that process. Interestingly, two of those conditions, like ulcerative colitis and Crohn's colitis, are both autoimmune conditions. I mentioned earlier that in my clinical experience, autoimmune conditions almost are invariably related to emotional trauma. So, there you've got the mechanism, emotional trauma's contributing to the copper deficiency.

Morley Robbins:

In the world of animals, the veterinarians deal with these same issues in animals. The condition of Crohn's in animals is called Johne's disease. J-O-H-N-E-'S, Johne's disease and Crohn's disease are identical. Here's the catch, how do veterinarians treat Johne's disease in sheep, and cattle, and horses? With copper.

Dr. Joseph Mercola:

Oh, interesting.

Morley Robbins:

That's the only treatment is copper, put more copper into their feed. So, that would suggest that Crohn's, same thing.

Dr. Joseph Mercola:

Okay. This is fascinating. Just a quick question on the mechanism. You had mentioned with the gastric bypass that duodenum's bypass, where the minerals are absorbed. Interestingly, the iron is absorbed, too. So, you think that would be somewhat partially protective, but it winds up in the enterocytes, which makes the whole thing worse. But the issue is, is that the same mechanism with gastric sleeve, where they just remove a large section of the stomach, so your volume in your stomach is radically reduced, 75% to 80%, you can't just physically fit more food in there? But the duodenum is untouched. So, is it just an association or are you of any suspicion why that occurs when you reduce the volume of the stomach, surgically?

Morley Robbins:

I would imagine that, and again I don't know, because you're raising a really important distinction there. I would assume that there is absorption taking place in the stomach in addition to the duodenum and that-

Dr. Joseph Mercola:

Oh, okay. Because for those who don't know, anatomically, duodenum is the next level of the stomach. It goes from stomach into the duodenum.

Morley Robbins:

Exactly. I'm wondering if the sleeve in some way disrupts the duodenum.

Dr. Joseph Mercola:

Some type of factor, that makes sense. I'm just perpetually curious.

Morley Robbins:

Well, think about putting a sleeve on this stomach. Again, I remember a physician telling me that when you use a proctoscope, that there's an inflammatory process all the way up to the mouth, that there's a reaction, there's an anatomical reaction to that intrusion equipment all the way up. I'm wondering, could the sleeve around the-

Dr. Joseph Mercola:

Because a secondary inflammatory condition in the duodenum impairing-

Morley Robbins:

Exactly. Could that just be a response to that procedure?

Dr. Joseph Mercola:

Makes perfect sense. Okay. So, let's veer off before we sign off – it's become abundantly clear, unless you're sleeping under a rock or you weren't listening, fell asleep or something, that you need to have copper. First of all, we talked about getting the iron out, that's pretty straightforward. Almost everyone, unless you have acute trauma, needs to have the iron out on the protocol and process you described previously. But let's talk a little bit about copper augmentation and retinol, because those are the other two pieces of the puzzle. You've got to get the copper in. There are some people out there in this space who have actually written books and I don't want to name names, but they're recommending really high levels of copper, like 100 milligrams or even more of copper a day. And I know that is not your recommendation at all and you've kind of cut it off at 10 and are pretty fond of getting it from foods.

I personally think you should be getting copper from foods and I don't take copper supplements at all. I was able to get it from foods and I have some vast, pretty impressive energetic analysis that confirms I don't need, otherwise I would be taking in a heartbeat. Almost everyone I know and believes this is taking coppers and supplements, you're probably going to need it. But there's one that's incredible, in our last interview, you just blew my doors off by helping me understand why it was so important. But you are a big fan of copper bisglycinate, which clearly is the specific type of copper you want. Because copper is there, but you need to complex it and chelate to another anion.

So, the glycine, the beautiful thing with copper, because it has a valency of plus two or plus four and the higher the valence, the more difficult it is going to the cell, because the charge is going to repel it. So, the valence of copper bisglycinate is zero, so it easily penetrates and you absorb it, which is what you want to do. And you like 10 milligrams.

Morley Robbins:

Yeah.

Dr. Joseph Mercola:

That's my summary. So, why don't you talk, expand on that and mention the retinol. You got to be careful, but you almost everyone's going to need retinol. I don't take it either, because I get it from the food. In that case, I got it from beef liver or beef organs, put it that way, for a few years.

Morley Robbins:

Just for the record, I want to remind you that you do owe me a bucket of acerola cherries.

Dr. Joseph Mercola:

Yeah, fortunately.

Morley Robbins:

I know.

Dr. Joseph Mercola:

Yeah, I should, since our last interview, we actually physically met at a conference and unfortunately the timing didn't work out. And then shortly after that meeting you were probably aware of that Hurricane Ian hit us and it literally pounded my cherry tree, my acerola cherry tree.

Morley Robbins:

I'm sorry to hear that.

Dr. Joseph Mercola:

So, they're almost out of production. They did survive and they will be back, so it's not going to be this year. I will make through on that promise. I obviously got so many friends that want them. Actually two of the clients that I sent to you are really-

Morley Robbins:

I'm a patient guy. I'll wait. I can wait.

Dr. Joseph Mercola:

Okay. You'll get them for sure.

Morley Robbins:

But in terms of traditional food sources, if you go back in the annals of food sources, you want copper, you get nuts, seeds, wheat products would have copper. Organ meats, of course.

Dr. Joseph Mercola:

But nuts and seeds are high in LAs (linoleic acid), so you got to be careful.

Morley Robbins:

Yes. Absolutely.

Dr. Joseph Mercola:

And oxalate many times. So there may be better sources like copper bisglycinate.

Morley Robbins:

Well, no, no, no. And so I think it's important for people to realize that when they're making these food selections based on nutrient tables, they've got to wonder, "Is this still valid in 2022?" Has the soil composition changed? And so historically what we've suggested to people is bee pollen, it's a very important source of B vitamins, but it's also you can't pollinate a flower, you

can't pollinate an animal without copper. It's really important. And so bee pollen, again, historically has been a rich source. Real vitamins-

Dr. Joseph Mercola:

And it's bioavailable. I mean it's really, really important. Because remember it's not just copper, copper sulfate. Copper sulfate you'll get some, but not like the copper and copper in bee pollen.

Morley Robbins:

Exactly. But the thing is, the copper of bee pollen tells you it's got copper just right away. But it also suggests that there's other nutrients as well. But real vitamin C-

Dr. Joseph Mercola:

If people didn't know, copper is blue.

Morley Robbins:

Yeah, right. But the thing is, again, the acerola cherry, that's very rich source of vitamin C, among other factors. And so that's a very rich source of tyrosinase. And tyrosinase has high levels of copper in it. So that's a secondary [inaudible 01:26:46] source. What we've historically said in the Root Cause Protocol is organ meats, especially liver. And again, historically, a grass fed animal, especially a grass-fed cattle, is going to have more copper in its organ, in its liver organ, than it's going to have iron. But again, we're challenged in the modern era with the modern farming chemicals that are affecting copper status. So, that's why we're having this conversation is to say, well those are historically good, but we may need additional because there's been so many compromises in the environment.

And the part that you're highlighting is this copper bisglycinate, the article that I mentioned earlier by Earl Frieden from 1968, the title is "The Biochemistry of Copper." He makes mention of three states of copper, three valences. Again copper one, usually found inside the cell. Copper two found outside the cell. But what he highlights is this copper zero, it's called copper-neutral. And that's the copper that is being used in copper bisglycinate, and it's immediately absorbed by the tissue, and that's the source of copper that we're using in the supplement that we've developed called Recuperate IQ. And again, it's a play on words, Re-cuper-ate. And it seems to be working wonders, especially for people with long COVID. And they take that supplement and it's like they're back in the game. So I think that it's important for people to know that there are options out there. NIC has something called copper hydrosol. It's a great source of copper. Dr. [Loren] Pickart out in Seattle, Washington developed a copper cream, copper GHK peptide, and it's a 3% luxury cream.

I regularly recommend those in addition to the copper bisglycinate, just because I think in this very stressful modern era that we're in, and I don't think we're out of the stress yet. I think as long as we're above ground, there will be stress. And I think what's missing, the biggest source of stress in our body, I would argue is oxidative stress. And if we can't turn oxygen that we're breathing, if we can't activate it and turn it into water to release the energy molecules, that becomes a great source of stress in our body. And when that activation can't happen, it's going to affect iron recycling and then the iron is going to start to build in our tissue. And so it's just this

one two punch. As soon as copper is compromised, iron and oxygen are going to get out of regulation and it's going to create lipid peroxidation and it's going to create all sorts of metabolic dysfunction, energy loss.

And that's where people need to really connect these dots is that when we're in a stressful situation in our world, we're going to have oxidative stress in our body. And I think what we're trying to do in these conversations is introduce people to a parallel universe of how the body really stays in balance, how it stays in homeostasis by regulating iron and oxygen. And there's only one element on the planet that does it, and that's copper, especially bioavailable copper.

And to your point, what makes it bioavailable are two critical enzymes that are called copper pumps. One is called ATP7A, and the other is called ATP7B. And the conditions that are attached to those, 7A is Menkes disease. 7B is Wilson's disease. But what's important for people to know is that those enzymes are critical for throughout our body because ATP7B is instrumental in making ceruloplasmin, loading those eight copper atoms inside that protein, so it can work its many, many functions in the body, the antioxidant functions. And then 7A makes a whole host of enzymes, probably a dozen or more, that then influence hundreds of other enzymes.

And one of the principle enzymes that's influenced by 7A is tyrosinase, dopamine beta monooxygenases, the PAM (Peptidylglycine α -Amidating Monooxygenase) enzyme, the whole mechanism of creating superoxide dismutase. These are powerhouse enzymes in our body that most people don't know about that are all copper dependent. And ATP7A and ATP7B need retinoic acid, which comes from retinol, not from beta-carotene. It's got to be converted into retinol so that it can go through a conjugation and become these hormones that are called retinoic acid. They're very powerful and they are what enable these copper pumps to do their work. And they perform miracles in the body responding to oxygen stress and iron stress. And this is the hidden piece of physiology that I don't think is stressed enough in the training of doctors.

Dr. Joseph Mercola:

Thank you for sharing that. I'd just like to clarify, at least from my perspective, the copper recommendation and because I don't want people to be confused about this. The recommendations for the optional forms of copper like copper hydrosol, and the peptides and such, those were in addition to, not in place of the copper bisglycinate.

Morley Robbins:

[inaudible 01:32:50].

Dr. Joseph Mercola:

You've got to have that as the crux. And in fact, I think most people it would be to be safe than sorry. Ideally you want to get it from food. No question. That's how I got it. I mean, basically I got my copper because I have an acerola cherry tree, which has tyrosinase and it's got whole food vitamin C, not ascorbic acid. It's whole food vitamin C, ascorbic acid is in there, but it's with all those other 150 phytonutrients that facilitate, that are really the critical part of the complex.

And so, I got plenty of copper in addition to that. Vitamin C works in that too, that process. And

I got vitamin A, retinol, not beta-carotenes. You got retinol because I mean I eat a quarter pound of ghee a day and have been for a year. So, that's key. So I don't need to take supplements. Most people are not doing that. It's relatively unusual. And I suspect you can count on one or two hands the number of people who don't need a supplementation of this. So, don't think you're one of them unless you're doing something similar to that, and to go on the copper bisglycinate. I mean it's really, really, really important, along with looking – emphasizing which I had no clue until this conversation that literally it's more than likely you have an emotional challenge. I mean, if it's 25% to 45% chance that you don't, I mean it's a significant but likely more than likely than not that you have one. So that needs to be addressed. Otherwise you can do the best things. You can have the optimal supplementation and it's not going to get better.

Morley Robbins:

Yeah. No, we're living in a very charged time. We know that there's forces in play that we have no control on. And again, we're back to people with high IQ like to be in control. Well, we're not in control. And so that creates stress right away, right out of the blocks. And these are very turbulent times. And so I think the benefit of these conversations is giving people the metabolic bedrock of, “How do symptoms actually start?” Well, they start because we're not making enough energy and we're not making enough energy because we have a mismatch between copper and iron in the mitochondria. And that's really where it all originates and it's a foundational part of our physiology.

Dr. Joseph Mercola:

Yeah, thank you for being such a pioneer and teacher in this area. Most of us, I've been in understanding the dangers of iron for longer than most people over 30 years. I've known about this, but I did it. It was relatively superficial appreciation and was absolutely ignorant of the crucial importance of copper. No idea how important it is and retinol is as we've explained in this presentation.

So, for those who want more information, obviously you've got to book “[Cu]-RE Your Fatigue,” the Root Cause Protocol, and you have a website and you have teaching courses. So, tell us how people can do that. And I think you have, I don't know, one or two training sessions a year where you get that. And this is not necessary for you as a listener, but certainly your clinician. But if you're an enthusiast and passionate about this, certainly do that. But we really want clinicians to understand this because their responsibility is to educate their patient population. The more people, most everyone needs to understand this. So in addition to recommending to your course, because those are the clinicians who are going to help the people who are in the complex scenarios of the two clients that we discussed. But everyone else could just listen to our interviews and you can probably get it yourself. But why don't you tell how people will want more information, want to get trained, what they can do.

Morley Robbins:

The website is RCP, Root Cause Protocol, RCP123.org. Or you can go to TheRootCauseProtocol.com if you want to get more formal about it. But a lot of information in there is a resource section that has the 81 posts on iron toxicity. It has the hundreds of YouTube podcast videos that I've done over the years. But as we're just pointing out here, there is access to the training, it's called the RCP Institute. And it's a 16-week course where we go into the depths

and breadths of what we're talking about in these conversations. We just finished up group 16, just finished last Thursday. Enrollment starts today, or it might be tomorrow, but I think it is going to open up-

Dr. Joseph Mercola:

Well, this is not going to be posted today.

Morley Robbins:

By this time this conversation takes place. The enrollment will be open as of early November. And we look forward to people being a part of that. Again, it's a 16-week-

Dr. Joseph Mercola:

When is that training, again?

Morley Robbins:

The training starts February 9th, which is a Thursday.

Dr. Joseph Mercola:

So plenty of time. Plenty of time.

Morley Robbins:

Yep, absolutely. And it's every Thursday afternoon from 3:00 to 6:00 PM Eastern, and we have-

Dr. Joseph Mercola:

Three hours. So, 16 times three, that's 39 hours of training.

Morley Robbins:

So, we've got people all over the world. All over the world are in these classes. We typically have 10 time zones in the class and people from all walks of life, a lot of practitioners, as you can well imagine, but not exclusively practitioners. There are quite a few moms that just want to figure out, "How do I get my family well?" We've had many moms go through it. But the important thing is the training is out there and it gets better every year. It's a very structured program. There's live classes, there's a recorded video, there's case studies, there's reading material, there's tutors to do. We break the class into smaller groups. We had 220 students in the last, in group 16. We're expecting that many or more. It's going to be somewhere between 220 and 300. We think we're going to maybe crest 300 this coming group 17.

Dr. Joseph Mercola:

Great.

Morley Robbins:

Very, very excited. And so people are looking for that would really enjoy it. There's also an RCP community, which you can access to the website and you can participate in our biweekly Q&As.

We have webinars. And then for those who are into social media, we have a Facebook page and a Facebook group. And the Facebook group has almost 300,000 members in it now. And the Facebook page is really focusing on the nuts and bolts of the RCP. And it's a great place for people to get started to learn the nuance.

And the other thing that people can do is when they go to the website, there is a way to download the RCP handbook. You donate your email address, we'll respect that, but we'll give you access to the 50-page download. And the stops and starts are laid out there, the phasing of the starts. It's especially well-described. And then we give recommendations for the different nutrients that we recommend for people, wherever possible food base. But there's a lot of information that's out there. And like we've said earlier, it's a whole other dimension of healing based on minerals, based on understanding stress, based on understanding the impact of emotional stress on our physiology. And it's having a lot of success with people who are really finally untying their knots and finding that they are getting back into balance in a very natural way.

Dr. Joseph Mercola:

Well, thanks so much more. Morley, I appreciate all your pioneering efforts and especially helping us understand, identify the fundamental contributing factors to mitochondrial dysfunction and how to address it relatively easily with simple steps and for teaching it to others. It's been great and I look forward to continuing dialogue with you and essentially sending you some acerola cherries.

Morley Robbins:

Well, thank you again for the opportunity to have this series of conversations and then we got to roll up our sleeves in the new year and-

Dr. Joseph Mercola:

Get serious.

Morley Robbins:

Absolutely. So, I look forward to that. Thank you again.

Dr. Joseph Mercola:

All right, well thanks again. Appreciate it.

Morley Robbins:

Okay, bye-bye.