

# **Understanding the Crucial Role of Copper in Optimizing Human Health**

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

### **By Dr. Joseph Mercola**

#### **Dr. Joseph Mercola:**

Welcome everyone. Dr. Mercola, helping you take control of your health and today I'm joined by Morley Robbins, who is a repeat guest. You may remember from my last interview with him, but if you don't, I'll remind you. He isn't formally trained as a health expert, but has taken it on as a passion of his and as a result of that made a dedication.

There's very few people I know that are diving into literature for three hours or more a day, and reviewing the science, and not just the articles that were just published, but really going way back sometimes more than a century ago. And when you do that for years and years and years, and your mind works, you're going to come up with some really good understanding of the science and the reality of things.

#### **Dr. Joseph Mercola:**

His focus and passion has really been more the minerals, so in some ways he's the "mineral man," but initial focus was on iron or magnesium. Then it kind of shifted to iron, and then from iron to copper, and then all the micronutrients that are really vital to integrate the copper into your system, which is one of the most challenging areas is really copper. And virtually no one understands this.

#### **Dr. Joseph Mercola:**

In my view, I don't think there's any other individual out there who's put the whole package together in this area better than Morley, and it's a great pleasure and privilege to connect with him. And I've been able to twist his arm to a really high degree, and he's committed to writing a book together. It's kind of been delayed for a bit, but that's fine because he just needs to be free to follow his passion and just really unearth these details that no one else is looking at.

#### **Dr. Joseph Mercola:**

So, I think you're really going to enjoy this, it's going to probably expose you to some concepts that you haven't been exposed to previously, unless you've studied or read Morley's work. We're going to start and it's going to be fun, I'm not sure where we're going, but it's going to be great. So, welcome, and thank you for joining us today.

#### **Morley Robbins:**

Well, thank you. Thank you for that very kind introduction. If someone had told me in 2010, when you and I first met, that we would be chatting, some twelve-

#### **Dr. Joseph Mercola:**

Where was that at? Where did we meet?

#### **Morley Robbins:**

Weston A. Price.

**Dr. Joseph Mercola:**

Okay.

**Morley Robbins:**

Down in Dallas. And I thought, "Here I am, I'm meeting the legend, Dr. Mercola," and it was a very special moment for me. You know, I had danced with some giants in the health care industry, but no one on the clinical side that had your stature. And now here we are having conversations and planning a book, it's just an absolute honor and kind of a dream come true. So, I really appreciate the chance to have these exchanges because the information needs to get out, and you respect that and honor that and you're making every effort to enhance that so it's a real opportunity here to-

**Dr. Joseph Mercola:**

Well, it's mutual because without your efforts, I would be unaware of this really vital, important component. In retrospect, there wasn't much that I wasn't doing after knowing a good portion of what your – that knowledge base is. It hasn't really changed a lot except to reignite my passion to remove my iron.

**Morley Robbins:**

Interesting.

**Dr. Joseph Mercola:**

So, as a result of your reminder, because I've been aware of iron for-

**Morley Robbins:**

For a long time.

**Dr. Joseph Mercola:**

Yeah. Way into last century, literally the late '80s.

**Morley Robbins:**

Wow. Okay.

**Dr. Joseph Mercola:**

And so, I had started the process for myself, but then I just thought, the new part of the puzzle that you brought that I had no understanding of, was I thought it was a temporary thing that you just drain yourself of some blood, that you'll be fine. But what I failed to appreciate and you showed to me is that the iron stores in your body are extraordinary.

And essentially, if you commit to a program of lowering your iron, it's pretty much a lifelong program, because you just can't, especially after over 50. I mean, if you're in your younger age, you probably could do it intermittently. But at 50, it's got to be regular, because it's just, there's so much iron in your tissues that when you drain it out, it just kind of comes to an equilibrium and it continues to saturate your store. Not your stores, but the serum levels.

**Morley Robbins:**

Yeah. And I think one of the most important bits of understanding is to realize that if copper is not adequate in the diet, which is a fairly safe bet worldwide, but that's a very significant defect in the modern

diet. And if copper's low, iron's going to build in the liver, and a liver that's filling up with iron is going to totally change its physiology. It's going to change the frequency. It's going to change its immunoproperties.

And it's just, I think that's been probably one of the greatest "a-has" for me is to realize that, I mean, the liver metabolism is highly dependent on copper and retinol, and there's not a lot of awareness of that. And it just seems that everyone just said, "Well, yeah, it's an iron organ and we've got to store iron there." It's like, "Wait, there's some other pieces of the puzzle that we've got to be aware of."

**Morley Robbins:**

And I think, probably, the most dangerous part of exploring the work of what is iron metabolism, the words "high" and "low" seem to dominate the literature. Iron's too high, iron's too low, iron deficiency anemia, the greatest nutrient deficiency on planet Earth. And it implies that it's a ruler function. It's just simple math; it's high, it's low. When in fact, and I think what we've discussed and I think what you really appreciate is, it's more like calculus.

**Morley Robbins:**

It's a very sophisticated process of the interaction between copper and iron, and if that interaction doesn't go well, iron is going to start to accumulate in the tissue and it's going to start in the liver, but it's going to go elsewhere, as you well know. And I think that is a really central part of, kind of the takeaways of this conversation is, make sure that people know that iron does accumulate, and that iron can be released through blood donations. And as you suggest, especially as you get into your 50s, 60s, 70s, it needs to be a regular part of your health routine.

**Dr. Joseph Mercola:**

Yeah. I think, if you don't mind, I'd like to just review this topic a little. I know it's not one of your favorites, but you have a deep knowledge of the physiology and it is relatively complex. I mean, I don't want to go that deep and do the reticuloendothelial system and that side and all that, but, but just to like sort of superficially cover it, so people understand it. So, you talked about iron in the liver and I believe the clinical term for excess iron liver is hemosiderosis.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

So, the typical response from someone who's just been exposed to this will wonder, "Where's all this extra iron coming from? And why do I have such high iron? Why is it such a pernicious problem?" And not only pernicious, but the other, be pervasive.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

Pernicious and pervasive. I mean, it's almost universal. Even in people, and I definitely want you to go into the reason that so many people get confused on. In fact, I just consulted with a woman last week, who's had a serious problem and she had very high platelets, and it looked like it might have been a blood cancer, but then she also had really, really low irons, ostensibly low iron. Her serum ferritin was eight. Eight.

**Morley Robbins:**

Sure.

**Dr. Joseph Mercola:**

Of course, they put her on iron supplements, right. I immediately took her off their supplements and put her on copper and retinol.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

And a lot of other things, but – so, why don't you talk about that component and then how it's almost universally a mistake when you have a low serum ferritin, which is the classic diagnostic strategy. I mean, an astute clinician will do some of the other tests like total iron binding capacity and serum transferrin, but most just do the serum ferritin.

**Morley Robbins:**

So, that's great. Let's start with some basics. So there.

**Morley Robbins:**

It's important for practitioners, especially to not measure iron status with just one marker. And I think a lot of practitioners are falling into that trap of just using serum ferritin. We can come back to that, but I think it's important to emphasize, there really are three key ways to measure iron status.

The biggest concentration of iron in the body is in our hemoglobin. It's 70%, of the iron is in our red blood cells. So, it's an enormous bolus of iron. And it's been used as a marker for iron status from the time of the Civil War up to the late 1900s. I mean, the shift began because of a very important article written by Jacobs et al in 1972 in the British Medical Journal about the importance of serum ferritin. And so, they kind of moved the spotlight away from hemoglobin and started to focus on the serum ferritin. But hemoglobin far and away is essential to understand what is going on with the biggest bulk of iron.

**Morley Robbins:**

Then the second marker that I really focus on is called serum iron. And it's a very small percentage. It's less than 1% of the iron, but it's a very important measure of iron because it's really getting at the recycling program, iron recycling. And so, you and I have been talking for 10 minutes and every second of every day, we have to turn over two and a half million red blood cells. That's a lot of activity. In the course of 24 hours it's 200 billion red blood cells need to be turned over.

But what's a surprise is to learn that only 25 milligrams of iron are needed to support that 24-hour cycle, but 24 of those 25 milligrams, 95% of the iron is coming from this recycling program. So, very significant understanding that the serum iron, it's only representing a small percent, but it's representing the efficiency of the iron recycling.

**Morley Robbins:**

And so, hemoglobin should be between 12 and a half, 13 and a half for women; 14 and a half, 15 and a half for a guy. That would be considered, functionally healthy hemoglobin levels, serum iron, for a woman should be about 100. And for a guy, it should be about 120. And the closer it is to 100 or 120, the

more efficient that recycling program is.

And then we get to the third bucket that you're referring to, alluding to, and that's serum ferritin. And what's important for folks to realize is that there's actually four different types of ferritin in the body. There's what's called heavy chain, and light chain. Those are the two broad classifications. Well, heavy-chain ferritin is referring to the ferritin protein inside cells and inside the mitochondria that require copper in order to work properly.

**Morley Robbins:**

And that form of ferritin is like an ATM machine and it's in and out, in and out. And it depends on copper to get it in, and get it out. It's really, really important. And the other form is called light-chain and the – I'm going to back up. The heavy-chain is more associated with heart and kidney.

And the light-chain is more focused on the liver and the spleen. And so, the liver and spleen are very much involved in this recycling program and there's no copper required to get the iron in there, but the complication is it's not easy to get the iron back out.

**Morley Robbins:**

And then we get to the form that everyone is familiar with is called serum ferritin. And the ferritins that I'm referring to, the heavy-chain and light-chain, those are inside the cell. Well, the ferritin it's called serum ferritin. That's outside the cell, it's in the blood. It's not in the cell. And what's very, what is not well-known is that this ferritin that shows up in the blood is very iron-poor. It doesn't have iron in it. The iron has been discharged in the liver and then the protein gets secreted out when there isn't a good function in the liver to recycle the iron.

**Dr. Joseph Mercola:**

Excuse me, for a moment-

**Morley Robbins:**

Go ahead.

**Dr. Joseph Mercola:**

-Morley, because it just occurred to me that, as you were describing this, there's a really important area of confusion.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

Because you're talking about serum ferritin, serum is in the blood. And you said earlier that 70% of the iron is in the blood, but it's actually in the blood cells.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

The red blood cells. So, the serum ferritin that you're measuring in the blood is really outside the red blood cells.

**Morley Robbins:**

Absolutely, thank you.

**Dr. Joseph Mercola:**

I think many people get that confused. I know I certainly do so.

**Morley Robbins:**

No, that's a very, very important part. Because when we see a tube of blood, it's red.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

We put it in a centrifuge and we spin it down and it turns into two liquids. The bottom is red and it's called packed red blood cells, as you well know. And then the liquid at the top, it's kind a kind of a milky white almost.

**Dr. Joseph Mercola:**

I hope it's not milky white. That would mean you have high triglycerides. Hopefully, hopefully it's clear yellow.

**Morley Robbins:**

Okay. All okay. That, I'll buy that. So, it's a different color. It's not red, it's a different color. And it's called serum and I spell it a little differently. I spell it S-E-A-R-U-M because it's actually supposed to be like seawater. It's supposed to have the mineral composition of seawater. And that's where this serum iron is hanging out in the serum. And that's where the serum ferritin is hanging out, is in the serum, in this yellowish fluid that you're referring to.

And so, that's a really important distinction for people to understand the subtlety of iron. It's the bolus is in the red blood cell and small amounts, very small amounts are in the serum, but the real head faith is serum ferritin because it's not representative of iron per se. The iron was discharged in the liver. And where I first learned about that was in my conversations with Douglas Kell, Ph.D., who's a famous iron biologist at University of Manchester.

**Morley Robbins:**

And he's written extensively about this in 2009, 2014, '18, '19. He was very actively involved in trying to explain what was going on with COVID as well. And so, there's a lot of confusion in the public and in the practitioner circles, because of this nuance of what serum ferritin is really representing. And I think it's important that we need to, we need to know all three, but we need to know the subtleties of what's really being implied.

And as you know, and we've discussed previously, it's the bookends of serum ferritin that are very confusing, and very significant. Because the easiest one to explain is rising serum ferritin, starts to get

high and it's highly correlated with inflammation or an infection. And again, it makes sense, the liver's taking it on the chin. You know, there's, there's something going on. Iron is not being metabolized properly.

**Morley Robbins:**

Pathogens might be involved. And so, the body starts to secrete the ferritin in a more significant way. And for a woman, the serum ferritin, the red flag goes up at 150. For a guy, the red flag goes up at 300. It can go up into the thousands as you know, I mean, it can go up into the 5,000s and even higher, with severe chronic disease and inflammation. And that's easy to understand.

It's when we come back to the client that you were just working with, where it was low, it was single digit ferritin. And the alarm bells go off. And there are only a few authors that I've come across that even talk about low ferritin. [inaudible 00:18:12] is, 2015, probably the best of the lot that I've found. And what he's indicating is that low ferritin is an indication of metabolic breakdown in the spleen.

**Morley Robbins:**

And that his best estimate is it's some kind of parasitic dynamic that's affecting protein production. The ferritin protein is not getting transcribed properly. And so, the misunderstanding is that, just as you noted, this particular patient was put on iron supplements because her ferritin was low. What was the first thing you did?

You stopped the iron supplements and you started to introduce the copper, retinol and other factors to support the recycling. And I think it's probably one of the greatest errors made. One of the students who's gone through the RCP Institute training and she's had 80 iron infusions, Dr. Mercola, which is just unbelievable. And I think she said it was like \$12,000 over the course of-

**Dr. Joseph Mercola:**

Add insult to injury.

**Morley Robbins:**

Yeah. Add insult to injury, but what's exciting. She, I think she just turned 50 recently. She has six children and they're all doing great, but it took her eight years, but she donated blood for the first time in her life because her hemoglobin was normal for the first time in her life. After she had really disciplined herself with the Root Cause Protocol. So, it's a testament of the amazing resilience of the human body.

But I can tell you that first conversation that she and I had eight years ago was uncomfortable because she couldn't believe that her doctors were misinformed. And so, over a process of time, she came around and then she decided to take the training. And she really harnessed herself to make sure that she could do this. And it was around her birthday, she posted on Facebook, this picture, her lovely arm giving a pint of blood. And she was just euphoric that she was able to do that.

**Morley Robbins:**

So, I think it's an important lesson for people to realize is that the body does have this natural mechanism of recycling, does have this ability to have resilience, but that resilience is really largely dependent upon bioavailable copper. And that's where I think a lot of the misunderstanding is, is that a lot of the articles and textbooks around iron metabolism, rarely, if ever mentioned, the copper side of the house.

And in traditional Chinese medicine, copper is referred to as the general, and iron is referred to as the foot soldier. Well, when you put it in that context, then you begin to understand orders of magnitude of

influence that copper has relative to iron, but that's not well understood in average clinical circles that the people would be exposed to.

**Dr. Joseph Mercola:**

And maybe you can touch on some of the reasons why these iron levels get elevated, largely related to the fact that we don't have a typical excretory system for iron, unless we lose blood, that's it. And you, or you sweat, you can sweat it out in saunas, but it's not really-

**Morley Robbins:**

No, I mean you-

**Dr. Joseph Mercola:**

High levels.

**Morley Robbins:**

Yeah. You're not going to get the level you're going to get with a blood donation, but there is no enzymatic function. There's no hormonal function. The only way to really get rid of excess iron is gravity, and that's the blood donation. And you know, our ancestors, they would work the fields and then they would fight in the fields and they would get injured. But their wives, they had a monthly blood loss. And it's well-known that one of the main reasons why women outlived men, and this was the work of some very famous hematologists, but Jerry Sullivan being instrumental in this work back in 1982, he published a very important article in Lancet magazine saying that, "Oh, it's the female cycle."

The menstrual cycle is what allows women to live longer, because they're dumping iron every month for about 40 years. And no one ever thought to connect those dots. And less iron is less oxidative stress, which is going to create less metabolic dysfunction, which is going to create less symptoms and bottom line

**Dr. Joseph Mercola:**

Tissue damage essentially.

**Morley Robbins:**

Yeah. And the challenge we've got now is, and you alluded to it, and I don't know how deep we want to go into it, but in order to have proper understanding of iron metabolism, at some point we need to talk about hepcidin and we need to talk about hemosiderin. Well, those are very, almost taboo subjects in the clinical world, because they begin to introduce other proteins and other storage lockers for iron that are not readily discussed, not readily studied. I mean there, I've only found two authors who write about hemosiderin. Dr. Sato wrote for many, many years and there's a more recent publication, but not a lot of talk about hemosiderin. And you refer to again, the liver accumulation of hemosiderosis, and what's important for people to understand is that if, if a ferritin protein can hold – they claim it can hold as much as 4,500 atoms of iron.

**Morley Robbins:**

That's a lot of iron. And what makes iron special is these four unpaired electrons. So, that's a lot of unpaired electrons in the ferritin protein. Well, hemosiderin can hold 10 times more iron. Which means it's holding 10 times more unpaired electrons. Well, that's a polite way of saying oxidative stress. And when hemosiderin starts to build up in the tissue, that's when people have some serious issues with our iron regulation.

But what's wildly confusing is hepcidin and it comes from the HAMP gene. Heparin acute microbial protein. So, it's got some connection to pathogens. And what's it trying to do? Heparin is trying to get iron out of the circulation, to get it away from the pathogens. But it's a bit of a slippery fish because it reacts to iron status. It reacts to inflammation status. It reacts to hormonal status.

**Morley Robbins:**

I mean, estrogen and testosterone have significant influence over hepcidin. It's reacting to copper status. I mean it's just, so it's, when people are being lectured by their doctor, that their ferritin is out of line, they should be asking about, "Well then let's study hepcidin," and I'm guessing they're going to be met with blank stares because-

**Dr. Joseph Mercola:**

Of course.

**Morley Robbins:**

-it's not regularly measured as you know, and even if it were measured it's, well, it's important to know that elevated levels of acute, excuse me, of active hormone D can suppress hepcidin. Retinol deficiency can increase hepcidin. I mean, we start to get into these switchbacks that suddenly, the whole understanding of iron, again, it isn't just around ferritin as we're discussing and it begins to get into a more refined understanding of what's the overall metabolic status? Are we producing energy? Is copper doing its job to produce energy, but is copper doing its job to regulate the iron recycling?

**Morley Robbins:**

Because that's the key, is understanding that this constant recycling system of the red blood cells, the iron doorway is being opened by a copper doorman. And if ferroportin isn't doing its job, well then we're going to have a problem. And what is hepcidin's job? Heparin as a protein is to shut down the iron doorway. Well, so suddenly we have this very significant dynamic between this very important iron egress doorway, very important, that needs bioavailable copper. And if bioavailable copper's not there, this hepcidin protein is going to shut it down.

**Morley Robbins:**

And that's, I think, to me, that's where a lot of the confusion is because the, I would argue, based on reading and conversations with researchers, that the true anemia that exists on the planet, isn't one of iron deficiency. It's one of copper deficiency, not allowing for proper iron recycling. And so that's a very important nuance. And the where the real misunderstanding is, is iron may look low in the blood. You know, ferritin looks low or hemoglobin looks low, serum iron looks low, but it's high in the tissue. There's no blood test that measures iron status in the tissue.

**Dr. Joseph Mercola:**

Once you do a biopsy, which most people aren't going to do.

**Morley Robbins:**

Do biopsy. And I've got some colleagues now down in Miami, one is a radiologist who's very proficient with MRI. And he was a little skeptical about this message that, he'd heard our conversation. And I said, well, why don't you measure your iron status in your liver? And he said, "All right, I will." Suffice it to say, he's now a believer. He was shocked at how much iron – he's developed a way.

**Dr. Joseph Mercola:**

How did he do it? With MRI or with a biopsy?

**Morley Robbins:**

With a tesla 2 MRI. And he's developed a scoring technique with Siemens and, who's the other big radiology, Siemens and-

**Dr. Joseph Mercola:**

It's a laboratory test. Or not, a hospital test but that is interesting. I did not realize you could quantify iron with an MRI.

**Morley Robbins:**

And what he's now doing, is now he's going to start to go in and he's going to be able, he's measuring iron, not just in the liver, he's going to measure it in the brain.

**Dr. Joseph Mercola:**

Geez. That is great.

**Morley Robbins:**

And so, I think your comment was absolutely spot-on that you have to do a biopsy. Well, now we can do it with an imaging test, which is a game-changer.

**Dr. Joseph Mercola:**

Wow. That is great. That is just, and he was, this work was catalyzed by our conversation?

**Morley Robbins:**

Absolutely catalyzed.

**Dr. Joseph Mercola:**

Wow. That's really good. All right so I want to tie some-

**Morley Robbins:**

I have no idea who heard this conversation. It was whenever it took place, was it March or April? It was like, boom.

**Dr. Joseph Mercola:**

Yeah. Well, so let's tie up the loose ends with hepcidin.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

It is a bit confusing. So, it essentially limits, when it's active it limits the reabsorption of iron, which should theoretically lower iron because as you mentioned, we have like 95% of the iron that is used every day, the 25 milligrams, 24 of it is reabsorbed. So, hepcidin impacts on this variable. So, it can play with

that and lower the amount of reabsorption to essentially lower your iron. Do I have that right or did I miss something?

**Morley Robbins:**

You absolutely have it. It's both the reabsorption, and another term would be recycling of the iron. And so, the formal name that you alluded to a little while ago, reticuloendothelial system, it's like, it's really a scary term. Well, after you dig into it, you find out it's all about recycling. And our body, the human. And I guess it's true of all mammals, but the human body is designed to recycle iron.

One of the most important things that we're able to do. And that is really dependent on bioavailable copper. A real quick fact to it, I just was reading an article about yeast. Brewers yeast, and Baker's yeast, and the way they refer to the yeast cell, it's mini-mammals. I'd never seen it written up that way. The physiology of the yeast cell is almost identical to mammalian physiology. So, they call them mini mammals. I thought that was kind of cool.

**Dr. Joseph Mercola:**

Interesting. So, I want to get back to the iron removal process and the transfusion because it's still, or not transfusion, the removal of phlebotomies.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

Because almost everyone watching this really needs to commit to a program of doing that. And the minimum is twice a year. Better is four, if you can. The problem is that you're taking such a large volume out that, it's literally 10% of your blood supply for most people. Some could be more, if you're a small woman, or less if you're a large man. So, that can hit you, especially as you get lower levels. So, ideally it's best you take out less, more frequently. So, you could take out half a unit, every month. Which would be 6 units of blood, and that's much better-tolerated. It tends to be a little more expensive, because you have to hire someone to come to your home to remove it.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

And you say, well, "What am I going to do with blood?" Well, what I say is throw it in your garden because it's a good nutrient for the, for whatever you're trying to grow. So, it's not really hazardous waste. It's biologically useful material to stimulate plant growth. And you could do it even lower. I just wanted to share what I've been doing since we, probably for the last six months now is I take out 2 ounces of blood once a week.

**Morley Robbins:**

Oh, interesting. Okay.

**Dr. Joseph Mercola:**

Yeah. Every week I take out two ounces and then when I still have the catheter in, then I hook myself up to an IV and I initially was infusing 4 grams of magnesium fluoride once a week, but I've dropped it down to 3.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

So, getting the magnesium in, taking out the iron.

**Morley Robbins:**

Wow.

**Dr. Joseph Mercola:**

It's gradually increasing my magnesium levels and finally getting my iron levels, so we're on the path. So, when you do 2 ounces a week, it comes out to about, with my blood test, about 6 to 7 units a year.

**Morley Robbins:**

Okay. And are you doing that yourself, or are you still working with a phlebotomist?

**Dr. Joseph Mercola:**

Yeah, no, I can. I insert the catheter because I basically have done 10,000 blood draws. I'm really proficient at getting the catheter in.

**Morley Robbins:**

Yep.

**Dr. Joseph Mercola:**

And, but once in your arm, you need two fingers to twist that. I tried to hold it, I couldn't do it by myself. So, I have to have someone twist the-

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

-onto the catheter.

**Morley Robbins:**

That's what I was trying to visualize. How are you going to do that?

**Dr. Joseph Mercola:**

I can't do it. I tried, I can't do it.

**Morley Robbins:**

Well, you're a better man than – I don't think I could willingly put a needle up my arm. I just-

**Dr. Joseph Mercola:**

No, it's easy for me.

**Morley Robbins:**

I know. I'm sure it is. I'm fine going to a blood center or having a phlebotomist come here, I always look away and then I'm fine.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

But if I look at it, I'm like, "Oh."

**Dr. Joseph Mercola:**

Yeah, I think you're more normal than – you're more typical.

**Morley Robbins:**

I think I am. It's hard to do that. But it's so important. I think what's amazing is the sheer simplicity of doing a blood donation, having regular blood loss and what it does to revitalize the body, the part that I'm not sure we've really talked about is when you do have that blood loss, it trips a wire for erythropoietin.

It's a very important hormone that triggers the production of new red blood cells. And the beauty is it actually has two signals. One, we're going to make some more red blood cells. The second signal is, let go of the iron in the tissue. It has a very powerful effect of releasing the iron to get it back down to the bone marrow, where it's needed to make the new red blood cells. The proficiency is pretty powerful.

**Morley Robbins:**

And so, I would guess that the more frequent process that you're engaged in, maybe it's taking some of the sting out of the system, that the body just has this natural response to blood loss. And instead of it being this big bolus, a full unit of blood, you're able to kind of-

**Dr. Joseph Mercola:**

Yeah, it's just much gentler on the body. And you don't get these huge feedback, hormonal reactions, the high EPO (erythropoietin) levels. So yeah, if you can – I mean, most people aren't going to be able to do that, but to me, this is really one of the most important interventions I do. And I look forward to it. I really look forward to it, actually. As odd as that may be.

But one of the reasons to catalyze my commitment to this is the – as I mentioned earlier, in the introduction, is that you help me understand that this the tissue iron that's so important, not what's in the blood serum ferritin level. And when you take out a whole unit of blood, 500 CCs, it's about 250 milligrams of red blood cells with your hematocrits, depending on your hematocrit level. That's about 250 milligrams of iron, 250 milligrams.

**Morley Robbins:**

That's right.

**Dr. Joseph Mercola:**

If I understand it. So, if you do that four times a year, you're taking out a gram. But why don't you go into tell how much most of us have iron stored in our tissues. It's astounding. You're not going to be able to get it down to healthy levels in your lifetime, most of you.

**Morley Robbins:**

Right. Well, this really came to light. I was in – the timing was around my 65th birthday. And I'd been reading quite a bit of research by Robert Crichton, who I guess, he still would be considered the dean of iron biology on the planet. He's in the Netherlands, and his textbooks are used extensively in medical schools and other professional schools.

**Morley Robbins:**

And so, I called him up out of the blue, and was complimenting him on his research. We were having a very nice chat and I said, "I have a favor." And he said, "What's that?" I said, "Would you send me one of your recent textbooks, inscribed?" He said, "Oh, I would be delighted." And as he was getting it out and writing the inscription, he said, "Morley, you know that we accumulate 1 milligram of iron every day we're on the planet." I said, "Yes, sir. I've read your research. I'm very familiar." And this isn't just Dr. Crichton, Guttridge, Hollerwell, it's Douglas Kell, it's some other very – Dr. Weinberg, the University of Indiana, these are all noted iron experts who've all agree on this accumulation of iron. So, the simple math, get your calculator out.

**Dr. Joseph Mercola:**

Well, before we go to the math.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

Just a minor clarification.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

If the milligram is stored in your tissues, diffusely throughout the body, but primarily in some of the major organs like you mentioned earlier, like the liver. But it's stored diffusely there. A milligram every day.

**Morley Robbins:**

Right. Milligram a day. And so, the math is milligram for every – you multiply your age times 365. Well, we get into some pretty big numbers. I'll be 70 later this year, and it's a scary number. And so, it's-

**Dr. Joseph Mercola:**

10 thousands.

**Morley Robbins:**

It's in-

**Dr. Joseph Mercola:**

20 to 30 grams.

**Morley Robbins:**

Yeah. Right. And the thing is, I think that would be maybe one of the most important things for people to realize is that this is a – it's a hidden factor. It's not a well-known factor that's playing in the background of the symptoms that you've got going, whether you've got arthritis, or osteoporosis, or vision issues, or heart issues.

Again, the iron is being stored throughout the body. And it's just not a well-understood and well known dynamic. And as people begin to embrace that, and realized that to your earlier point, there's only one way to get rid of it. If the body doesn't say, "Wow, I've got too much iron, I'm going to trigger the XYZ hormone."

**Dr. Joseph Mercola:**

It does for other toxic, but not for iron.

**Morley Robbins:**

But not for iron. Exactly. And so, it's a formidable physiological fact is that we have this bolus of iron in our tissue. And again, Dr. Jerry Sullivan [III]'s the pathologist. His real focus was on cardiology. And he developed what became known as the iron heart hypothesis. And it's not a very popular thesis with cardiologists, but he was able to prove that it was accumulation of iron in the heart muscle cells that were causing the wide spectrum of all the issues, whether it's A-fibrillation, the enlarged heart, all sorts of any kind of myocardial infarct.

I mean, he was able to sink it back to the accumulation of iron, and what that was doing to kill energy production in that incredibly important organ in our body. And so, it's just the accumulation of iron inner organs is very significant because these organs are supposed to be producing energy.

**Morley Robbins:**

And to do their function. For the stomach to do what it's supposed to do, for the liver to do, what, 500 different functions, the kidneys and so on. Well, when they stop doing those functions, it's a safe bet, it's because iron is accumulating in those tissues, and it's affecting energy production, which is then going to create oxidative stress, which is then going to create the metabolic dysfunction that we call this symptom or that symptom.

And that's where the alignment of understanding the importance of too much iron syncs up with the symptoms that are laid out in the Merck Manual. You can trace just almost every one of them back to this iron-copper dysregulation because copper's supposed to be regulating the iron. And when it doesn't do that, it starts to accumulate. And I think that's really what you want people to understand is that this very delicate mechanism, this essential mechanism is subject to the status of bioavailable copper. And if that's

not right, the iron's going to get out of balance and then cause the dysfunction and dysregulation in the body.

**Dr. Joseph Mercola:**

Yeah. We'll jump into the copper of the other variables in a moment. But I just want to tie this section up on iron. And we went a lot deeper and I was anticipating, but that's fine because a lot of people are going to love this. But if you wouldn't mind, you teach a course on this, and maybe you could mention a little bit about that, and enroll people and you've trained a lot of people already.

So, you're very familiar with teaching people the details of the laboratory analysis of this iron assessment. So, we talked about some of them, I wondered maybe you can just review the things like the serum transferrin level, the total iron-binding capacity. You've already mentioned the serum iron, then of course the CBC, you've got the hemoglobin level. So, can you kind of walk us through how one would look at that laboratory because it's unusual for even an astute clinician to order all of those when they're analyzing iron.

**Morley Robbins:**

Yeah. So, on the CBC, you're going to get – obviously going to get hemoglobin, but you're also going to get things called MCH (mean corpuscular hemoglobin), MCV (mean corpuscular volume), MCHC (mean corpuscular hemoglobin concentration) and then RDW (red blood cell distribution width). These are, for me, really important markers.

The first three are really related to hemoglobin status, concentration, volume. And these were originally developed by a world-renowned hematologist named Dr. Max Wintrobe. Originally got his medical degree in Canada, got his degree in physiology from Tulane University, went to [Johns] Hopkins, wrote the first textbook in hematology in the late forties, and ended up starting the medical school program at University of Utah in the early '50s. But he developed these markers that when MCH – excuse me, MHC, MCHC, and MCV are low, when those are low, those are signs of low bioavailable copper.

**Dr. Joseph Mercola:**

Well, traditionally thought to be low iron.

**Morley Robbins:**

Yes, I know.

**Dr. Joseph Mercola:**

But your correction and clarification is low bioavailable copper.

**Morley Robbins:**

And then the other one is RDW, red blood cell distribution width, RDW. And when that number starts to get too high, that's another sign of low bioavailable copper. Where RDW really came into the limelight the last couple years was actually a study done at Hopkins in April of 2020, where they began to notice the significant elevation of RDW with folks who had COVID. And so, we don't need to get into it now, but COVID affected copper status, which is affecting RDW, so those are important markers to be aware of. But then we get into more traditional blood tests for iron status. We've talked about hemoglobin, we've talked about serum iron, and we've talked about serum ferritin.

**Dr. Joseph Mercola:**

I'm sorry to interrupt you again. It occurred to me, if you could insert a commentary on the – I mean, the interpretation of serum ferritin because you've already established pretty clearly that would normally cause almost any astute clinician to immediately put someone on iron if they had a single digit ferritin, so you really can't use that as a sign of iron efficiency, but I'm wondering if you can comment on the – is the fact that you can use it as a sort of a surrogate generalized concept or idea of how high the iron burden is based on the level of the serum ferritin. In other words, the higher it is, the worse you are.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

I mean, either for inflammation and/or iron overload.

**Morley Robbins:**

So, we're back to my conversation with Dr. Kell, and I asked him point blank, I said, "What's the ideal ferritin level for [crosstalk 00:46:36]?" And he said zero. And I went, "What?" So again, we have to be really careful. I would never – the caution to the listeners and to the practitioners that might be following this or no becoming aware of this, I would never use ferritin only as an indication of iron status. You need to see hemoglobin, serum iron, and serum ferritin. You need to see them in relationship to each other.

And where I peg it, and I think Robert Thompson and some other practitioners are pegging it, is serum ferritin should be between 20 and 50. That seems to be a nice, sweet spot for people. When the serum ferritin begins to get up in the hundreds, there's a significant likelihood that there's pathology in the liver that's causing that.

**Morley Robbins:**

Some infection or some kind of inflammatory process. And so that's a real clear indication that there's too much release, too much secretion of the serum ferritin into the bloodstream. It's the other side that I think is so vexing. And when it gets below 20, especially when it gets into single digits, like you faced with your patient. What I've come to understand is that single-digit ferritin, coupled with some other markers that we're going to talk about, TIBC. The total iron-binding capacity.

When TIBC starts to get too high. So high TIBC and low serum ferritin, I begin to suspect parasites in the spleen and/or in the liver. And it's just, it's like a carpenter uses their thumb to measure an inch. That's kind of what single-digit ferritin and elevated TIBC is. That's my inch rule of thumb that there's something going on here. And it isn't that there's iron deficiency, there's iron dysregulation.

**Morley Robbins:**

And what everyone needs to really focus on is, "What do I need to do to mobilize the iron?" And that's going to require bioavailable copper, which is – it's really different than saying, "Let's just slap some iron into this person's body." And it's important that people recognize that low ferritin does not mean low iron per se. It means low recycling.

Something in the iron recycling system is out of balance, and it needs significant attention. But I would argue that it's almost without exception, it's a lack of bioavailable copper. The spleen organ is intensely copper-dependent. The liver, intensely copper-dependent. That's not well-known in clinical circles.

**Morley Robbins:**

And it was Joseph Prohaska who brought my attention to the spleen-copper connection. He was probably one of the greatest copper biologists on the planet. And so, it's important for people to understand that. And the spleen's just a little tiny organ, but boy, does it carry big sway in the body, particularly, as it relates to the recycling.

The other parts of it are in order to really understand iron, you've got to understand copper. And if you don't know what the copper status is, both in terms of serum copper and serum ceruloplasmin, and the ratio between copper and ceruloplasmin, well, then you don't really have a nuanced understanding of how copper might be influencing that.

**Dr. Joseph Mercola:**

I definitely want to go to copper, let me just add in one potentially confusing element that many people are confused on.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

Or clinicians, certainly, is that when you see these single-digit ferritins, the reflex reaction is to put the person on iron. And interestingly, the person typically feels better.

**Morley Robbins:**

Yes.

**Dr. Joseph Mercola:**

It seems to be a powerful response to suggest you're on the right path. So, can you help clear up that confusion?

**Morley Robbins:**

Right. So, we can use cocaine to wake up, and you can use alcohol to go to sleep. But no one in the right mind to do it that way. And yes – excuse me. Any heavy metal will increase the production of red blood cells. And I think that's the surge that people are feeling, when they feel better because if they've taken iron, that's what they're seeing.

If it's not the most important, it's certainly one of the top three articles by Dr. Robert Hodges, 1978, where he is measuring the impact of iron and retinol in human subjects. And the graphics in that article are profoundly important, and maybe one of our sessions here, we could actually use that as a reference point, so people can see the meticulous work that Dr. Hodges is to show that, yes, when you do give someone iron, if they're showing really low hemoglobin, and if they're showing that they've got anemia, there's this infusion of iron, there is this temporary blip and it lasts for six weeks.

**Morley Robbins:**

He measured it meticulously. And the hemoglobin spikes, and then it falls back down. And when does hemoglobin actually start to rise in a steady fashion to the level of optimal hemoglobin? This introduction of retinal into the diet. And this is a study that was done over – it was almost a two-year period. And so, again, a key principle is missing information equals missing truths.

Well, if we don't know about Dr. Hodge's study, and it's an immensely important study to understand that, yes, giving iron does have a temporary effect, but it's not long-lasting, and it's not really supporting the truth of iron physiology. Invariably, what the body needs is more bioavailable copper that's made possible through retinol. That's why the retinol was so important in the study. And when retinol was introduced, it totally changed iron physiology to the betterment of how people were responding. And that's where, I think, there's this complete bias in clinical circles is that, "If ferritin looks low, well, we've got to add iron."

**Morley Robbins:**

Well, Dr. Hodges would argue differently. Now again, people can say, "Well, that was 1978. That's ancient history." Well, I would stake my reputation on that study as opposed to the contemporary thinking today where the level of iron that's being used in obstetrics, in geriatrics, in pediatrics, in sports medicine, Dr. Mercola, it's a little-

**Dr. Joseph Mercola:**

It's criminal.

**Morley Robbins:**

It's frightening. And it is, I would agree with you. It is criminal. And it's because, I believe, and you're seeking to tease this out in a significant way. There is a gross misunderstanding of the dynamic between copper and iron, and how significantly influenced iron status is influenced by the availability of copper in the body.

**Dr. Joseph Mercola:**

Okay. So, thank you for expanding on that. I want to transition out of iron with this spinal component, and reinforce what you just said earlier, which is the fact that even to this day, I think, many physicians are confused about the clearly observed increased longevity of women over men. Usually it's a few years. And they attribute it not to the low iron from secondary blood loss from the menstrual cycles.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

But to the hormonal shifts, usually higher estrogen, that sort of thing. I think still many clinicians believe that, I really do. But that's not true. And then to support that, I mean, this is correlation. This is not causal, but there's a strong correlation [of] evidence of the studies that review people who have donated blood and the clinical benefits are observed. So, I'm wondering if you can comment on those.

**Morley Robbins:**

Well, I know that the Red Cross, those studies from the Red Cross, I'm familiar with, I'm sure it's been done in other circles, but again, as you say, it may be more correlational than causal. But I think we could probably edge our way into causal. But consistently, the studies that are longitudinal-natured, longitudinal studies of iron donation, blood donation, there's greater longevity in those individuals, consistently study after study, after study. And I think it's reasonable to say that it's lower iron in our body is going to lead to lower oxidative stress. Again, your focus, your zeal is around linoleic acid, and I totally respect that, but what's the match?

**Dr. Joseph Mercola:**

Yeah. The match is iron. Yeah.

**Morley Robbins:**

That's done. It's important for people to know we've got to cut that asset out. We got to get this iron under control, too. And that's the central part, is getting people to realize that this iron dynamic is profoundly influential in our health status. And it's not a, I don't think it's a well-understood mechanism in clinical circles, much less their patients. They just – it's not been discussed openly in the way that I think it should be. And I think it's now, maybe it's coming to light, and more and more people are certainly becoming aware of it.

**Dr. Joseph Mercola:**

Yeah. Just one last test before we go onto the copper and the retinol. Mentioned some transferrin, but what do you view as idea levels? Is it closer to 30%? Or what's a sweet spot, the goal-

**Morley Robbins:**

For the percent set. So, when you divide-

**Dr. Joseph Mercola:**

Saturation insurance transferrin. Sorry.

**Morley Robbins:**

That's when you divide serum iron by total iron-binding capacity. So TIBC, it's a derivative of transferrin. So, transferrin is the transport protein to carry iron, ideally back to the bone marrow, so it can be turned into new red blood cells. And so, when you – the math that I've seen is that transferrin level multiplied by 12 and a half will get you to TIBC, it'll get you in the ballpark. So, it's a derivative of transferrin. And so, serum iron divided TIBC somewhere between 20 to 30%, 25% [crosstalk 00:58:04].

**Dr. Joseph Mercola:**

So, it should be below 30%.

**Morley Robbins:**

Yeah. And yeah, absolutely. And in the articles I've read, the closer that percent saturation is to 20%, the lower your chance of ever getting cancer.

**Dr. Joseph Mercola:**

Wow. Wow.

**Morley Robbins:**

The closer that percent saturation is to 60%, the greater your chance of getting cancer. And I think it's important for people to understand that what the hidden factor in cancer is iron. Iron accumulation in the cancer cells. And that's a whole 'nother conversation, obviously.

**Dr. Joseph Mercola:**

Well, that's an interesting, because even though I was committed to this a long time ago to optimizing my ferritin levels, and literally my ferritin levels were still below 50, but I had stopped donating the blood or removing it.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

And my percent transformation saturation crept up to 50%. Now it's down now to low thirties. So, I've still got ways to go, but that's a big improvement, and sit in about six months.

**Morley Robbins:**

Yeah. And I've had many clients with cancer in the saturations up in the 60%, 70%, it's not unusual. I've got clients who are in the eighties and nineties who don't have – but they have genetic issues, which you're very well familiar with. And so, they work aggressively through the RCP and blood donations to stay on top of that, and get that down into more – they're down into the thirties and 40%, which is entirely different.

**Dr. Joseph Mercola:**

Yeah. And I was always have one more item to have you comment on. But one of the things that annoys me is there's a fair number of people out there who believe that phytic acid or commonly called IP6 is a useful strategy to lower serum iron. Or just total body iron might be better. So, I had miserable failures with them when I tried to use it clinically with my dad who I also had to share the same thing with, thalassemia. I was able to control it by finally figuring out that IB6 doesn't work for squat until I got him into therapeutic phlebotomies. So, what's been your experience with IB6?

**Morley Robbins:**

It's a straw when we need a fire hose. And that's really what a blood donation is. I have clients who do derive benefit. IP6, using it – I've got a student, Karen Gadol in South Carolina, who's developed a product called iDetox, and it's a mixture of IP6 and quercetin and some other factors. And it does help people – there are certain people who are not able to, or want to donate blood, which I don't totally know. But just for whatever reason, they can't do it.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

Products like that seem to be-

**Dr. Joseph Mercola:**

If you can't donate blood, you can always get a therapeutic phlebotomy. That's going to cost you something. But it doesn't mean you're barred from the rest of your life of ever removing blood from your body. Don't get that confused. It just-

**Morley Robbins:**

No, you're right. But like you said, small women who don't weigh enough.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

That's a different threshold that they've got to deal with. And again, if they're going to work with a mobile phlebotomist, they have much more leverage over that in terms of their ability to do it. It's just, there are some pretty strict rules now, and the threshold to donate blood now, it used to be 12, it's creeping up to 13.

**Dr. Joseph Mercola:**

Wow.

**Morley Robbins:**

They're raising the bar now. And it's like – that's post-COVID. Well, that's a change post-COVID.

**Dr. Joseph Mercola:**

All right. But the other component of IP6 is that it's a not nonspecific mineral chelator, so it's not just going to target iron. It's going to get your beneficial minerals too.

**Morley Robbins:**

That's true. No, you're absolutely right.

**Dr. Joseph Mercola:**

Yeah. So, that's why I don't like it.

**Morley Robbins:**

Yeah. Got to be very careful.

**Dr. Joseph Mercola:**

Okay. All right. So, let's get to the fun stuff. The copper and the retinol, which is the magic. The ideally – it's not in our food supply for the most part. I mean, it's there, but it's radically reduced, would be the far more accurate comment. Down maybe 70%, 80% from a few generations ago. So normally you would get in your diet, but we're not getting anymore because of depleted soils. So, almost everyone seems to benefit from copper augmentation. So maybe-

**Morley Robbins:**

And it's important for people to realize, it's hard to imagine that the changes that have taken place to the food system. I think when you have the kind of a vague understanding, but when you – let's just focus on three issues. Yeah. The addition of iron, the addition of sugar, and the addition of seed oils. It takes your breath away.

**Dr. Joseph Mercola:**

Terrible triad.

**Morley Robbins:**

It really is a terrible triad. And I think what is lost is that triad has suppressive function around copper and retinol. And then you add, to your point, copper's not in the diet. It's missing from the soil, and it's refined out of food, things like that. And people pride themselves of eating a low-fat diet. I mean, I get a kick at it when I'm in Starbucks, I hear these skinny lattes all the time. People are afraid of fat. You are very well-aware of it. But it's a concept that our ancestors lived. The chapter that you sent over to me, which was absolutely riveting, and thank you for sharing that-

**Dr. Joseph Mercola:**

Oh, yeah. The chapter for those – just to interject the chapter I sent you was one of the primary chapters of my new book I'm writing. It's linoleic acid. It took me about three months to write. And it's only about 20 pages, maybe less, 17 pages.

**Morley Robbins:**

Folks, it's a block – I mean, I just like, "Oh my gosh." But to me, the most amazing part of it is a table describing linoleic acid, from seed oils down to beef tallow. And it's like, "Oh my gosh. That's it." It's like they've totally flipped these animal fats into the seed oils, but it's the linoleic acid. I didn't know anything about that. And it was such a revelation, but you begin to couple, as you say, the terrible triad, and it just has this metabolic suppression on the body that people are not even aware of. And especially, I would argue that the copper – just iron fortification alone has an impact on copper.

And that's the work of Dr. Jamie Collins at University of Florida. Well, then you start to add in sugars. A lot of people have been studying that. Dr. Robert Lustig's probably the most recent. And then we get to your insights about linoleic acid. It's absolutely arresting to think about how do people even survive that. I really question our longevity in light of those, just those-

**Dr. Joseph Mercola:**

Well, and if you integrate the new COVID jabs, it's just like – and just vaccines in general. I mean, when I started medical practice in 1985, it was 1 in 10,000 kids had autism. One in 10,000. It's down to 1 in 30 now. One in 30 in a generation. So, that's the background at which you're introducing these new COVID jabs, which are absolutely decimating fertility, increasing spontaneous abortions, and increasing all-cause mortality. So, it's just-

**Morley Robbins:**

I was-

**Dr. Joseph Mercola:**

-shocking how resilient some humans can be.

**Morley Robbins:**

I would argue, and it would take a few hours to kind of tease it out, but shorthand, I would argue that people who are copper-deficient need vaccines. We'll just leave it at that.

**Dr. Joseph Mercola:**

Interesting. Interesting supposition.

**Morley Robbins:**

Yeah. And the other one, just to throw in there, since we're talking about the terrible triad. My new phrase, and I don't know whether it's going to get traction or not, but I'm coming to the opinion that sugar is white iron.

**Dr. Joseph Mercola:**

Mm-hmm.

**Morley Robbins:**

And it's just people don't realize how glucose metabolism influences iron metabolism, especially accumulation of iron. And it's absolutely staggering when you get into it. And I think it's important for people to just be aware that sugar isn't just bad. It's really bad. And I think the coupling with the linoleic acid, it's out of control.

**Dr. Joseph Mercola:**

Well, let's... The devil's in the detail. I'm not as convinced that sugar, generically, is bad because sugar is a carbo – or as glucose, that's which is the fundamental sugar that's-

**Morley Robbins:**

I should say sucrose.

**Dr. Joseph Mercola:**

Yeah. Sucrose or refined, processed food.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

Let me tell you my perception. And this is actually part of a larger book that I was going to write, but I essentially condensed because of so many other issues to just that chapter you read. But the larger book had a bigger context in that, and I might have said in this chapter is that when you are looking at the damages from sugar consumption and most every physician believes that sugar is the most pernicious seed oils. They don't have any clue about seed oils.

What they fail to understand is that almost all the studies that indicate the sugar from processed foods is causing this damage, they never looked at the fact that along with that sugar in the processed food are the seed oils.

**Dr. Joseph Mercola:**

And the seed oils far exceed the quantity of the sugar.

**Morley Robbins:**

Yeah. That's a very good point.

**Dr. Joseph Mercola:**

That's excluded from the analysis and which confounds it, and doesn't tease out the damage from the seed oils versus the sugar. It's not just pure sugar.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

Because sugar in the form of healthy carbohydrates, like fruit being the classic example, in moderate levels, especially metabolically flexible, is not an issue. Now, having said that, 14 out of 15 people, according to the most recent analysis, which still only dates back to 2018, 14 out of 15 people are metabolically inflexible.

So, in other words, they can't seamlessly convert burning fat as their primary fuel to sugar. They just can't. Or actually it's the converse, from sugar to fat. So then then a low-carb diet may be of some benefit. But if you are metabolically flexible and you're one of the 1 in 15 people who are, then it's not an issue, and sugar is actually necessary for optimal health. There's no doubt in my mind. Healthy sugar.

**Morley Robbins:**

Yeah. The nuances, glucose versus sucrose and high-fructose corn syrup. They're three very different things.

**Dr. Joseph Mercola:**

Yeah. But even fructose, even [Robert] Lustig and Richard Johnson, who even preceded Robert in his concern about this issue, consent or concede to the fact that fructose in fruits is different than fructose in high-fructose corn syrup.

**Morley Robbins:**

Right. No, again, the dose is the poison, right?

**Dr. Joseph Mercola:**

Yeah. Well, and the associated micronutrients, too.

**Morley Robbins:**

Right, exactly.

**Dr. Joseph Mercola:**

Which is, you didn't mention it, but this is another important component, in fact, that so many people are confused on, which is vitamin C. Now, normally vitamin C would be very useful. And I want you to explain the science of why it's so important to integrate copper into ceruloplasmin. But here's the take, and you wisely pointed out in your protocols, is that most everyone is confused between the difference between vitamin C and ascorbic acid and they think they're the same. They're not.

As an interesting aside though, this woman that I was treating, turned out she did not need to be put on vitamin C, even whole-food vitamin C. Because when you break it down, it turns into oxalates and she had a really high oxalate issue. So, it turned out it wasn't going to be good for her, but almost everyone

else, they're going to need vitamin C, and they don't need ascorbic acid. And it's actually going to make things worse. They need whole-food vitamin C. So, help us understand why that's the case.

**Morley Robbins:**

How much time do we have?

**Dr. Joseph Mercola:**

That's fine.

**Morley Robbins:**

Yeah, I think it's probably one of the great mysteries. I find it particularly fascinating that Albert Szent-Györgyi, who gets a Nobel Prize for his work in biological combustion and allegedly the discovery of vitamin C, in July 4th, 1936, 18 months before he gets the Nobel, he clearly states in a letter to the editor of Nature journal ascorbic acid is ineffective in curing scurvy. Well, that's a factual statement that we could-

**Dr. Joseph Mercola:**

From the inventor, the discoverer rather, he discovered it.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

Not invented it.

**Morley Robbins:**

So, there's so much confusion about it. So, ascorbic acid is, another name for it is called hexuronic acid, hex, six-sided. And then what he was particularly focused on was something called hyaluronic acid, which is involved in wound repair. Well, hyaluronic, hexuronic, they sound the same, but a lot of confusion around that. And the analogy that I use is, when I'm talking about the whole-food vitamin C complex, it's like a car has an engine, a steering wheel, four wheels, and a cover. And that's pretty much a car.

**Morley Robbins:**

Ascorbic acid is the cover of the car and no moving parts. And so, it is a component of the vitamin C complex, but in its isolation, it has different properties. And I don't think people realize, and this has been a raging debate since 1937 and it engenders a lot of passion, that people don't realize or they don't believe,

I'm not sure what the right description is, but someone who I really respected in terms of his understanding of nutrition was Dr. Royal Lee, who started the standard process supplement line. Well, he openly was very descriptive of the vitamin C molecule. He took pictures of it, chromatography, to show the difference in how the light was completely different in the vitamin C molecule versus just ascorbic acid, a lot of controversy around it.

**Morley Robbins:**

And so, what was striking to me was to read, just this weekend, I was reading an article by Wen and Wang. It's from May of '21 so it's a little old, I realize, it's over a year old. But it's talking about how

ascorbic acid chelates copper out of tyrosine. I was like, "Wow, that's good to know." And ascorbic acid was identified by Holmberg and Laurel, who were the physiologists from Sweden who discovered ceruloplasmin.

Ascorbic acid had similar properties to affect the structure and the copper composition of this critical copper protein. Well, it begins to beg the question, why are we having this dispute? Why aren't we using a more whole food structure? Why is there no whole food IV infusion available? Everything is ascorbic acid. I've asked, I've looked, I've had many practitioners try to do the same.

**Morley Robbins:**

And I find it fascinating that there just seems to be this ascorbic acid, that's it. And I think there's way more to the story. And what's important for people to realize is that when we talk about the engine of the whole-food vitamin C molecule, that engine is an enzyme called tyrosinase. That's why when you read about ascorbic acid pulling the copper out of tyrosinase, that's significant because it's going to affect the vitamin C molecule. And then we realize, "Oh my gosh, it does the same thing that proton pump inhibitors do the exact same thing, pull the copper out of tyrosinase."

And then we find out that, what's one of the cornerstones of food processing? Tyrosinase inhibitors. And why are they focusing on tyrosinase? Because any food that spoils turns brown, like an apple, you slice an apple or you slice a banana or any food that sits out, it's going to change color. It's going to get darker.

**Morley Robbins:**

Well, that's the tyrosinase action influencing the production of melanin. And so, we've got this obsession in the food industry on shelf life and a near absence of understanding of what's it doing to human life. I was just having a conversation with some of my alumni this morning, the more research-oriented group, about 12 or 13 of us. And I made some comment about how I was always fascinated by Paul Ehrlich, famed physician from Germany. Got, I think it was the 1905 Nobel Prize for mass cells. And when he was in medical school, he graduated in 1888, his fingers were either yellow, red, blue, green, or purple.

And his students would tease him about that. I made comment of this, and one of my students, she was like, "I need to send this article." Dr. Mercola, it's absolutely amazing. It's an article about the reagents that are used to study the five complexes of the mitochondria. And what color are the reagents? Well, the reagent for complex I is red, reagent for II is yellow, reagent for III is blue, reagent for IV is green, and the reagent for complex V is purple.

**Morley Robbins:**

And it's like, uh-oh, suddenly these colors are very important. And why am I focusing on all this? Because all the colors from yellow to black are courtesy of melanin, which is made possible by tyrosinase. And so, I think it's equally fascinating that all the colors are patented by Big Pharma. They must have a lot of importance inside our body.

But if the mitochondrial electron transport chain is expressing different colors, that must be really important in terms of electron flow, frequency, energy dynamics. And I think the only thing that would be more confusing than understanding the physiology of fat is the physiology of light. And maybe you would agree with me on that, but it's really important in terms of how our body does work.

**Morley Robbins:**

We are energy and light beings. And so, I think what I have is more questions around the use of ascorbic acid. I'm curious, and what I'm looking forward to, our mutual friend Robert Thompson has convinced me that it will be fun to go to the vitamin C conference in Clearwater in a couple months.

**Dr. Joseph Mercola:**

Are you going to be there?

**Morley Robbins:**

Yeah, I'm going to-

**Dr. Joseph Mercola:**

Oh my gosh, I'm one of the speakers.

**Morley Robbins:**

I know. I'm looking forward to that.

**Dr. Joseph Mercola:**

I'm going to meet you again, that's great. Oh my gosh, now I've got someone to hang out with.

**Morley Robbins:**

Exactly. And so-

**Dr. Joseph Mercola:**

What a surprise.

**Morley Robbins:**

No, I'm really looking forward to it because I'm going down there to learn, to understand. I really want to try to pull the curtain back and try to understand what's the focus and the clinical objective, and are there nuances to this?

**Dr. Joseph Mercola:**

No, I don't think there are. I'm just going there to help them understand a little bit. Because they allowed me to be keynote, they're not allowing Robert to be a keynote. He doesn't have a platform. So, I'm going to definitely, because everyone there is confused. But before I go on further I just want to mention that Paul Ehrlich, I suspect one of the reasons his fingers was blue, because he's the guy that published in 1890 that methylene blue actually works to cure malaria.

**Morley Robbins:**

Yeah, magic bullet.

**Dr. Joseph Mercola:**

[crosstalk 01:19:05] now.

**Morley Robbins:**

That's a real magic bullet, yeah.

**Dr. Joseph Mercola:**

Yeah, yeah. So anyway, but with respect to the differentiation between ascorbic acid is, this group that's going to be speaking, actually it's my mother's birthday. So, I think it's September 9th and 10th.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

Their focus is on ascorbic acid. And one of my slides I'm going to present at this, it's my view, and I think I made this term up, that ascorbic acid is a "pharmacomimetic." So, it's actually obviously a natural molecule, but it's serving as a drug-like product in high doses.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

And we actually sell that. We sell ascorbic acid. But I do not, do not, do not, do not recommend it for daily use. It's going to cause a complication that you just mentioned, it's going mess with tyrosinase, and it's going to make things worse. It's going to make your copper worse. So, you want whole food vitamin C, which actually we're going to come up with a product in that really soon. It's based on acerola berries and [inaudible 01:20:05], I think.

**Morley Robbins:**

That's fantastic. That's great.

**Dr. Joseph Mercola:**

So, I do not take ascorbic acid unless I'm really sick, you know? So, then I would take high doses because it's a pharmacomimetic, and you can't really go those high doses with whole-food vitamin C.

**Morley Robbins:**

What people don't realize is that when you take that chemical, that ascorbic acid out of its complex, it has different properties. And people are always trying to say, "Well, why is ascorbic acid silenced in the complex? It seems to act out."

I imagine there are thousands of chemicals that, depending upon what the field is, will dictate how they're going to react. And so, I think there's been a lot of misunderstanding. It goes all the way back to July 1936. You find out that, actually, ascorbic acid is ineffective. That's the word that Szent-Györgyi uses, it's ineffective at curing scurvy. Well that-

**Dr. Joseph Mercola:**

That's on one of my slides too. Because I think most of the people at this event do not know that.

**Morley Robbins:**

No.

**Dr. Joseph Mercola:**

They fully believe it treats scurvy, and it doesn't.

**Morley Robbins:**

And again, he was using Hungarian peppers, which have, they're very rich in vitamin C, complex. And somehow that significant difference has been diffused and played down for some 90 years now. It's absolutely amazing to me.

**Dr. Joseph Mercola:**

All right. So definitely-

**Morley Robbins:**

I'm thrilled that you're going to be giving the audience a dose of reality.

**Dr. Joseph Mercola:**

Yeah. I don't know why, maybe I was the carrot at the end of the thing, but they've got me the absolute last speaker of the last one. So, I said, "That's fine. No problem." But I'm going to see if I can get you into the speaker, even though you're not, I'm going to try to twist her arm to get you in on Thursday before the event that night. No, Friday, Friday before, because I think it's Saturday. Sunday?

**Morley Robbins:**

I think it's on-

**Dr. Joseph Mercola:**

It's Friday-Saturday, Friday-Saturday.

**Morley Robbins:**

Friday-Saturday, so it would be Thursday.

**Dr. Joseph Mercola:**

Thursday, yeah, Thursday night. I'm going to see if I can you in there.

**Morley Robbins:**

All right.

**Dr. Joseph Mercola:**

I'm going to twist her arm [inaudible 01:22:17] because you need to be there, because you need to connect with these guys. Paul Merrick is going to be there, Pierre Kory, Richard Fleming, and some other good people.

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

Nathan Goodrich, this guy I interviewed too. So, anyway, so that's ideally assuming you're not having a high-oxalate diet, most people don't, but some do, then you're going to want to take whole-food vitamin C on a regular basis. And dosage wise, what are you recommending, 200 milligrams?

**Morley Robbins:**

Well, actually great question. Depends on what the individual is dealing with, but a good dosing would be 400 to 500 milligrams. I might double that. There have been situations where someone who is dealing with an acute situation, I might triple it, but you've got to do it in divided doses so they don't overwhelm their system. But the thing is, the RDA (recommended dietary allowance), as you know, for whole-food C is 60 milligrams and the RDA for ascorbic acid is 1,000 milligrams. Well, when you start talking about 800 or 1,000 milligrams of whole-food vitamin C, you're really shifting physiology. And again, you've got to think about that tyrosinase enzyme being the core.

**Morley Robbins:**

And I think tyrosinase as an enzyme, maybe second only to ceruloplasmin, but tyrosinase as an enzyme I think is wildly misunderstood. And I think there's a connection between tyrosinase and ATP7A, a critical copper pump, just as there is a relationship between ceruloplasmin and ATP7B. And I think there needs to be more understanding and research around that. I think tyrosinase, by virtue of its color-producing properties, has been under attack for a long time by virtue of the emphasis on ascorbic acid.

**Dr. Joseph Mercola:**

Yeah, yeah, for sure. So, guess how much vitamin C I take a day.

**Morley Robbins:**

Oh my gosh.

**Dr. Joseph Mercola:**

Whole food.

**Morley Robbins:**

Whole food?

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

1,000?

**Dr. Joseph Mercola:**

Very close, about 4,000. But you know how I'm taking it? One pint of usually freshly picked acerola cherries.

**Morley Robbins:**

Yeah, that's right, you've mentioned that.

**Dr. Joseph Mercola:**

Yeah. And each cherry has 80 milligrams.

**Morley Robbins:**

That's unfair.

**Dr. Joseph Mercola:**

I split up, half of the pint in the morning, half of the pint in the afternoon.

**Morley Robbins:**

And are you going to sell that? Because I would buy that.

**Dr. Joseph Mercola:**

Yeah. Fortunately. Who wouldn't? I've got two giant 15-foot Barbados cherry trees which produce them, and they alternate, they pulse. So, half the time one's producing, the other half the time. But they produce literally from I think late April, early May up until November, some time in November. So, six months out of the year I'm getting cherries, fresh cherries every day.

**Morley Robbins:**

Wow.

**Dr. Joseph Mercola:**

Yeah, it's just unbelievable. I feel so fortunate. But for those people who live in subtropical climates it's called a Barbados cherry, and most of the nurseries in your area will have them. And boy, you couldn't make a better investment, really. Get as mature a tree as you can afford and you can start harvesting things yourself.

**Morley Robbins:**

Do they require much tending?

**Dr. Joseph Mercola:**

No.

**Morley Robbins:**

No.

**Dr. Joseph Mercola:**

No. The major tending is to go out and harvest them. The thing about fruit trees is there's almost no maintenance. Maybe you've got to prune a little bit, but that's it.

**Morley Robbins:**

Wow.

**Dr. Joseph Mercola:**

As opposed to gardening, which can be very high-maintenance, a lot of work in gardening.

**Morley Robbins:**

Well, I want you to know that when I knew that you were a keynote, I wasn't sure what the focus was, but I think my blood pressure's probably dropped 20 points knowing your stance on this. It's very comforting to know that there are some significantly important players like yourself who do understand this. And to me it became one of the points of irrational debate over the last couple years. It was hard to even have a civil conversation about it.

And I just find that troubling, that if something is that polarizing, there's got to be more to the story, and people don't seem to appreciate that. Once it becomes an electric issue it's like, "Wait a minute, let's back up and let's talk about it." Because it's so important to our physiology.

**Dr. Joseph Mercola:**

Yeah because the person who's putting this conference on, she basically sells most of the vitamin C that's used in IV infusions.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

So, she is totally conflicted and doesn't appreciate this perspective at all. So, actually, I met her in June, and the conference, the panels were full, but she changed things to allow me to come in and speak. Because I wanted to give this point, make this point, because people need to hear it and they didn't understand it. And I did explain it, the other guy, one of her scientific advisors is Nathan Goodrich, I think Nathan Goodrich is his name. Really good clinician out of Arizona and really smart guy, understands this stuff. So, we came to an agreement too. Just what I shared earlier because he uses in some patients 100, 200, 300 grams in one day. In one day.

**Morley Robbins:**

I can't imagine.

**Dr. Joseph Mercola:**

To treat cancer, you know? So, it's just huge, and it is a heroic measure for sure, but it's going to be a lot safer than chemo.

**Morley Robbins:**

Oh, yeah. And again, you're flooding the body with hydrogen peroxide at that point.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

That's going to overwhelm the cancer.

**Dr. Joseph Mercola:**

When you use those high doses, do you think it's because of the impact on tyrosinase? Is there any therapeutic intervention you would add to that, like taking extra copper?

**Morley Robbins:**

Well, I would. I And that's really where I'm going to be focusing my energies going forward, I feel really good about the book, I feel good about the protocol. I'm excited about our book. I really feel good about the training that we've got. But to me the missing piece of the puzzle is, and I'd love to explore it with you directly and others that you think would be influential, I think we need a more accelerated process of de-ironing and re-coppering the body. That's what these-

**Dr. Joseph Mercola:**

Well, how could you speed it up than taking out 6 or 7 units a year? How much quicker can you do it?

**Morley Robbins:**

No, no, I think that's a fair question. We've got their iron chelators, but they don't come without issue.

**Dr. Joseph Mercola:**

Oh, gosh.

**Morley Robbins:**

Is copper something that can be infused? If we've been infusing iron for what, a century or more, isn't there some way to infuse copper? And if so, what are the-

**Dr. Joseph Mercola:**

Good question. I would be nervous about that, but it may be a good idea. I don't even know that they make parenteral copper. They probably do. I just-

**Morley Robbins:**

They do. It's usually built around copper chloride. You might find some with copper sulfate, but again, those are copper salts. Are there other forms? Is copper bisglycinate, does it lend itself to infusion? I don't know.

**Dr. Joseph Mercola:**

And that's your favorite form currently, right?

**Morley Robbins:**

Yeah.

**Dr. Joseph Mercola:**

That's the one we use in our products too, is copper bisglycinate.

**Morley Robbins:**

And I was talking about something.

**Dr. Joseph Mercola:**

Which sounds fancy, but bis is another word for two. So, it's two glycines attached to the copper.

**Morley Robbins:**

And I was talking with an executive at Albia about it. And I didn't know this and maybe you do, forgive me if you already do, but when you're talking about copper chloride or copper sulfate, copper is in a +2 form, just the way it's designed. And copper bisglycinate, you would assume, okay, so that's that copper(2) thing again. Actually, what he was explaining to me is that the glycine molecule, and there's two of them as you noted, it neutralizes copper so it's actually coming into the body as copper(0).

**Dr. Joseph Mercola:**

Oh, it's even better.

**Morley Robbins:**

Yeah, right.

**Dr. Joseph Mercola:**

Yeah, because it's going to get into the cells. Because if it doesn't have a charge, it's more likely to penetrate the cell membrane. With a charge it repels it. Yeah.

**Morley Robbins:**

So, I think that's intriguing.

**Dr. Joseph Mercola:**

I did not know that. That's interesting.

**Morley Robbins:**

Yeah. So, are there opportunities that have not been explored? I'm game to try your acerola cherry juice. That would be a-

**Dr. Joseph Mercola:**

Well, it's not a juice. Well, they do acerola cherry powder, and in the winter when my cherry trees are not producing, or shrubs actually, then I have that powder. Or actually by that time I should have my whole-food powder vitamin C, which is-

**Morley Robbins:**

That's exciting.

**Dr. Joseph Mercola:**

A lot easier, yeah.

**Morley Robbins:**

Well I think the body, we need to find innovative ways of bringing copper back to some physiological norm. And I think the challenge is, and you're very sensitive to it, is we have this disproportionate accumulation of iron. Well, again, go back to when we were born. The download from mom is 70 milligrams of copper, 450 milligrams of iron. Well, that's about a 6-to-1 ratio.

So, what would it take to get back to that? What do we have to do to download the iron and what do we have to do to try to reinfuse the copper? That to me is the great unknown, and that's really where I want to focus my energies, is working with clinicians to do that.

**Dr. Joseph Mercola:**

That's an admirable endeavor for sure. So, what we mentioned briefly but certainly didn't discuss the details and specifics, was retinol. And retinol of course, most everyone understands, is vitamin A. What retinol is not in any way, shape, or form, is beta-carotene. They are two different distinct molecules, not to be confused. Although many, if not most nutrition labels get away with this mortal sin of putting on the label beta-carotene conflated with vitamin A.

**Morley Robbins:**

Or-

**Dr. Joseph Mercola:**

That is such a common mistake. You see it time and time again.

**Morley Robbins:**

And the other mistake is saying that retinyl palmitate is the same thing.

**Dr. Joseph Mercola:**

Thank you for expanding on that tragedy of errors.

**Morley Robbins:**

What's important for people to understand-

**Dr. Joseph Mercola:**

[crosstalk 01:32:55] of those, because it's a really key issue.

**Morley Robbins:**

Yeah. Well, what's important for people to understand is that there's something called retinol equivalency units, REUs, and retinol, get into the weeds, it's actually an alcohol. Well, it's a fat but it's actually an alcohol, and biochemists out there understand what we're about to say. But the important thing is-

**Dr. Joseph Mercola:**

That's what the -ol means, alcohol.

**Morley Robbins:**

What the OL means. But the important thing is, it takes 12 beta-carotene to have the equivalency of impact of one retinol. And that's a very important understanding, and it's not well-understood. And it's mislabeled on all sorts of supplement bottles. But also to your point about the retinyl palmitate, I was talking with a colleague in Germany, young man, and he developed what's called vitamin A toxicity. And I said, "Well, I'm really interested to know what happened." This is all because of COVID.

He started taking, what? High doses of ascorbic acid and he took very high doses of retinyl palmitate. And as we got into the weeds of his symptoms, and he had done the blood work so I could see his copper was in the 70s and his ceruloplasmin-

**Dr. Joseph Mercola:**

Serum copper, serum copper.

**Morley Robbins:**

Serum copper was in the 70s, 75 I think. And his serum ceruloplasmin was 15.

**Dr. Joseph Mercola:**

Oh.

**Morley Robbins:**

Which is 50% of what it should be.

**Dr. Joseph Mercola:**

Yeah.

**Morley Robbins:**

And so, as we got into it, what really stood out, and I think this is very important for people to understand this, the symptoms of what's called vitamin A toxicity, it's signs of iron toxicity in the liver.

**Dr. Joseph Mercola:**

Gosh, that's radical. Who would have known?

**Morley Robbins:**

Completely misunderstood. And so, what's really significant is, when we have vitamin A in our diet like cod liver oil or beef liver or whatever the source might be, free-range eggs, the retinol gets turned into retinyl palmitate, and it gets stored in the liver in what are called stellate cells, they actually are the shape of stars. But in order to work with that, it needs to be turned back into retinol so it can be transported on the transthyretin protein. And what's there? There's T4 and retinol, that's what TTR is. Transthyretin protein is carrying those two metabolites. And if the retinol is not there, TTR without retinol is not your friend.

You talk about the terrible triad. It's another component of destruction. But the thing is, that conversion from retinyl palmitate back to retinol, I haven't found it yet, but I will, I'm convinced it's a copper-dependent transaction to get it back into a usable form for transport and then subsequent use in the tissue.

**Morley Robbins:**

And this is completely unknown and not discussed in iron circles, retinol, vitamin A circles. No one's talking about this immense conversion back and forth. And when people are taking high, high doses of retinyl palmitate, which is synthetic, and you couple that with a copper-deficient liver, you are going to have an explosion. And that's what I think the so-called vitamin A toxicity, it's, again, low copper is going to increase iron in the liver, and that's what I think we're witnessing. It's a very significant event.

**Dr. Joseph Mercola:**

Yeah. So long as you just mentioned it, I think it'd be wise to educate our viewers as to those two copper tests, the serum copper and ceruloplasmin, what the ratio is. Because there's an ideal ratio you're shooting for, which I think is 3.33.

**Morley Robbins:**

Correct.

**Dr. Joseph Mercola:**

And that's, I think, is it the ceruloplasmin divided by the copper?

**Morley Robbins:**

Copper divided by ceruloplasmin.

**Dr. Joseph Mercola:**

Copper divided by ceruloplasmin, okay.

**Morley Robbins:**

And so ideal copper should be about 100, and this is based on research from the 1930s. I tend to trust that more than the contemporary research before the advent of all the insanity.

**Dr. Joseph Mercola:**

Or the perversion of the food supply.

**Morley Robbins:**

Exactly, that's right. So, serum copper about 100, and ceruloplasmin should be 30. And again, this is some scintillating research out of, of all places, Bell Labs in upstate New York. But it was human research, but it should be 30. And so, 100 divided by 30 is 3.33. What's fascinating is that ratio should hold depending upon how much copper there is in the body. Where it becomes really significant is if the ratio starts to rise or fall, then you know you have some kind of pathophysiology taking place.

When you have this elevation that's getting up into the fours and fives between copper and ceruloplasmin, you very likely have some kind of inflammatory event or an infection of some sort. When it starts to drop precipitously, what you really have is it's a clear sign that there isn't adequate copper in the diet to fuel the function of ceruloplasmin protein. And that in and of itself is a significant finding.

**Dr. Joseph Mercola:**

Yeah. And fortunately those two tests, serum copper and ceruloplasmin, are available pretty much in any commercial lab. They're really easy to get and not terribly expensive.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

So really powerful stuff. So, can you help us understand the different forms or how we would get more retinol in our diet? Which is, ideally, it should come from food. And I'm particularly interested in your

viewpoints on some of the more obscure but apparently still significant sources, which would be butter or ghee, obviously grass-fed, organic, would be ideal.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

And egg yolks.

**Morley Robbins:**

Yeah. So the five classic forms, and again, this is well chronicled in Weston A. Price circles, grass-fed butter, very important source. Heavy cream, again, grass-fed heavy cream. The cod liver oil used for centuries as a source of retinol. Again, grass-fed liver, and then of course what we call free-range eggs.

[Chickens] should not be eating an organic diet. They should be out with the bugs in the grass, in the sun, eating their, I would call it a natural diet. Organic corn and organic soybean are not what the chicken was designed to eat. Chickens are actually baby dinosaurs. But the thing is, they do produce a very retinol rich yolk. And the closer the yolk is to orange, the more retinol, the more it's going to be giving us the life-enhancing-

**Dr. Joseph Mercola:**

That's actually retinol, that's not beta-carotene.

**Morley Robbins:**

Yeah. And the thing is, the more yellow it is, the less nutrient organic. So, yellow eggs versus orange eggs, we want the orange, that's really what we're looking for. And again, who's making all these colors? It's [crosstalk 01:41:08].

**Dr. Joseph Mercola:**

The challenge with this, though, is the high linoleic acid level, relatively high. Even if you're having four eggs, you're still getting about 2 to 3 grams of linoleic acid, because almost all the eggs, this is including the eggs that are organic, free-range, free pasture – not pasteurized – pastured eggs, 99% of the chickens fed organically are fed high grains, and the grains are loaded with linoleic acid.

**Morley Robbins:**

That's right.

**Dr. Joseph Mercola:**

You almost have to feed the chickens yourself if you're going to get, and that's what I do. My chickens have 80% less linoleic acid than regular eggs. But even if they're fed organic grain, they're still going to have that.

**Morley Robbins:**

Well, you're not going to take my eggs away from me, are you?

**Dr. Joseph Mercola:**

I'll just encourage you to get your own chickens and feed them the right way.

**Morley Robbins:**

Okay. That's a very strong argument.

**Dr. Joseph Mercola:**

Yeah. I mean, that's the ideal. My little chickens produce about a dozen eggs a day. I'll bring you some.

**Morley Robbins:**

That would be amazing. I would love that.

**Dr. Joseph Mercola:**

Yeah, I'll bring you some of my eggs and, hopefully, I will bring some acerola cherries too.

**Morley Robbins:**

I was going to say, you're going to bring one of the trees, right?

**Dr. Joseph Mercola:**

Not the trees, but the harvest of the trees.

**Morley Robbins:**

The harvest of the trees.

**Dr. Joseph Mercola:**

I always travel with my cherries.

**Morley Robbins:**

I think the hard part of this conversation is that basically what we're concluding is we do have to grow our own food now.

**Dr. Joseph Mercola:**

Well, it's ideal. Yeah.

**Morley Robbins:**

Yeah. There's so many switchbacks in the food processing industry now. And, again, that's hard. I'm an urban cowboy. I didn't grow up on a farm. My wife, Dr. Liz, she grew up on an 800-acre farm. She knows what this is all about.

**Dr. Joseph Mercola:**

Big. Big.

**Morley Robbins:**

Big, but it's like, "Where are you going to find that kind of acreage? Where are you going to find- Who has the time?"

**Dr. Joseph Mercola:**

You don't need 800 acres that's for sure.

**Morley Robbins:**

Well, no, of course. But who has the time to work the land, but have the impact on society?

**Dr. Joseph Mercola:**

That's the issue. Right.

**Morley Robbins:**

Yeah. That's the challenge.

**Dr. Joseph Mercola:**

But the easy thing is to have fruit trees.

**Morley Robbins:**

Yes.

**Dr. Joseph Mercola:**

Because you do have the time. The only time investment is really to go out there and harvest the fruit. So that would be the key thing. And chickens are pretty-

**Morley Robbins:**

They're pretty low-tech.

**Dr. Joseph Mercola:**

Yeah. And I like it because, this whole thing with The Great Reset that appears to be imminent, and food shortages and supply chain challenges. So, it's going to make food access somewhat challenging. So, it would be a really good resource to have, to have enough food for your chickens and to be able to produce the eggs. And that's a really good tool for yourself, but also to barter for anything you might need in The Great Reset that's coming.

**Morley Robbins:**

That's true. That's very true. Absolutely. We're going into uncharted waters. We don't really know what the end-

**Dr. Joseph Mercola:**

Oh gosh, yes. Who knows what's coming down the road compared to what we had the last two years?

**Morley Robbins:**

And the significance of that is that when we have this uncertainty, we have stress. It's what's stress going to do, it's going to burn through minerals. And who's going to take it on the chin? Magnesium and copper. And what I think is amazing about your routine of taking out micro-doses of iron and you're putting back in significant amounts of magnesium chloride, that's genius, because you're able to metabolize stress in a completely different way when your magnesium level's where it's supposed to be and your iron isn't running on overdrive.

Because that's when people get anxious, that's when they get hyperbolic, they go into hypoxia. It's like all of these reactions that I think started a couple years ago, are directly a result of an emotion called fear and fear just drives iron into our tissue. So, it's absolutely amazing what it does.

**Dr. Joseph Mercola:**

Yeah. Yeah, so I was thinking about the amount of iron I'm removing every week, which is 60 CCs, which is about 25 milligrams of iron. So, every week I'm pushing back the clock one month. Because normally you're going to accumulate 25 milligrams, about 25, 25 to 30.

**Morley Robbins:**

And I think your goal is to live what? 130?

**Dr. Joseph Mercola:**

30 is rational. It may extend beyond that, but right now the technology does not exist to go to 130. I think it's beginning to emerge.

**Morley Robbins:**

Yep.

**Dr. Joseph Mercola:**

But who knows? 30 years, that's a lot of technological advance, unless they Great Reset us back to the Stone Age, which is a possibility. Who knows?

**Morley Robbins:**

I wonder, do the med beds work without electricity?

**Dr. Joseph Mercola:**

I don't know that the technology to generate electricity will disappear. That would have to be a pretty bad reset. But who knows? I think their implementation is going to have some pretty significant unintended consequences that they have no idea what's going to happen. They could be pretty severe.

**Morley Robbins:**

And while we're talking about retinol and we're talking about energy, it's probably important for people to know, and this is a very nuanced subject that was profiled by Dr. Hammerling in 2016, where he was talking about retinol as a key component of the movement of electrons from complex three to complex four. And the electron actually rides the back of the retinol structure.

That alone, is mind-blowing to think about. If retinol is not in our diet, then it's not in our electron transport chain, then it's not able to support the optimal generation of energy. To think of retinol in a sense of as an energy-focused nutrient, it's very unusual. Because most of it is around immune system or vision.

**Dr. Joseph Mercola:**

It's so important as you mentioned, it's for ceruloplasmin.

**Morley Robbins:**

Oh, absolutely.

**Dr. Joseph Mercola:**

So, without it, you're not really going to make it and that ratio's going to be all distorted. And isn't ceruloplasmin one of the biggest proteins in your body? I thought it was.

**Morley Robbins:**

Yeah, 1,066 amino acids.

**Dr. Joseph Mercola:**

That's huge.

**Morley Robbins:**

There are a couple that are bigger, but it is a beast. I think what makes it unique is, in its original format back in the '40s, it had eight copper atoms and it was that way for 30 years, and then suddenly it had seven and was that way for another 30 years, and now the current ceruloplasmin protein has six copper atoms. And my question to any-

**Dr. Joseph Mercola:**

Are these what they think it has? Or this is documented objective reality?

**Morley Robbins:**

Documented. Absolutely documented.

**Dr. Joseph Mercola:**

Really? So, it's decreased by two copper atoms?

**Morley Robbins:**

It was documented in '40-

**Dr. Joseph Mercola:**

Holy moly. That's shocking.

**Morley Robbins:**

Yeah. And no contemporary copper researcher can explain to me what happened.

**Dr. Joseph Mercola:**

Gosh.

**Morley Robbins:**

Think of a car that's a V8 and you take two cylinders out. So, it's a V6.

**Dr. Joseph Mercola:**

Great analogy.

**Morley Robbins:**

Well, V6, it's still a good car. Doesn't have the same power.

**Dr. Joseph Mercola:**

We say turbocharged.

**Morley Robbins:**

Right. Yeah, right. So, the thing is, we're pretty much running on V6 ceruloplasmin, and that's a different beast than our ancestors. And it's hard to imagine the difference, but it's hard to imagine how did they create the difference? It's a great unknown.

**Dr. Joseph Mercola:**

Wow. So, that's the key and a big part. What you've just described over this entire interview is something that – I don't know. What's your best guess? My guess is less than 5% of the clinicians understand it. Maybe even less than 1%.

**Morley Robbins:**

I'd put it closer to 1% to 2%.

**Dr. Joseph Mercola:**

Yeah. Yeah, definitely. So, it's under 5%, but it's even more extreme.

**Morley Robbins:**

Right.

**Dr. Joseph Mercola:**

Probably more physicians are metabolically fit than understand this. Fourteen out of 15, as opposed to like 17 out of 18.

**Morley Robbins:**

One of the issues that we've not had a chance to talk about was where we put a lot of emphasis on mitochondria, and I know you were well-versed in the microbiome, but there's clearly a relationship between the microbiome and the mitochondria because it's all bacteria. And the thing is I think more emphasis needs to be placed on the microbiome and how we can support that. And there are products that are emerging that are, I think, going to be very important, particularly ones that are able to produce [inaudible 01:50:11] as a byproduct of their design.

**Morley Robbins:**

And I think it's an area that when you think about like neurodegeneration, it's actually the breakdown of the microbiome that then rides up the vagal nerve. And the vagal nerve is supposed to be monitoring metabolic balance before it gets to the brain. And I think there's been some significant alteration of the metabolic balance of the vagal nerve, which is affecting brain function now. It's a very new area of research now, but I think it's critically important because it's probably the fastest-growing breakdown in humans right now is neurodegeneration.

**Dr. Joseph Mercola:**

The two points that really get highlighted for me when I think about those would be simple interventions that are vastly ignored. The most important is exercise.

**Morley Robbins:**

Absolutely. Yeah.

**Dr. Joseph Mercola:**

That is the single most important therapeutic intervention to limit or prevent the advent of neurodegenerative disorders. And not hardly anyone understands this. You need aggressive exercise. In addition to that, ideally after that exercise, you hop into the sauna because the sauna generates heat. A significant sauna, if it's hot enough and you get your temperature to at least 102, maybe 103, for 20 minutes, you're going to generate heat-shock proteins. And what does the heat shock protein do? It refolds these proteins.

Now admittedly, those proteins may have been misfolded because of microbiome disruption, but nevertheless, the heat shock proteins will help refold them to the way they're supposed to be. And if they are unable to do that, they tag that protein for elimination. Typically, the beta amyloids and tau proteins get misfolded in the brain.

**Morley Robbins:**

Well, I've waited almost 12 years to find out what heat-shock proteins really do. So, thank you.

**Dr. Joseph Mercola:**

You didn't know that?

**Morley Robbins:**

No, I didn't.

**Dr. Joseph Mercola:**

Well, everyone tells you about heat-shock proteins. Yeah. And there's not just one, there's dozens of them.

**Morley Robbins:**

Oh my gosh, yeah.

**Dr. Joseph Mercola:**

Yeah, yeah. But that's their primary function and it's really, really important. A lot of biohackers think about cold thermogenesis and jumping in the pool. Sure, you get some benefits, maybe increasing your dopamine, but it pales in comparison to the benefit of sauna therapy, which is well-documented.

I can talk about sauna therapy for hours, but the big benefit is to get up. And you don't do it every day. I do it, ideally, it's like every other day is an ideal dose, like three or four times a week. But my schedule's such I can only do it three days a week because I have certain things I can't combine sauna with.

**Morley Robbins:**

Well, sure. Yeah.

**Dr. Joseph Mercola:**

But it's a powerful intervention that will also help you detox. And if you integrate it with the right type of light therapy, you can actually do something called photobiomodulation, which is another intervention to prevent neurodegeneration. Because the near-infrared light – not far-infrared – near-infrared penetrates the skull really easily.

**Morley Robbins:**

And the reason why the near infrared is so important is that complex IV is blue. It absorbs red light. The red light allows for the completion of the function in the complex. But it stops the impact that nitric oxide has to disrupt the function of complex IV. So red light and complex IV are-

**Dr. Joseph Mercola:**

All right, so I couldn't agree more, but I'm going to drop another piece of information that you probably didn't know because you've been so darn busy researching this, but the near infrared light also does one other magnificent thing that was only discovered about two years ago and hardly anyone knows. I suspect you missed it because of your focus, but it actually goes into the mitochondria and it causes it to generate melatonin. Ninety-five percent of the melatonin produced in your body is produced in the mitochondria. Only 5% in the pineal gland.

**Morley Robbins:**

Yeah. No, I knew that.

**Dr. Joseph Mercola:**

Okay, then you're way ahead of the curve, because I thought you might've missed it.

**Morley Robbins:**

No, no. Dr. Reiter's a genius. But I don't think I understood that the red light was critical for melatonin production. That's earth shattering, I think.

**Dr. Joseph Mercola:**

Yeah. Yeah. And melatonin in the electron transport chain is exactly where you need it, because these hydroxyl radicals, they only live for a billionth of a second and that means they can't travel very far. So, you can't be making an antioxidant in the cytoplasm and expect it to have a damn bit of difference in the mitochondria.

**Morley Robbins:**

That's exactly right. No, the big issues are ferro-oxidase in the blood, glutathione in the cell, and melatonin in the mitochondria. Those are your—

**Dr. Joseph Mercola:**

And melatonin catalyzes and upregulates production of glutathione.

**Morley Robbins:**

Yeah, yeah, yeah.

**Dr. Joseph Mercola:**

It's like crazy good.

**Morley Robbins:**

And, again, there's a copper dynamic.

**Dr. Joseph Mercola:**

Oh no, what's the copper connection? I missed this one.

**Morley Robbins:**

Well, glutathione, the greeter in the cell for copper is glutathione, but there's two metabolic steps to make-

**Dr. Joseph Mercola:**

In the cytoplasm?

**Morley Robbins:**

Mm-hmm. And there's two metabolic steps to make glutathione and you're involving cystine molecules. Well, cystine and copper have a very tight relationship. You got to have energy. You can't make glutathione without energy.

**Dr. Joseph Mercola:**

Glutathione. Wow.

**Morley Robbins:**

And melatonin is, you're relying on a copper-dependent enzyme to flip serotonin into melatonin. And so, it's a beast. The melatonin molecule is amazing in terms of its strength and impact. And, again, the fact that it's being made inside the mitochondria, which is copper-rich, I think is very, very significant.

**Dr. Joseph Mercola:**

So, I did not know about that connection. That's great. Another reason they make sure your copper is up.

**Morley Robbins:**

Yeah, absolutely.

**Dr. Joseph Mercola:**

Yeah, yeah. And we talk about copper doses, usually it's a few milligrams. And there are others out there who are in this field who are not as well-researched and studied as you who are promoting much higher doses, like even a hundred milligrams of copper a day, which you and I both disagree with. So, why don't you talk about doses?

**Morley Robbins:**

Well, again, when you get into the research, they're typically working with maybe, for recovery purposes, 3 or 4 milligrams. And the upper tolerable limit is identified as 10 at NIH (National Institutes of Health). Again, I think the folks who are going higher doses, in large part they're using a lot of transdermal application. And, again, the point that I-

**Dr. Joseph Mercola:**

Swallowing copper sulfate.

**Morley Robbins:**

Right, and swallowing some. The point that I've made to the principles in that whole movement is, "Let's start measuring your excretion of copper. Start telling us how much is coming out the back end, the urine and the feces." Because I don't think we have a real full understanding of what's happening to all that copper in your body. I would argue that you're taking a lot in, it's coming out the backside. But absent the proof, we can't really make a decision.

**Morley Robbins:**

But I think that the body is clearly responding to increased dosing. Back in the '30s and '40s when they had notable studies to look at what's the upper limit, the most they would ever work with was 10 milligrams. There's a fascinating case study that took place in Canada. A patient came in who couldn't walk. He was apparently an alcoholic. And for some miracle, one of the residents said, "Maybe we should test his copper status." And it was in the 'teens. It was absolutely the lowest they'd ever seen. Ceruloplasmin was single digits, believe it or not.

**Dr. Joseph Mercola:**

Oh!

**Morley Robbins:**

But he didn't have Wilson's disease. And then the genius of this team, these two residents that saved this guy's life, their drug of choice was hot cocoa.

**Dr. Joseph Mercola:**

Which is loaded with copper.

**Morley Robbins:**

And in three days he was walking again.

**Dr. Joseph Mercola:**

Wow. Wow.

**Morley Robbins:**

So, it's, again, the amazing resilience of the body. But again, that was with a hundred milligrams of hot cocoa, but it was high doses of hot cocoa brought him back.

**Dr. Joseph Mercola:**

So, the reason I mentioned that is that you present a very compelling story to make sure you get enough copper. And there's a lot of people out there think, "If a little is good, more is going to be better." And I'm not opposed to rescue doses in some very specific situations, but there doesn't appear to be any, any, any justification to go much over 10 milligrams. This woman we treated, I got her up to 12 milligrams, but that just can be for short-term.

**Morley Robbins:**

Well, yeah.

**Dr. Joseph Mercola:**

Not long-term. And it's a copper bisglycinate, which is [crosstalk 01:59:08]

**Morley Robbins:**

Yeah, it's a great product. I think that the big unknown is that the copper's even a factor in our health. And I appreciate all that you're doing to try to make people aware of it. It gets overshadowed by the focus on iron, as we've discussed. But people need to realize that part of the challenge we face now is the food system is not designed to supply copper. It's missing in the soil. It's missing in the foods. It's missing in the animals. So, we're really at a point where we almost are bound to take it in supplemental forms.

**Morley Robbins:**

And so the copper product that I've got works with the same copper bisglycinate and it's complexed with desiccated liver and some spirulina, which I think are important components. But the key is copper seems to be well received when it's mixed with food. And that's the key. People need to understand that. And it's particularly dependent on fat in the diet. It's a fat-soluble mineral. People need to understand that.

**Dr. Joseph Mercola:**

Take it with food.

**Morley Robbins:**

Take it with food.

**Dr. Joseph Mercola:**

Food that has fat in the meal. Not just an apple.

**Morley Robbins:**

And fat metabolism runs off of copper-dependent beta-oxidation enzymes. So, they have this very close relationship with each other that not a lot of people know about. And so, it's a blind spot that is a very common issue in society.

**Dr. Joseph Mercola:**

So just to highlight this, most people would benefit from copper supplementation, but along the lines of the encouragement for people to create their own food, especially fruit trees, which are relatively low maintenance, you can add copper to the plants.

**Morley Robbins:**

Yes. Right, right.

**Dr. Joseph Mercola:**

Copper sulfate is usually what you can buy. It's inexpensive, available just about anywhere. It's only going to cost you a few dollars a year to – typically the best way is to foliar spray, to spray it on the leaves and the underside of the leaves. And you can do that a few times a year. And I spray my acerola cherry

trees a few times a year and my blueberries and my avocados and everything else. So, they're all copper supplemented. So, guess how much copper I take as a supplement. How many milligrams?

**Morley Robbins:**

I'm going to guess around 6 milligrams.

**Dr. Joseph Mercola:**

Nope.

**Morley Robbins:**

No?

**Dr. Joseph Mercola:**

Zero. I do not take copper supplements.

**Morley Robbins:**

Oh, wow. Okay.

**Dr. Joseph Mercola:**

I don't need it.

**Morley Robbins:**

Well, no. With the infusion of the vitamin C that you're getting, you probably don't.

**Dr. Joseph Mercola:**

That's right, it's in the – I'm taking like two to four grams of the whole food vitamin C which has been sprayed with copper sulfate.

**Morley Robbins:**

Right. And, again, you want to make sure that the soil is getting that copper sulfate too. That's right.

**Dr. Joseph Mercola:**

But the best application is through the leaves. That's my understanding.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

Yeah, so you're going to – the foliar application. You can put in the soil, there's a lot of dependencies on soil, but you'll get it into the plant if you put it in the leaves. You got to be careful of the timing. You don't want to put it on if it's really hot, but not too cold, because the pores have to be open. It gets too hot, the pores close because they didn't want to lose water. So, there's a timing issue too. But if you're familiar with foliar application, you just want to add some copper sulfate.

**Morley Robbins:**

Yeah. No, I've read that the microbes, they really look forward to getting the copper in the soil.

**Dr. Joseph Mercola:**

Yeah, yeah. There's no question. You can use them both. You can use them both.

**Morley Robbins:**

Yeah. That's right. No copper at all. Well, it makes sense in light of your dietary focus. That makes perfect sense.

**Dr. Joseph Mercola:**

Yeah. And I don't take any vitamin A. I get all mine from my food. No, I don't take any vitamin A. Most people are going to benefit from some vitamin A, but I take so much ghee. I have like 4 ounces of ghee a day.

**Morley Robbins:**

No cod liver oil for you? That's amazing.

**Dr. Joseph Mercola:**

No cod liver. I don't need it.

**Morley Robbins:**

Okay.

**Dr. Joseph Mercola:**

I don't need it. No.

**Morley Robbins:**

That's awesome. That's actually very exciting.

**Dr. Joseph Mercola:**

Yeah. So, you can do it. The goal is to get to that point. You got to be kind of OCD, obsessive-compulsive. Ideally you should get it from your food, but our food supply is so perverted and bastardized that it's not there and you have to really grow your own, for the most part, or obtain it from someone who's doing these techniques, so that you can get it through your food.

**Morley Robbins:**

Yeah. And if you're not going to grow it on your own, and you're relying on farmer's markets, then you need to have meaningful conversations with the farmers to say-

**Dr. Joseph Mercola:**

Or visit their farm. Because most of those are not farmers. What they do is they go to the same people who sell it to the grocery stores and they put it on the farmer's market, but you think that they grew it.

**Morley Robbins:**

Right. You need to find out how the soils and the plants are.

**Dr. Joseph Mercola:**

Yeah. Visit them.

**Morley Robbins:**

It's really critical.

**Dr. Joseph Mercola:**

Yeah. So, anything else you'd like to – I didn't know we'd talk about the whole time with this, but it worked out really good. This is a good primer. This is going to be solid and it'll help a lot of people. Such a confusing topic and the details are not known that well at all. And I believe it's really crucial to integrate into your lifestyle if you want get some health. And if you're battling some mysterious illness because there's no question, there is just no doubt in my mind, it's this bioavailable copper leading to optimized utilization of iron that's going to be playing a significant role in whatever illness you're contending with.

**Morley Robbins:**

Again, the whole issue is making sure people understand that we need to be able to make more energy so our immune system can think. And, again, the focus of conventional medicine has been, "Let's attack the enemy." I get that, but not enough has been placed on, "What do we do to strengthen the host energy system?" Especially from an immune standpoint. The immune system needs energy and intelligence and that's running on the backbone of copper.

**Morley Robbins:**

During COVID, I found 52 articles that clearly documented and proved that copper was instrumental in regulating immune function. Not a lot of people talk about that. It's a whole aspect of physiology that has been kind of pushed aside because of other interests and what have you. But I think as people begin to realize, on this energy side, the impact that it has, not just in terms of how we feel, but in terms of our response to whatever threat might be out there, I think it's essential to understand that. And your point about it's a lifestyle issue. That's really what this is. This isn't, "Oh, I'm going to take some supplements and be fine."

**Dr. Joseph Mercola:**

No, no.

**Morley Robbins:**

It's a shift in your thinking about how you're going to live your life, how you're going to have access to food, what you're going to do to prepare it, things like that.

**Dr. Joseph Mercola:**

Yeah. So it's key. And, again, it's not a call to, "Oh, if a little is good, more is better," and to mega-dose on copper, because that can get you into deep weeds. And it's not a magic bullet that you're going to necessarily have hyper-immune function in a few days. This is a long-term play. This is a marathon, it's not a sprint.

**Morley Robbins:**

Exactly.

**Dr. Joseph Mercola:**

But once you've identified these variables, you can address them. You've got the lab parameters that you can monitor your progress and you can see it. But I think the take-home message is, pretty much everyone's got to be getting rid of their blood, removing it. You just have to if you want to optimize your health.

**Dr. Joseph Mercola:**

Have you ever seen a clinical condition, I'm sure they're there because there's always an exception, that they really should have iron? Can you describe a scenario where that would be the case?

**Morley Robbins:**

No, that's a fair question. One of my students in Los Angeles had severe blood loss, menstrual blood loss, for probably about seven or eight years. But she was totally on board with this conversation that we're having. She was philosophically, emotionally and physically devoted to it. But her hemoglobin got down to 3.

**Dr. Joseph Mercola:**

Really?

**Morley Robbins:**

And so for folks-

**Dr. Joseph Mercola:**

Slowly. Because if it went acutely, she'd be dead.

**Morley Robbins:**

Yeah, exactly. So, people need to know that hemoglobin can go down to 10. That's not a big deal. It really isn't. Getting below 12 is not the crisis that it's been made out to be.

**Dr. Joseph Mercola:**

Right.

**Morley Robbins:**

But between 10 and 5, believe it or not, and I think you know this but for the audience, between 5 and 10, that loss of hemoglobin is corrected by heart function, by the pumping action of the heart. And the heart will make up for a lack of hemoglobin down to a hemoglobin of 5. Again, as you say, it's a gradual process. When you start to get below 5, you're now changing the whole dynamic and parameter of the body. And when she presented to the hospital with a hemoglobin of 3, it was against her desire, but she yielded to the physician that she was working with and she did get a blood transfusion, not an iron transfusion. And that seemed to be all that she needed to then get it back. And now she's back up into – she's over 10 now. I think she may be between 10 and 12.

**Dr. Joseph Mercola:**

I would not have given her an iron supplement. I would've given her a transfusion too. That's – geez. She could have died.

**Morley Robbins:**

So that's only an N-of-1 that I'm personally aware of. I think the idea of, as it's called, iron deficiency anemia, I think it's a misnomer. I really think it's copper deficiency anemia. And given that iron's the most significant mineral on the planet. What is it? 26% of the Earth's composition is iron. And I think it's a dysfunction of iron, it's not a deficiency of iron. And so, I think I would encourage the listeners and the practitioners in the audience to take aggressive action around building up bioavailable copper before you start to turn to iron. Iron is just – it has too many downsides.

**Dr. Joseph Mercola:**

Ship timber disaster.

**Morley Robbins:**

And, again, back to the terrible triad, the relationship that iron has with the linoleic acid, the relationship that iron has to these sugars that are in our diet, the excess sugars. Not trying to criticize carbs, it's just too much simple sugars. I think it's a metabolic dynamic that people don't understand and iron is in the thick of it. And we've got to be really respectful of our body's ability to naturally metabolize the iron. But that's a function of bioavailable copper, not more iron. And I think that's a message that needs airing on a regular basis so that people begin to really adopt it, understand it and take action on it.

**Dr. Joseph Mercola:**

Okay. Well, this has been great. I'm sure everyone watching this has benefited and learned something. And many may feel like they've been drinking from a fire hose, but that's okay because I want to tell you, this is just a tiny, a very, very small fraction of the extent of Morley's clinical wisdom. And he actually teaches courses and has groups where you can go and dive deeper. So, Morley, why don't you tell, for those who want to watch this two or three or four times to pick up everything that we've discussed, what's the next step to find out more?

**Morley Robbins:**

Okay, great question. We've got, it's a website, RCP, Root Cause Protocol, RCP123.org. And there are social media sites. We have Magnesium Advocacy Group and we have the RCP page. We have an RCP community that you can join, where every other week we have Q&As. People get to ask questions and we do our best to answer them. And then the training that you're referring to, it's called the RCP Institute. We're about halfway through the class, 16 now. Historically we've had 20 or 30 students. It started to creep up into the seventies, nineties, and this class is 220 students.

**Dr. Joseph Mercola:**

Congratulations. Word's getting out.

**Morley Robbins:**

No, word is getting out. And it's a very switched-on group of people. I'm absolutely blown away by the caliber. But we have intakes and the classes are in the beginning of the year and then the second half of the year, 16 weeks.

**Dr. Joseph Mercola:**

Good. Yeah, so you have plenty of time. I'm not sure when this will be posted, but it should be well before the beginning of the year, so you give people time to queue it up if they're interested.

**Morley Robbins:**

That'd be great.

**Dr. Joseph Mercola:**

That's great. Yeah. Phenomenal. Phenomenal. All right. Well, thanks so much for sharing your wisdom. It's going to help a lot of people and I'm really excited to get this message out.

**Morley Robbins:**

Well, I appreciate the opportunity and look forward to our continued dialogue. Again, I'll put a plug in for that Robert Hodges article, '78, would be a game-changer for people to understand what's really happening if we inject iron into the body. I think people will be blown away by it.

**Dr. Joseph Mercola:**

You bet. All right. That sounds good.

**Morley Robbins:**

Okay. Thanks again.