

Understanding the Pros and Cons of Ketone Supplementation

A Special Interview With Frank Llosa

By Dr. Joseph Mercola

Dr. Joseph Mercola:

Welcome, everyone. Dr. Mercola, helping you take control of your health. And today, we're going to talk about exogenous ketones. In other words, ketones that your body doesn't make, and are made by something you take externally, too. And we're going to be discussing that with Frank [Llosa], who actually has a conflict of interest because he is a head of a company that makes these ketones. But I decided to bring him in because I think there is great value. I've changed my position quite a bit. Before Frank comes on, I just want to clarify it. I now believe that it is relatively unhealthy for your body to create ketones. Not that you can't do it or shouldn't do it, but it is an emergency mechanism. And there's great value to it and it keeps you alive. But in order to make ketones, you have to activate stress hormones. There's no other way you're going to do it.

It's an emergency response. You're going to have to activate cortisol, adrenaline [and] glucagon. And if you do that chronically, I don't think it's a good idea. I used to do that, but I don't do it anymore. But that doesn't mean that ketones are dangerous, they're actually very powerful tools that you can use selectively to improve your health. And we're going to talk about how that does that in a bit. But if you choose to activate your ketones, you can, but just know that there's a counterpart that's rarely ever discussed, which is the activation of the stress hormones, which I'm convinced is a concern to do chronically.

If you do it acutely, no problem. If you do it several times, a few times a month, probably fine. But if you do it every day. I think you're asking for trouble. That's my conclusion, you can certainly reach your own. So, with all that preface and warning, appropriate warning for endogenous ketones, you have an exogenous ketone company. So, welcome and thank you for joining us.

Frank Llosa:

Thanks for having me.

Dr. Joseph Mercola:

Now, if I'm not mistaken you actually worked with the very prominent ketone expert Dr. Richard Veach, who passed away a few years ago now. Is that correct?

Frank Llosa:

Correct. He was my wife's godfather, that's how I got introduced to all this and went down the rabbit hole.

Dr. Joseph Mercola:

So, why don't you start the story by telling us a little bit about Dr. Veach? I unfortunately never interviewed him. By the time I got around to it, he had already passed. I think David Asprey was the last person to interview him, if I'm not mistaken. So, tell us a little bit about Dr. Veach, since you're an indirect relative of his. You know his history very well and actually are essentially a business partner. Let us know the story.

Frank Llosa:

Okay. So, the story actually started a few months before I even knew what Dr. Veach was doing. When I saw a friend of mine, we were about to go out, go clubbing, and he grabbed a pound of cheese, and he was overweight. He was well overweight, and he downed the entire pound of cheese. And I'm like, "What in the world are you doing?" He's like, "I'm losing weight." I'm like, "Good luck with that buddy." And obviously he was doing Atkins or ketogenic diet, and I knew nothing about that. Then I started hearing rumblings around the dinner table about this uncle, who he should be given gold medals for how well the U.K. Olympic team did, because I then found out that his ketone ester was being given to the U.K. Olympic team, even though he's a U.S. NIH (National Institutes of Health) scientist. So, then I met him at an 80th – I'm not sure what year – birthday party of my father-in-law.

And I had already gone down the rabbit hole of endogenous ketones and what it is to be in a ketogenic state. And I was able to actually converse with him, and he wasn't used to conversing with someone. Because for him to explain his life's work [of] 35, 40 years with Hans Krebs, the Nobel laureate, the Krebs cycle, try to recreate the endogenous ketone process through a drink, for him to have that conversation with someone at a dinner party, he just doesn't want to have it. He just doesn't want to be bothered.

But we got along. And he was frustrated that he'd been sitting on this ketone ester for 10 years that hadn't come to market. And I tried to help him raise some funds, but here's how the pitch went. We think people will take \$70 a day worth of a drink that tastes like vomit. And back then CBD (cannabidiol) was all the rage and stuff like that, so no one wanted to take a risk on something like this. Even though Dr. Veach had all these papers, he just said, "Read the goddamn papers." But no one quite got it. And then he said, "Hey, why don't you go do it?" And I said, "Okay."

Dr. Joseph Mercola:

So, he wasn't a very effective marketer, but he delegated that responsibility to you?

Frank Llosa:

Well, he didn't believe in marketing or business. He just thought that someone should just give him 20 million bucks and make a tanker cart of it, and just have people walk up to the tanker cart with their little cups, and just pour ketone ester and be done with it. He didn't understand marketing. And actually, I'm the one that brought him kicking and screaming to the Dave Asprey podcast, because he didn't want to. He's like, "Why do I need to be on a podcast? Just

read my papers. It's all in the papers." And I was like, "Well, the world has changed and people want to hear it." So then he very reluctantly, he even tried to cancel the date the morning of. And I made a cameo at the end because I was also experimenting with endogenous ketones. I could get up to 8 millimolars, just endogenously without any endogenous ketones.

Dr. Joseph Mercola:

That's a lot. 8 [millimolars] is pretty darn high. You weren't eating for a few weeks?

Frank Llosa:

No, no. I just would get into a pattern of not eating breakfast, and then after a while I just wasn't hungry at lunch. So, I'd be only eating once a day and then I would just – The meter was very friendly to me because sometimes it would read and say "high." High means that it's above the 8-millimolar mark.

Dr. Joseph Mercola:

Wow.

Frank Llosa:

That's not even multiday fasting, but just over a period of time my body was able to switch to that.

Dr. Joseph Mercola:

Most people don't do that. They're lucky if they get to beyond 2 or maybe in 3.

Frank Llosa:

The biggest jump that I had was I was only hitting 1.5, 2. But then one day accidentally I missed lunch, and then I missed dinner because I had to vote, and then I tested myself late. And that was the first time that I'd done an extra six or seven hours, and that's when I jumped from the 1.5 to the 3.5. And I was like, "Oh, even eating fat, it doesn't kick you out of ketosis, but it lowers your ketone numbers." So, the key was not eating, and if I just didn't have an appetite, I just wasn't eating. But I did lose too much weight and then people had said, oh, it looked like I was sickly and stuff like that. I felt great, but I was underweight. So, it was not sustainable at those super-

Dr. Joseph Mercola:

It's definitely not sustainable.

Frank Llosa:

-crazy high numbers.

Dr. Joseph Mercola:

Do you know why you feel great, or do you know why you felt great, put it that way?

Frank Llosa:

Well, ketones going to the brain, lower inflammation, inflammation and better brain fuel.

Dr. Joseph Mercola:

Okay. I guess maybe you can – I don't know that it's better. It's better from some perspectives from some others it's not. Because the brain cannot function on ketones alone, that's biologically impossible. It will crash. You have to have glucose.

Frank Llosa:

Well, didn't they test it? I thought there was a paper in the '70s from Harvard with Cahill, where they were able to starve people for 30, 60 days, an experiment that they couldn't do nowadays. And Dr. Veach always laughs and says, "Well, they were theologians, so it was fine."

Dr. Joseph Mercola:

I'd like to see that paper. To the best of my knowledge, it's not true. I could be mistaken.

Frank Llosa:

It was a long period, 30, 60 days that they were able to convert and be just running on ketones. And I've been keto myself-

Dr. Joseph Mercola:

Okay, wait, wait, wait. I know why that's not true. With respect to they were fasting, they had no sources of exogenous glucose.

Frank Llosa:

No food, period.

Dr. Joseph Mercola:

No food [inaudible 00:08:06].

Frank Llosa:

No fat. Just complete 30, 60 day fast, like a Jesus fast.

Dr. Joseph Mercola:

But I'll tell you why they still had glucose in the brain. Do you know why?

Frank Llosa:

Well, the body makes it, breaks it down.

Dr. Joseph Mercola:

It was gluconeogenesis, which is why-

Frank Llosa:

In that instance, yes.

Dr. Joseph Mercola:

So, let me clarify my statement. My statement is that your body absolutely requires glucose, but not to eat. Because it requires it so much that if you fail to eat the glucose it will sacrifice your body to create it.

Frank Llosa:

So, gluconeogenesis-

Dr. Joseph Mercola:

Gluconeogenesis.

Frank Llosa:

-breaking down the muscle to get it some way. I agree with that.

Dr. Joseph Mercola:

It has to release adrenaline, glucagon and cortisol, all of which activate the destruction of primarily your lean muscle mass and your bones, and even some brain tissue. To sacrifice that tissue to create glucose, sends it to the liver, [the] liver converts it to glucose and sends it back to the brain. So, you have to have it. If your glucose in your blood goes down to zero, you're dead very shortly.

Frank Llosa:

I could agree with that. I don't know the nuances of that, but that sounds reasonable. Your body makes it. Your body makes a trickle amount to keep it going.

Dr. Joseph Mercola:

One of the ways you commit suicide is just inject a lot of insulin. The insulin will drop your blood sugar low enough below the threshold, and you'll go into a coma and die. So that just illustrates the vast importance. Yes, ketone is a great fuel as you mentioned, it does a lot of good things, but you still need glucose. And if you want to augment it, I think that really the most ideal is to give your body the glucose, and then still give it some ketones. But the only way you can do it without your product, or a product similar to yours is to fast. And then you activate those stress hormones again. So, when you take this out-

Frank Llosa:

If you want to get the super high numbers. There are people that are able to maintain a 0.5, 1.0 and just live life on a low-carb diet and get a steady trickle of ketones. But if you want to get super high ketones, you got to do a multi-day fast, and that's only going to last so long.

Dr. Joseph Mercola:

And I think the comments that you were getting on the way you looked, there's probably some accuracy. You looked sickly. So, people aren't stupid, and they're not mean and trying to disparage you needlessly, they were concerned because you didn't look healthy. That can be easily discerned by most people, so there's probably some intuitive concern there.

Frank Llosa:

There's also a facial color that some people even – so not only the extra too slender, but also some facial color. So, that was just an experiment, and I had my wife try to go keto for a little bit, and she got the keto flu. And she was in a fetal position in bed with her eyes bulging, heart racing, be like, “What have you done to me, these damn experiments?” And for her I called some experts and they said, “Give her 10 capsules of just salt.” And I was like, “What? You're going to overdose on salt?” They're like, “No, no, no, you can't –” Well, I don't know if you can't, “But you won't overdose on salt.” And within 10 minutes, 10 minutes, she was fine. It was just a salt depletion. I've even heard about people going to the hospital because they tried to do a ketogenic diet. And they said two hours sitting in the wait room, they couldn't figure out what it was.

And I said, “I can tell you what it was.” They said, “Two Harvard doctors couldn't tell me what it was for the first two hours, how do you know what it was?” I said, “I bet you they just gave you salt and you were fine.” She's like, “How did you know that?” It's like, “You didn't tell them that you did a ketogenic diet.” So they're looking for all these different things, and it was just salt depletion. And people say, “Oh, the ketogenic diet doesn't work for me.” Well, did you get enough salt? And they go, “Yeah, I put extra salt to my eggs.” I said, “Did you unscrew the salt container and add salt to your eggs?” Because the massive amount of salt loss on keto, people, they just can't fathom it. They need huge, huge salt loads.

Dr. Joseph Mercola:

That's certainly true. You want to make sure you have enough salt, otherwise you're going to run into problems with this. So, there's a number of different options, and you can run us through the

chronology, because you were involved in all of them and actually have implemented some new strategies in providing ketones, which I want to talk about. The traditional ones were these ketone esters, and then there's a lot of different derivatives of the ketone esters.

Frank Llosa:

Sure. I can go through the whole umbrella, world of exogenous ketone and walk all the way through it.

Dr. Joseph Mercola:

That's what I want you to do, because there's a lot of confusion about the enantiomers, or the stereoisomers, or which ones. And Dr. Veach had some really strong opinions. I suspect you share his views, is that correct? [inaudible 00:12:51].

Frank Llosa:

He would come back from the grave and slap me if I did anything [inaudible 00:12:57].

Dr. Joseph Mercola:

Because it's diametrically opposed to another expert in the field who disagreed with Dr. Veach and that's Dr. Dominic D'Agostino, who believes there is an alternative strategy. I don't really know enough about the science to place a vote here, but I'd be interested in your perspective as one view to look at.

Frank Llosa:

Sure. All right. So, the umbrella category of exogenous ketones means drinking something that will raise your blood ketones. So, there are seven or eight products that we can go through right now. The first one, people often don't even put into this category, which is MCT-C8 oil. I call it a half-endogenous, half-exogenous ketone. Because it's a fat, so it works towards your macros, but 10% to 15% of it goes through the liver and creates D-beta-hydroxybutyrate, creates ketones. You can eat a cake and add C8 to it, and your ketones will go up. Now, it doesn't mean you're in "ketosis" as a regular consumer would define ketosis, which the consumer thinks of it as burning fat to make ketones. You wouldn't be doing that. You would be exogenously consuming this oil on your cake.

Dr. Joseph Mercola:

But you're still getting the benefits.

Frank Llosa:

We're getting some of the benefits. I think the cake would negate next to all the benefits, but you are getting some ketones in your system.

Dr. Joseph Mercola:

Well, it depends on what the cake was made of. If it was made of conventional-

Frank Llosa:

Yeah, I'm just talking about-

Dr. Joseph Mercola:

-seed oils then of course it's going to be dangerous. And refined sugar, especially with high-fructose corn syrup is never a good idea.

Frank Llosa:

I'm sure you could make a-

Dr. Joseph Mercola:

But you can make a healthy cake. You can make a healthy cake for sure. That exists. You can make a healthy pizza. It's difficult to do, but you can do it.

Frank Llosa:

I'm just talking about grocery store cake.

Dr. Joseph Mercola:

Oh, that's [crosstalk 00:14:38].

Frank Llosa:

You can add C8 to it and it'll raise your ketones, and technically someone would say, "Oh look, I'm burning fat," but you're not.

Dr. Joseph Mercola:

No, you're not burning fat, but you are still getting the benefit of exogenous ketone elevation.

Frank Llosa:

You would be getting some of the ketones in there-

Dr. Joseph Mercola:

Why don't we go with that now, because I think it's important to understand that, because there is [a] benefit. Anti-inflammatory benefit primarily. There are HDAC (histone deacetylases)

inhibitors, which is an anti-inflammatory component, which is really important. So, why don't you review some of the benefits independent of the food that you're eating?

Frank Llosa:

Well, anti-inflammatory and some people for cognition. The more of an issue you have with glucose reaching the brain, the more of a benefit you have. So, some people will drink it, whether it's any of these exogenous ketones, and feel nothing in the brain. But your brain is being fueled by 100% or 95%, there is no improvement to be had. Steve Koonin, I don't know if he's a doctor, but scientist Steve Koonin talked about the brain energy gap. So, the bigger the gap, the percentage of the brain that can be fueled by glucose, it could be 60%, 70%. You add exogenous ketones, it uses a different pathway, reaches the brain and gets you closer to that 100%. So, some people, for example, TBI (traumatic brain injury) people, they have brain fog. They take the ketone ester and it is instant, immediate and predictable, within 15 minutes. It's not even a 10-day, 30-day thing, it's just instant. So, the bigger the gap, the more you feel it. But then there's-

Dr. Joseph Mercola:

And that gap that you're referring to is the lack of sufficient fuel to activate the sedative processes in the brain. Because the brain is only 2% of the body weight, but yet consumes 20% of the body's energy. It's a big energy producer, one of the biggest.

Frank Llosa:

So, some people, the glucose isn't able to fully fuel their brain, so there's that gap and then this helps fill that gap. Within the exogenous ketones you've got the C8. And then you've got what first came to market, which is called the racemic ketone salts. And what that is – Dr. Veach had this 20 years ago and he threw it in the trash. It's beta-hydroxybutyrate. We'll talk about chirality in a second, but it's beta-hydroxybutyrate, which is an acid, which you can't really drink directly by itself because the pH is too low, it would burn a hole in your gut, bound to a base. So, sodium, magnesium, calcium, potassium, and those are called ketone salts. There used to be a hundred different brands on Amazon making all these claims that were just ridiculous. And one problem was that the salt load was just way too high. I'm all for salt. I just finished saying unscrew the top of your shaker to put more salt in, especially when you're entering into keto.

But these ketone salts were just way too high in salt load. Now, some people would use them, the ketone salts, because they would raise your ketones barely. So, you'd have an entire serving of ketone salts, and maybe be lucky if you get a 0.3 rise in your millimolars. And if you took the capsules of racemic salts, maybe if you took half of the bottle, 15 out of the 30 capsules, you might be able to have a 0.2, 0.3 rise, just next to none raise in blood ketone levels. So, those are racemic salts. The word "racemic" means that some products like D-ribose or L-tryptophan, the L form is what the body can use, sometimes it's the D form. And with ketones, it's the D form, D-beta-hydroxybutyrate. But these first products were the racemic form, which means the D form and the L form, which the body can't use.

We can discuss it that some scientists say that because the body can't use it as an energy source and can't get rid of it, that it stays in the system, and might have some other effects such as reducing hunger. But Dr. Veach was adamant about only using the D form, only using the form that your body recognizes and uses, and not to use any foreign substances in part because of unintended consequences. There have been some medicines that were accidentally racemic when they should have been chiral.

And then after eight million doses they say, "Uh-oh, we just discovered the problem that occurred from having the racemic." So it doesn't mean that everything racemic is bad. Advil, which you probably would put in the bad category. Advil is racemic, but it's not bad because it's racemic, it just happens to be racemic. So, the racemic ketone salts first on the market, and a lot of promotion, and touting, and weight loss promotion.

The funny thing is some people would actually find benefit in using these when they first entered into a ketogenic diet, and then they would say, "Oh wow, this really helped me get through the brain fog or the keto flu." And I said, "Well, did you try just using the salt?" It's just the salt portion. I think that the benefit that people were feeling with the racemic ketone salts were, (A) caffeine. So most of the drinks they load in caffeine, so you "feel something," so that's not ketones. But then the massive salt load was helping them with the keto flu. But they could have just saved a whole bunch of money by using pink Himalayan sea salt and saved money. And I did get reports of people saying, "After one or two weeks entering into keto, I'd still be taking these racemic ketone salts, and I couldn't put my ring finger on." Why? Because after you're transitioned into the ketogenic diet, you no longer need that massive, massive salt load.

And that salt load is because you lose 2, 3, 4, 5 pounds of weight, but that weight is all water within the first few days. And that water just has grams and grams and grams of salt, so you need that replenishment. So, people were claiming that after two weeks it wasn't working, so then they put the can up on the shelf and then wait for five months later when they want to do the ketogenic diet again, and they pull it down and I say, "Great. But save some money, go get just salt." And then finally the chiral version of the salts came out, which is much more expensive to do. And you'll know whether their product is the D form or not, because they're going to brag about it on their labeling, because it costs so much more.

No one's going to accidentally use the higher purity without saying D, also known as R, which is confusing. But D-beta-hydroxybutyrate, ketone salts. So, those are the ketone salts. But even Dr. Veach, even the R form was not a fan of those because the salt load was still way too high, except for maybe during that transition time. And then you have the ketone ester, which now has its own umbrella of several different ketone esters. It used to be that there was only one ketone ester. So, all the scientific papers were very easy to understand. Ketone ester meant this molecule, which I'll discuss, which is D-beta-hydroxybutyrate, the free acid form bound to R 1,3-butanediol, also known as D 1,3-butanediol. And what happened was the ester enters into the bloodstream intact. People thought it actually separated it in the gut. And if it separates in the gut, why not just take the two parts separately? But drug companies will make an ester form of something to enter into the bloodstream more readily.

So, they did find that the ketone ester got into the bloodstream, then enzymes would separate it, make it into a fast release of D-beta-hydroxybutyrate, free acid, the same molecule that your

body makes when it burns fat. And then R 1,3-butanediol that goes through the liver, and 80% of that converts to ketone. So, you have a fast release and a slow release. So, then the next exogenous ketone, and I'll come back to the other ketone esters-

Dr. Joseph Mercola:

Is the ketone ester the one that Dr. Veach uses?

Frank Llosa:

So, Dr. Veach is a ketone ester, which we now more specifically call ketone monoester. Mono means one bond. Because [inaudible 00:22:31] has a ketone ester. Technically a "ketone ester," the word ester just means a bond of two ingredients where one of them is ketogenic, only one. So actually, 10 years ago they used to call ketone salts "ketone esters" actually because it's a bond. But they stopped doing that, used the name ketone salts, thank God. But [inaudible 00:22:50] has the acetoacetate, which is a different ketone, which is less energetic than the beta-hydroxybutyrate bound to racemic 1,3-butanediol, but that is not a ketone monoester, but still in the category of ketone ester. There's two other esters that are out there now – one is a C6 or C8, they've made two different versions because the first one didn't work – bound to R 1,3-butanediol.

So, they actually take that C8 and make an ester of it, but that molecule is actually too large and it doesn't enter into the bloodstream intact. So, I don't know how different that is than just taking the two separately, but they make an ester of it. I think in part to be proprietary, but it's 16% as bioavailable. So, they'll market this \$5 drink and say, "\$25 of ketones cost less per gram." But it's just not bioavailable, has to be taken with food, which defeats 90% of the use cases of how we give the ketone ester. So, that makes it even less effective than the 16%. And then there's another one that's D-beta-hydroxybutyrate bound to glycerol, but two or three glycerol molecules. Again, not a monoester, so that's why we're starting to put on our bottle ketone monoester to distinguish. Because these companies say, "Look, we sell ketone ester, and all the papers talk about ketone ester." And I call that science hijacking.

It's a different molecule, don't be confused. It looks cheaper, but it's actually, I think – I consider it more expensive because you need so much more of it to work. And the glycerol ester, the glycerol converts in the glucose. So, time will tell with trials whether that's beneficial for certain instances, which it might be. And the one that with the C8, one benefit that I can give to them is that actually works better with food than the ketone monoester. Ketone monoester with food just doesn't penetrate. So, if someone for some reason had to take something with food to limit glucose spikes, maybe that drink would be better for that instance. But for a fasted workout or for workout period, because of the GI issues of that molecule, I don't think any athlete's going to do that. So, then the last molecule in this umbrella of exogenous ketones is R 1,3-butanediol.

So, this is half of the molecule of the ketone ester. So, D-beta-hydroxybutyrate, bound to R 1,3-butanediol]. I asked Dr. Veach, "Hey, just making the R 1,3-butanediol is much cheaper than that extra expense of making an enzymatic bond, and all the loss, and material, and the extra processing, and time, and just money. Why not just give an extra 30%, 40% of the R 1,3-butanediol] to make up so that the blood levels would be the same as the ketone monoester?"

And his answer changed everything. He said, “The mice were stumbling, the mice were drunk.” Because hyper technically 1,3-butanediol, the word “diol” means alcohol. It’s a form of alcohol. Now people think of alcohol and then it turns them off, they say, “Oh, I don’t drink alcohol.” No, no, you don’t drink ethanol. So, ethanol is what’s in beer, vodka [and] wine.

People think that they’re drinking different alcohols. No, no, no, they’re all drinking ethanol for the last 7,000 years. So, this is technically a type of alcohol but not ethanol. And so, R 1,3[-butanediol], it gets you buzzed. It got the mice buzzed. So, he wanted to use it for therapeutic purposes, but he can’t have grandma stumbling around all day, so he threw that out. I took that out of the trash and said, “I think some people might want that.” And that’s when I filed a patent for that. And then it took four years because I was making the ketone ester and we had supply problems. We had to scale it up, and buy all the equipment. We manufacture it all. We ultimately then launched this separate company called Hard Ketones to just focus on the R 1,3-butanediol, as an alcohol alternative with GABA (gamma-aminobutyric acid) receptors.

And it gets you buzzed. And we put in – I don’t like to say that one is three times or 10 times stronger, it’s just different. So, we like to say different ketones, different results. So, the ketone ester is better for brain sharpness, or you love to take it on that airplane, or for sports performance. The hard ketones are more for relaxation, trigger some GABA responses, and to get that buzz. And we put 17 grams of the R 1,3[-butanediol] into one of these cans, 15 to 17 grams. Meanwhile, what we call one serving is 2.5 grams of ketone ester. So, just a massive factor, eight times the quantity on a per serving basis, it’s just drastically different. But some companies that try to market it as, “Oh, it’s a new and improved better than ketone ester, because it’s slow release,” it’s all hogwash.

Dr. Joseph Mercola:

So, why don’t we review some of the benefits? You alluded to them earlier when you might want to use this therapeutically. I’m not convinced that using it chronically is a good idea. It’s necessary unless you’re really exposed to some very severe oxidative stress. But I know through Dr. Veach’s associate, would be the best to call him, Bill Curtis, who you well know. Really sharp guy in molecular biology and understood a lot of Veach’s work, helped me understand that one of the therapeutic applications of raising ketones would be a radical decrease in oxidative stress, really significantly, and it does it through the mechanism of activating NADPH (nicotinamide adenine dinucleotide phosphate), I believe.

Frank Llosa:

That is something that Veach talked about with the other ketone molecules, was that people just want to look at BHB (beta-hydroxybutyric) numbers and say, “Hey, it doesn’t matter the molecule. If you can get to 1 millimolar, it’s all the same.” But there are so many more things going on in the background. And he explains in a video that I got of him, talking about how the NAD (nicotinamide adenine dinucleotide)/NADPH ratio is not something that we can test easily in the blood. And just because your BHB levels are at 1 millimolar, you could be messing up the real thing that matters over here with the ratios. So, that’s why also he wasn’t a fan of these other molecules because of that ratio analysis.

Dr. Joseph Mercola:

And sadly, there's not really any good existing tool to measure that. You can measure NADH directly or NAD+ directly, but that's almost impossible. There's probably only a few labs in the world who can do that. And you can't send your blood to them because freezing the sample really doesn't work very well. Or it could work, but it's such a perishable molecule. You almost have to do the test in the lab just doing it.

Frank Llosa:

Well, I think it's going to be just real-world experience of mental cognitive tests with both molecules. What worked, what made you drunk? Some people slur their words and bump into tables with the Hard Ketones. And other companies are saying, "Use this before your LSAT (Law School Admission Test) exams." And I'm just like, it just blows my mind. It's so confusing.

Dr. Joseph Mercola:

But I'm just trying to understand the benefits for those who may be open to it with respect to oxidative stress, and let me give you examples. You're going to get a CT scan. You're getting chemotherapy. You're going on a flight and you're traveling at 35,000 feet, which is significantly higher than Mount Everest, folks, significantly. It's like another 10,000 feet. And it's pretty bad up there at Mount Everest, so it gets much worse the higher you go. And that thin shield of aluminum you have wrapped around you at 35,000 feet doesn't stop gamma rays. It comes right through like a hot knife through butter, and it's going to cause oxidative stress in your cells, no question.

I think this is one of the good strategies for those types of instances, CT scans, extra X-rays to do that. And maybe you can discuss some of the dosing on that because from my perspective, I don't recall, but there's a bit of divergent opinion on it, whether you take it right before, or after, or even wait a day and take it a day after, I think is what Veach was recommending. So maybe walk us through some of the different strategies.

Frank Llosa:

Well, with radiation, there's going to be a paper coming out within a month. It's been seven years in the making, and it was briefly touched upon in a chemistry book, which is why I can mention it, where they gave mice enough radiation so that 70% of the mice died. And then they took another group and gave them ketone ester either before and after or just after. And when they took it before and after, 100% of them survived and then lived just as long. And then if they were taking just afterward, 90% of them survived. So, just massive, massive –

Dr. Joseph Mercola:

[inaudible 00:31:30].

Frank Llosa:

-just taking it afterwards. So, that is going to be, I think, a groundbreaking paper. It's going to open up so many possibilities. As far as for cancer, what we really need to understand-

Dr. Joseph Mercola:

Are you one of the authors on the paper?

Frank Llosa:

No, no, no. I'm not a doctor, not a scientist. I just push them to get things published because Veach was screaming about getting that published three or four years ago. And for whatever reason, bureaucracy, it just wasn't coming out. So, the prospects for that for cancer, the next step for understanding the science there, and I wish if someone has the money to donate to make this happen, is to make sure that the radiation only protects the good cells, that it doesn't accidentally protect the bad cells.

And there are theories – so Travis Christofferson, M.S., who wrote the book, “Ketones, The Fourth Fuel” – Great book to take a deep dive on this – He explained to me, but not in a way that I can re-explain, that the good cancer cells are protected and the bad cancer cells in theory shouldn't be protected. So, for potential cancer, you would want to make sure with some study that it's only protecting the good cells and not accidentally protecting the bad cells. Because that mice study just shows that it protects the entire body, it doesn't show the difference that you need.

Dr. Joseph Mercola:

[inaudible 00:32:49].

Frank Llosa:

And a lot of cancer radiation, my understanding is it's a fine balance between how much radiation you give to kill the cancer versus killing the host. You don't want to kill the person with too much radiation. So, if you have an opportunity to be more aggressive on the radiation or protect from that, that has a lot of prospects.

Dr. Joseph Mercola:

So many people hear the word cancer and the first thing they do is run. And I do mean run straight to the oncologist who almost universally recommends chemotherapy. Not all, but most do, I think. And the sad reality is that a large percentage, if not the majority of them, strong majority, actually benefit directly. They're financially reimbursed by that recommendation for the drug, which should be illegal, but it's not. I don't know why it isn't. And these drugs aren't cheap, they could easily be into six figures per month.

Frank Llosa:

Wow.

Dr. Joseph Mercola:

So, there's a massive conflict of interest there. And now I'm not claiming that's true for all oncologists, and there's probably some where it's not at all, but it is a concern. It's a risk. And my experience with treating cancer or helping people treat their cancers, I was never a primary clinician for doing that. It's something I avoided assiduously. So, I didn't really understand the science of it. Now I understand the science of biology much better at a foundational level, and essential to that is optimizing your mitochondrial function. There's no question that is the key. That is the core to improving health and removing diseases. So, if you're going to engage in chemotherapy, I would first encourage you to consider not doing that, not doing that. Because essentially what you're doing is sabotaging your ability to survive. You're essentially putting handcuffs on any physician who understands health to help you in the future.

And in most cases, you're writing a premature death sentence. That's how strongly I feel about it. I just couldn't say it more clearly. Don't take chemo. Your life depends on it, to not take it. But if you decide for whatever reason that – I'm sure there are exceptions. Absolutes are rarely ever true, and I'm sure it's the case here. In those exceptions or for whatever reason, decided to risk it because what drives that decision mostly is fear because your life is at stake. It's literally a life and death situation, there's no question. So, if you're going to take that, I know this is a long prelude to it, but I really believe that you would be very foolish not to consider high doses of these ketones because it will provide protection against the healthy cells from being damaged, specifically your immune cells. When you knock out your immune system, your ability to fight cancer almost disappears. So, you have to be really very careful. So, given that context of the massive preventive potential in that scenario, what would you advise for dosages of someone considering chemo?

Frank Llosa:

Oh, that's where I prefer to have the doctor give recommendations.

Dr. Joseph Mercola:

But there are ranges. [inaudible 00:36:06]-

Frank Llosa:

I can tell you that there is a concept out there called therapeutic ketosis, where it's like 3 to 5 [millimolars], some random number on a chart. And I'm not sure that I completely agree with that, that's more mice data. And with the mice data, I'm not even sure that they've compared 1 [millimolars], versus 2 [millimolars], versus 3 [millimolars], versus 4 [millimolars]. They just like this phrase, "3 to 5 [millimolars]." And I get phone calls all the time saying, "I can't hit 5 millimolars, and if I don't hit it –" And I'm like, "Your stress is actually making everything worse than your attaining these numbers." So we've seen plenty of benefits for cognition, even in 0.5 [or] 1 millimolar, the tiniest amount. As far as with radiation, I don't know. I'd love for someone to fund a study that compares one number versus another number. But if you want to keep it simple, just \$5 worth just to get something in you.

Dr. Joseph Mercola:

Well, if a life is at stake here, I think you'd want to be a little more precise than just winging it with \$5 worth. Your opinion is helpful, and I wouldn't ask you if I didn't think it wasn't.

Frank Llosa:

I just don't know. I just don't know.

Dr. Joseph Mercola:

I don't even know.

Frank Llosa:

I don't know if 1 millimolar helps versus the 2 millimolar.

Dr. Joseph Mercola:

I don't think the answer is in – although it's more accurate, is to measure your ketones and see what it is because the dose can be different. But what do you think, if it was you, what would you take?

Frank Llosa:

First of all, I'd load it up for two or three days beforehand. I think there is a loading-

Dr. Joseph Mercola:

What does that mean? What does that mean?

Frank Llosa:

That would be a 10 to 20 millimolar, so two to four servings every day.

Dr. Joseph Mercola:

And what's a serving?

Frank Llosa:

We call a serving – sorry. We used to call a serving the entire bottle. Now the cap became a serving, which is 5 mL (milliliters), so we go to 10 to 20 mL.

Dr. Joseph Mercola:

That's the concentrate?

Frank Llosa:

Yeah, the concentrate the KE4, which is 50% after-

Dr. Joseph Mercola:

You can't talk about the concentrate without a warning.

Frank Llosa:

Oh, the taste.

Dr. Joseph Mercola:

It tastes terrible.

Frank Llosa:

It tastes really bad. Some people say that they like it, and I say, "Don't tell anyone else because then they're going to manage expectations, and they're going to think that it tastes good." No, it's like taking a shot of apple cider vinegar, or a shot of ginger, if that's your mentality-

Dr. Joseph Mercola:

No, that would be good. This is not that.

Frank Llosa:

Okay. All right.

Dr. Joseph Mercola:

It's much worse than that, really. I think I'm allergic to it. I can't take it anymore. And probably it's a clue that for me that isn't good. I would consider it if I was in an unusual scenario, because it is a powerful therapeutic agent. There's no question. And that's primarily the reason why I had you on, because I think people should know about it. I'm not necessarily suggesting or endorsing that people take it, that's for you to consider and evaluate yourself. But there are cases where I think it's very, very helpful. And potentially even life and death cases.

Frank Llosa:

Well, we'll get you some of the raw stuff, which tastes even worse because you might be having some reaction-

Dr. Joseph Mercola:

I don't want the raw stuff. I don't want the raw stuff. Do not send me the raw stuff.

Frank Llosa:

We have stevia in our main ketone ester, so maybe there's some reaction there. Because usually people do not have a reaction, that's very rare that someone-

Dr. Joseph Mercola:

Yeah. It's almost a severe nausea. And I typically don't have a problem with stevia. I don't mind stevia. How do you deal with it?

Frank Llosa:

For what it's worth, I didn't want to talk about this, I actually tried to – Maybe they did FedEx it to you. We are coming out with something new that has six times more water, zero burn, just ketone ester.

Dr. Joseph Mercola:

I think you have a packaging, is it the Hard Ketones?

Frank Llosa:

No, no. We call it Ketone Shots.

Dr. Joseph Mercola:

Ketone Shots. Okay.

Frank Llosa:

So just straight up ketone ester in water, doesn't even have stevia. It has just monk fruit, no burn. And it's the equivalent of two capfuls, but in a 2-ounce bottle, similar to this other product that we have called KE1, but it's just the ketone ester in water. And you'll like that, it's very smooth. But we think that that will replace our own KE4, which is our 80%, 90% market share is KE4.

Dr. Joseph Mercola:

Wow. So that's a big transition for your company, it's huge.

Frank Llosa:

The plan is to finally make it taste good and just monk fruit, some inulin and that one will make a big difference.

Dr. Joseph Mercola:

You can even use it [inaudible 00:40:04] effective probiotic, if you have healthy gut bacteria. If you don't, it could actually make you worse. Do you know how it makes you worse? It

indiscriminately feeds your bacteria in your gut. And if you have a predominance of disease-causing bacteria, otherwise known as pathogenic bacteria, which is usually a facultative anaerobe that actually can survive with oxygen, because most of the bacteria in your large intestine should not be exposed to oxygen. And if they do get it, they're dead. But when you're unhealthy because of dietary choices, you change the environment. And most people have this, actually, this is why I'm discussing it. Because if you have that scenario in your gut and you give them inulin, you can feed the bad bacteria. Which in their cell walls, what makes them bad is they have something, a fat-sugar combination called lipopolysaccharide, LPS for short.

And when those bad bacteria die, it's something that is also called endotoxin. It is a severe toxin, just as bad as omega-6 and estrogen, and it causes cellular damage that can kill people actually in excess and can cause septic shock. Really big problem. So anyway, but if you're healthy that inulin is amazing, because it feeds the good bacteria and really will help them grow.

Frank Llosa:

We've put in a very small amount as well, as few ingredients as possible because we're focusing on the ketones doing the work. But one comment about whether to take it for situations over time, the plan was with Dr. Veach for it to be a daily elixir forever. Keeping in another 0.5 ketones on a daily basis.

Dr. Joseph Mercola:

So that is an interesting comment, and I appreciate that. And Dr. Veach was a smart guy, he really was. And unfortunately, he didn't have the skill set to communicate effectively to the masses.

Frank Llosa:

Agreed.

Dr. Joseph Mercola:

In fact, he was severely challenged actually, which was probably one of the reasons why I didn't connect with him. There's a lot of people smarter than him that can communicate. He just chose to live in this state where he didn't want to communicate with people who didn't understand him, and that was very few people. There was probably only a handful of people on the planet that could communicate with him effectively.

Frank Llosa:

Yeah, agreed.

Dr. Joseph Mercola:

You have to be a molecular biologist to do that. Almost a world-class molecular biologist.

Frank Llosa:

One of his papers was about ketones for longevity in particular, and he looked at four or five different animal models where the animals lived longer under different trials. And each one of the papers had a different reason why they thought that the animal lived longer, either it was fasted or caloric deprivation. And his conclusion was, "Hey, you guys all missed it. It was because each one of these models triggered ketones, and it was the ketones that led to the animals living longer." That's a high-level summary of that paper, which you could take it to a different level.

Dr. Joseph Mercola:

And the basis for that observation was his assessment of the data that's concluded that the common denominator was elevated ketones?

Frank Llosa:

Yeah.

Dr. Joseph Mercola:

Okay. And obviously they weren't taking exogenous ketones-

Frank Llosa:

Right. That's just endogenous.

Dr. Joseph Mercola:

Which is [an] interesting observation. And really lends strong support to what I believe at this point is a supposition, and that is that there could be some huge benefit, that you could achieve very similar results that those animals achieve without fasting. Because I am not convinced, as I stated when I opened up this discussion, is that endogenous ketones are likely more harm than good for most people. I would not recommend that. But to take an exogenous ketone product like yours, it's a whole different story because you're not activating stress hormones at all. None. Zero.

Frank Llosa:

You'll like this. The actual for clinical trials when they come to me and ask what I recommend as far as the diet, because one thing is how much exogenous ketones to take, and another thing is, well, what diet we put them on. I think the ideal diet is a low glycemic index, non-ketogenic diet with exogenous ketones, because I think half of the problem is the sugar. So, when you're on a ketogenic diet, people love it, but we don't know how much of the benefit is the ketones, and how much of the benefit is just getting rid of that sugar, the glycemic spikes and stuff like that. So, the best of both worlds could be the low glycemic index, so things that don't spike your blood sugar. I tell people, "Buy an \$88 continuous glucose monitor before buying my ketone

ester. Let's see what your blood glucose is doing spiking, and try to hammer that down and flatten that before spending money on ketone ester."

So, the ideal diet I think is low glycemic, but not necessarily keto, and then adding exogenous ketones, especially on a short-term basis. Because short-term basis, you're going to do the ketogenic diet wrong, you're going to get into the keto flu, you're going to be stressed out. So just lowering your carbs and getting rid of high-glycemic foods is going to be half the battle. And then adding exogenous ketones to that. And when people tell me that they drink orange juice, and then they want to take ketone ester for their cognition, I'm like, "Don't even bother."

Dr. Joseph Mercola:

Well, I would offer a different evaluation or recommendation because I disagree pretty strongly with that. And you say, "What?" That would be my older version. The newer version is a deep appreciation of the importance of glucose as the primary fuel on the mitochondria. Now, to achieve that state is a challenge for most people, because of the reference I made earlier that most people's microbiome is seriously dysfunctional, as a result of the dietary choices that were previously made. And when you have these gram negatives that have endotoxin in your cell walls, and you take carbohydrates, specifically fruit, which I believe is the best food on the planet. And the polyphenols are particularly good, but it has fiber, and the fiber can go in and it can activate these pathogenic bacteria and it can cause a lot of problems, complications. So, you have to be really, really careful about optimizing your microbiome.

And there are specific strategies that can be done that we're not going to discuss in this podcast. But if your microbiome is healthy, and then you can eat fruit, and you can even eat starches. And it's shocking because I typically eat between 400 and 500 grams of carbs a day. And I know many people – I can think of Ashley Armstrong as one who is 140 pounds and eats 600 grams of carbs a day, yet has totally normal blood sugars and normal glycohemoglobin, because her mitochondria – our mitochondria can burn glucose effectively. We have a very active metabolism, and that is no suppression in thyroid hormone, our other hormones are fine, and you can burn that fuel. And when you're burning that fuel, which is I think the crux of your argument. You're concerned with the recommendation of low glycemic because that's the way most people are ostensibly achieving it. But I don't think it's ideal, I think it's far from ideal.

If you have a low-glycemic, you still run the risk of activating the stress hormones. If you take not enough carbs, you're going to activate adrenaline and cortisol, and those are not good chronically, they're great that they exist and they keep you alive. No question. Thank God we have them, without them we would be dead, assuredly. But if you activate them all the time, you're going to run into trouble.

Frank Llosa:

But what about the stress, if you don't mind, the stress of drinking an orange juice and having your blood sugar shoot up?

Dr. Joseph Mercola:

Well, that's not stress. That's not stress.

Frank Llosa:

That's not stress?

Dr. Joseph Mercola:

Unless you consider it a hormetic stress, yes. Will it spike? It'll spike, but it spikes and comes right back down. Right back down if you're healthy. If you're not, if you're metabolically inflexible, then that's going to be an issue. So, you need to control your insulin. So, the other component of this is you need to be insulin-sensitive. You do a fasting insulin level and it's 2 or under 3, or under 3, or under 2, which mine has been many times under 2, 1.5. Try to get an insulin level below 1.5. It's pretty low.

So, you have to be insulin-sensitive. If your insulin in fasting is 5 or 10 or even higher, you got a problem, then you're not going to be able to do that, then you will have an issue. So there's other – the diet, the exercise, the sleep. There's a lot of variables. And even emotional stresses, stressors can be a factor. But once you get that optimized and you're looking at ideal biology, then – In fact, truthfully, I drink about 4 ounces of orange juice every night before I go to bed.

Frank Llosa:

Wow.

Dr. Joseph Mercola:

Yeah. For specifically to do that, to get that fuel. Because it's really easy to digest when you're not really activating digestive processes, because it's very simple. Now, I would not eat protein or fat before I go to bed at all.

Frank Llosa:

Funny thing is people actually drink our ketone ester before bed, it's one of the top uses.

Dr. Joseph Mercola:

I think that's a good idea. I haven't done it for a while, but I was putting the ketone esters with the orange juice.

Frank Llosa:

Really? Okay, well that's –

Dr. Joseph Mercola:

Play with that. I think you might see a difference. And I think there's good biological theory to support that. Because I think Veach was onto something when he said that the ketone elevation is

probably it. And it feels like that would be a good strategy, which is why I had you on the show because I really think there's merit to what you're doing and providing, and you do a good job at providing it.

Frank Llosa:

What do you think about the Hard Ketones on that side of the alcohol alternative to help people [inaudible 00:49:41]-

Dr. Joseph Mercola:

I wanted to go into that. This is your life job. You live, breathe and eat this thing all day long, so your insights are going to be better than mine. I can reconcile some of the biology better than you, but you know the ketones top to bottom. My understanding, and correct me if my misunderstanding if that's the case, that there wouldn't be much of a difference as long as it's just a source of ketones and supplying that to your body.

Frank Llosa:

It's pretty different. It's very different.

Dr. Joseph Mercola:

[inaudible 00:50:10].

Frank Llosa:

There's a lot of things that we don't know that are going on behind the scene, so just because two products might raise the ketones the same number-

Dr. Joseph Mercola:

Help me understand.

Frank Llosa:

So, we don't really fully know, but with the Hard Ketones the focus of that product is single-handed to get people off of regular alcohol, ethanol. I don't know what your position is, but some studies say, "Oh, one drink a night might be actually beneficial." But some of those studies when you actually peel it away they found that the reason that the one drink a night people live longer was because the people that were zero drinks a night, not all, but a large portion of them were people that were diseased, just got diagnosed with cancer, and they were told that they had to stop drinking alcohol. So then they go to zero, and then they die off earlier, and then it screws up all of the data because the zero drinkers are people that were drinking zero because of a disease. So, I'm in the camp that even one drink a week isn't healthy. I don't know where you are on that.

Dr. Joseph Mercola:

No, I agree. I'm not a big fan of alcohol. I rarely drink it. But on the other hand, if someone found great social value in drinking small amounts on a regular basis, I don't know that that's going to be significantly harmful, although it might be. There's a lot of variables that we don't know, but there are some studies that support that as a lifestyle.

Frank Llosa:

If someone's going to a wellness center and they're drinking only one or two drinks a night, I would say all of these different biohacking things you might try, the No. 1 thing is going to be to get that person off of that one to two drinks a night to see the best benefit in inflammation.

Dr. Joseph Mercola:

The No. 1 thing is to get them off of the seed oils.

Frank Llosa:

Okay, okay. Sure, sure, sure.

Dr. Joseph Mercola:

Because that's going to increase reductive stress, which will secondarily massively increase oxidative stress. And the reductive stress, when you've got an excess of NADH running around, you are moving the body in the wrong direction rapidly, rapidly.

Frank Llosa:

Well, I think the seed oil, there's probably less of an addiction to seed oil. Maybe there is an addiction, so you can cut that out more easily. Alcohol is a little bit-

Dr. Joseph Mercola:

It's actually a challenge. It's not a reward challenge.

Frank Llosa:

You have to look at what's in your ingredients, and it might be much harder to eat out and-

Dr. Joseph Mercola:

[inaudible 00:52:30].

Frank Llosa:

-stuff like that. But it's not an addictive craving like regular alcohol, just a visceral chemical imbalance. So, people have been able to switch from regular ethanol to our product, either cold turkey or they cut their alcohol in half by drinking some of our stuff first. And it helps with alcohol withdrawal symptoms, and just helping get people off of regular ethanol. We've had

some people now a year and a half that haven't drank anything, that were drinking a bottle of wine a night. Switched over to two cans of our stuff and haven't gone back, and it's been three years now. And then they got off of our stuff, that's the important thing. Two months later, I said, "Hey, you haven't ordered. Are you okay?" She's like, "Oh, I'm fine. I'm just not ordering anymore." I'm like, "Well, did you go back to wine?" She's like, "No, no, I just went to water. I'm sorry." I'm like, "That's not a bad thing. That's a great thing."

Dr. Joseph Mercola:

That's the goal.

Frank Llosa:

You transition to our stuff and then you just were able to just stop our stuff. And even the weird thing about this drink, because of the ghrelin effect, it lowers your desire for itself. So normally with a beer, you have a blood glucose spike, and I think is it acetate that goes into the brain? You just desire another beer, and another beer, and another beer. But with this, people have one or two and they just don't crave a third, fourth, fifth.

Dr. Joseph Mercola:

I think it might be acetaldehyde, isn't it?

Frank Llosa:

Well, the ethanol converts it into acetaldehyde, but then acetaldehyde then converts to acetate, which I think goes into the brain.

Dr. Joseph Mercola:

I didn't know that.

Frank Llosa:

The brain craves the acetic acid, acetic. The brain craves that as part of that cycle of ethanol. And then the R 1,3-butanediol converts to a four-carbon version of acetaldehyde that is not as bioavailable, so the body can't use it as a toxin, and then it goes on to quickly convert to beta-hydroxybutyrate ketones.

Dr. Joseph Mercola:

I think that's an important part of this conversation, is that for any one of you who struggle with alcohol for whatever reason and are concerned about it, you've got to be foolish not to consider this product to help you. Or someone you love who is in a similar scenario because it clearly works. Nothing works 100%, but it's certainly worth a try.

Frank Llosa:

People care about three things: taste, price and buzz. And what we found with the buzz is people that are already using SSRIs (selective serotonin reuptake inhibitors) or kratom, they don't feel a buzz at all, no matter how many they drink and I don't know exactly why. Eighty percent of our customers feel the buzz with one or two, and those that don't, we refund them. But I ask them a series of questions, and time and time again, "Oh yeah, I do take SSRIs. Does that matter?" When you keep on saying that repeatedly, we now put it on the can, "You won't feel anything if you –"

Dr. Joseph Mercola:

Do you know why that is?

Frank Llosa:

The GABA receptors get – I don't know if the word is blown out or-

Dr. Joseph Mercola:

[inaudible 00:55:25]. And serotonin is not a health molecule, it really isn't. In excess it will destroy health. It's like an estrogen agonist actually. SSRIs are very dangerous. They should not be on the market at all. They're really dangerous drugs. They should not be used by anyone. I know it's a strong statement, but I believe that, really bad idea.

So, in the future – Remind me, I'll send you some articles on this that show the dangers of serotonin. And you may be serving them. I know they're not your customer at that point, but just helping them out doing the right thing and letting them know that it may be time to consider a course of weaning off this. And if they really believe they need an antidepressant, there are other options.

Frank Llosa:

I would send them that link for sure, because trying to get people off of medicine in general-

Dr. Joseph Mercola:

Your test is a marker to identify these individuals, which is interesting. Kratom is another issue. I'm not a huge fan of kratom. It helps something, but it has a questionable legal status too in this country.

Frank Llosa:

A questionable legal status. And people email me saying, "I wish I'd listened to your podcast telling people to stay away from kratom because it's highly addictive." He's like, "I'm now up to eight bottles a day, and I feel like I'm addicted." The kratom stuff, I'm not a fan of that.

Dr. Joseph Mercola:

I actually grew some kratom trees because I live in a subtropical area, and one of the hurricanes took them all out. They were big too, they were 30 feet.

Frank Llosa:

That was a sign. So, when you take the Hard Ketones, do you feel a buzz or a sense of relaxation?

Dr. Joseph Mercola:

No, there's definitely a buzz. I don't take SSRIs. It's actually a treat because your piña colada flavor is just like, "Oh." I don't drink piña coladas. I did in the past, just because the flavor, it's so sweet and tasty.

Frank Llosa:

Well, we try to make – it's probably sweet for you, but we actually try to make it as low on the sweetness scale as possible. So, the general palette-

Dr. Joseph Mercola:

I'm a big fan of sweet, believe me.

Frank Llosa:

Well, the general population wants it sweeter. So, we've tried to make it as unsweet and subtle as possible. We have two other stronger drinks, I think you've tried probably the G&T and the Ginger Mule. But those are less water in them, so they've got more of a kick to it and people have to get used to it.

And I think what we just sent you is our newest can called Dr. Up. So Dr. Up is designed for you to doctor up your own drink. So, it's unsweetened and no added flavor, which I thought you might like too, and you just make your own. We didn't want to sell a concentrate because someone's going to go and do a TikTok challenge and mess it up. So, we still wanted to have an 8 ounce can to have you drink 8 ounces, but this is designed for you to make your own stuff. So, people are using their either sugar-free or with sugar cocktail mixers, and making their own drinks with the Dr. Up.

Dr. Joseph Mercola:

You know what else you can do? There's this new device, relatively new, it's been out for a while, but maybe a year. It's called the Ninja CREAMi. Have you heard of that?

Frank Llosa:

No.

Dr. Joseph Mercola:

Ninja's a really good company with respect to making devices in the kitchen, they got a great mixer and blender. But this CREAMi, you freeze up a drink. Well, there's no alcohol there. You couldn't freeze alcohol, obviously it doesn't freeze. But this drink you could because there's no alcohol in it. But I don't think-

Frank Llosa:

This drink, the R 1,3[-butanediol], it does freeze. At this concentration we have had them explode in the freezer.

Dr. Joseph Mercola:

Okay, good. So, then it would work. So, you can take that and you can create your choice, and you can have an alcohol-free ice cream.

Frank Llosa:

Yeah.

Dr. Joseph Mercola:

You could. You could do it.

Frank Llosa:

Make your piña colada even more like a frozen piña colada, a frozen daiquiri.

Dr. Joseph Mercola:

The CREAMi device, it really works. It turns it into almost like commercial ice cream.

Frank Llosa:

I've seen the Ninja-

Dr. Joseph Mercola:

Blenders.

Frank Llosa:

-blenders and stuff, but not that other thing.

Dr. Joseph Mercola:

The CREAMi is starting to take off.

Frank Llosa:

With the Hard Ketones, do you take them for any other benefit at night triggering GABA? What are your thoughts on that?

Dr. Joseph Mercola:

I like natural progesterone. I think it's a better GABA agonist. It's really, really effective, and it is a really powerful estrogen antagonist, and it's a cortisol blocker. I think natural progesterone should be taken by just about everyone.

Frank Llosa:

You mentioned cortisol blocking. So, one non-scientific thing that we found with people that take ketone ester before bed is that they don't get that 2 a.m. cortisol spike that wakes them up and then sometimes keeps them up for two hours. They take a half of a capful, like \$1 worth, and they're like, "Hey, I just didn't wake up at 2 a.m. and woke up, and my cellphone was still on my chest." Which I am sure you don't agree with, but the whole point is that they didn't roll around is the point of that.

Dr. Joseph Mercola:

It's okay if it's on airplane mode, but most of these people, it's not. So, they're just radiating themselves if they had known the damage. The problem is, it's so convenient and it's so unnoticeable, there are no acute symptoms. You just find out 10 or 20 years later when you got cancer.

Frank Llosa:

Right. Do you think ketone ester could be on a daily basis, help with the radiations from the cell phones?

Dr. Joseph Mercola:

I think so. Thesis work suggests that pretty strongly at the NADPH, that it activates – I think that's the mechanism-

Frank Llosa:

We have had some pilots. I actually just got an order that said from a hotel in Miami. And it said Air France pilots that were ordering it.

Dr. Joseph Mercola:

Smart pilots, probably read my newsletter.

Frank Llosa:

Maybe. And then the first ketogenic astronaut went into space last month. He was ketogenic. He was given a meal plan of 700 items, and he picked the most ketogenic items on the list, they wouldn't give him more oils and stuff like that. NASA just wasn't that advanced, they're still stuck in the '70s and '80s when it comes to nutrition, but he takes our product before the launch and then I wish he could take it up with him, but he was keto while all up there. I'd love to see if there's any data on his blood.

Dr. Joseph Mercola:

I think the correct choice would've been if he were to take your product up there. I think that would've been helpful. I'm not convinced as I said earlier, that the ketogenic diet is a good strategy. And you mentioned taking your product to block cortisol. But one of the reasons cortisol would be secreted 2:00 in the morning is that your glucose levels are so low. If you're on a low-carb diet, if you're taking 50 grams, 100 grams of carbohydrates a day, your glycogen stores over time will become depleted and you will run out of glycogen in the middle of the night, and you'll have to secrete cortisol to activate the creation of glucose. So, you don't want to block that response because it's therapeutic. It's actually life-saving.

Frank Llosa:

No, this was for non-keto people. People that are already keto I tell them not to take my drink before bed-

Dr. Joseph Mercola:

Okay, good.

Frank Llosa:

-because it's too cumulative. It's too cumulative, it's too much. But the non-keto people, they can. When my wife goes in and out of keto, she forgets, and then she takes the same amount of ester before bed and it drastically changes her sleep. And she's like, "Uh-oh, I was cleaning the closet for two hours."

Dr. Joseph Mercola:

For the worse. For the worse.

Frank Llosa:

For the worse. Taking ester while keto was too much.

Dr. Joseph Mercola:

And you will not sleep-

Frank Llosa:

Before bed.

Dr. Joseph Mercola:

-you will be too activated. You're just amped up because your cortisol is really high and that's not good. Just not a good strategy. And so, I'm glad you're doing that because that is really a wise course. Because it doesn't help your sales, it hurts your sales. But you're telling people the truth. And letting them know that this is dangerous to take when you're on keto. Do not take it.

Frank Llosa:

Well, I don't know about dangerous. It just made your sleep worse.

Dr. Joseph Mercola:

Well, that's a sign. I'm not saying it's going to kill you prematurely, although it might for long term over years and years. But it's certainly not pushing you in a healthy direction, put it that way.

Frank Llosa:

But the people that are non-keto, taking it before bed, they're recording 30 minutes more deep sleep-

Dr. Joseph Mercola:

If they have adequate glucose stores and have plenty of glycogen, then I think it's a good strategy. And I told you that's what I do or did. I stopped it for a while, but I'm re-inspired by talking to you. I think that's-

Frank Llosa:

People with their Oura Ring data, they're able to see real time. And then also, let's talk about HRV (heart rate variability). That's when people see a big difference, is in the recovery of the ketones. We haven't even talked about the ketones with regard to recovery. So, we sponsor the No. 1 cycling team in the world, Quick-Step. I go to the Tour de France, and these teams use huge amounts after their seven hours of riding and a huge amount before bed, crazy amounts that I would never recommend. They drink an entire bottle after the ride and before bed.

Dr. Joseph Mercola:

Is that 50 grams in a bottle?

Frank Llosa:

So, 25 grams of active is what they take after the work ride.

Dr. Joseph Mercola:

So, 50 grams in total.

Frank Llosa:

And then 25 before bed. And I tell the regular consumer, “Unless you have seven hours of 500 watts an hour, do not do this.” And I’m actually wondering whether they’re taking so much that somehow it’s creating an energy excess, that’s then creating a crash on the other end that’s making them fall asleep, because it’s mind-boggling the amount that they’re taking.

But the No. 1 study I would want to touch upon for recovery is they simulated a Tour de France race, and they gave these large amounts after a 15-day race. They simulated four to six hours a day of racing these large amounts, and the ketone ester group was able to do 15% more watts during these 15 days. And then the final time trial was 15% faster over placebo group. It was a monumental difference in recovery.

Dr. Joseph Mercola:

Has it become a recognized physiological fact within that community, so much so that almost everyone is using it because without [it] they’re at a disadvantage?

Frank Llosa:

So, I looked at the roster last year and I was able to find 90% of the teams had at least one customer. And one guy will buy it to give it to the team, and we had supplied 90% of the teams. It’s the de facto. Very few people in the U.S. know about it. And it does work beyond cycling. So, cycling is now the default. And one guy was actually saying, within Quick-Step, he was making a comment about how tired he was, but it was his first Tour de France. And the other guys that were older laughed and said, “You haven’t done a Tour de France without ketone esters.” It’s a night and day difference. So, it was horrible for him, but it is just another level of more horrible. And the times have just been – over the last four or five years have just been sustaining the watts over the days like they’ve never seen, so I haven’t seen a chart. But if there was a chart, you’d probably see the watts averaging over the years.

And the way that they’re just not dropping off and slowing their watts over time has been drastic. But in the U.S., we have Duke University, the men’s basketball team took it during the ACC tournament, and that’s a recovery thing, and they took low doses too. That was a huge difference. They took only 10 mL, 10 mL instead of 50 mL, right after their game. And they were able to track their glycogen restoration in their muscles, is what they looked at, and just helping you recover and be more sharp the next day. And also, people that do two workouts a day, they take it after the first workout and they feel the second workout, they say it felt like, “I didn’t even workout in the morning.”

Dr. Joseph Mercola:

So, that's a pretty powerful anecdotal story. I think it's useful to look at the results of highly competitive athletes. Now, I am not a fan of the extreme cardiovascular endurance like [the] Tour de France. It's a real testimony with-

Frank Llosa:

Well, that's not healthy. Tour de France is not healthy.

Dr. Joseph Mercola:

Very unhealthy and they're damaging their health for doing it. But it is an extraordinary platform to demonstrate the power of these strategies.

Frank Llosa:

And some ask whether ketone esters are healthy in the long-term. And I like to say the cycling for six hours a day is not healthy, this is countering that.

Dr. Joseph Mercola:

It's mitigating the damage, for sure, so it is healthy in that context. But I think it can be healthy, and I think Veach made a good observation, and it's probably accurate that some amount, especially if you're not in ketosis already from a low-carb diet, could be really – It's an interesting consideration. Now, a point I wanted to mention, you said these cyclists were taking 100 grams, no, 50 grams a day. Was it twice a day?

Frank Llosa:

50 grams of active. So, 25 grams of active. So, 50 mL-

Dr. Joseph Mercola:

Twice a day.

Frank Llosa:

-of the bottle twice a day.

Dr. Joseph Mercola:

And the active is about a dollar a gram. So, that's \$50 a day. So, it would be financially burdensome for many to do that. But it's unnecessary, it's absolutely necessary. What is your dose for the active for most people? Is it 2 grams, 5 grams?

Frank Llosa:

I like to talk in terms of the drink itself. So 10 mL, so two capfuls. So, two “servings,” two capfuls of KE4. That’s what the Duke basketball players used, and they were able to find benefit with \$5 worth.

Dr. Joseph Mercola:

That’s 5 grams then.

Frank Llosa:

5 grams of active.

Dr. Joseph Mercola:

5 grams.

Frank Llosa:

Now, I did debate a little bit with the guy who did the clinical trial on 25 grams twice a day, he’s like, “Why are you telling people to take less? That it works just as well?” And I said, “I didn’t say that.” I said we don’t know whether less is as effective, because no one has done a dose response-”

Dr. Joseph Mercola:

Dosing structure.

Frank Llosa:

“-and taken it down.” I’m just saying people are finding benefit at \$5 worth. Now, if money’s no object and it’s not going to mess up your race if you’re taking it after the race, sure, go ahead, take more. You can take as much as you can afford. And you can then decide whether you’ve noticed a difference between \$5 worth and \$25 worth. But most people find benefit in as little as five bucks worth, some people even less. But I like to stick with the 10 mL, post-workout. You’ll see it in your HRV and recovery data.

Dr. Joseph Mercola:

What’s the lowest dose that you’ve seen or noticed improvements?

Frank Llosa:

So, when we first were selling the drink, it was literally the entire bottle. \$30 was what you were supposed to take as one serving. Then we have a Facebook group, 3,000 people commenting, saying, “Frank, I’m telling you, I took half a bottle and it was even better.” I’m like, “Okay.” And then it just went lower and lower and lower. And before you knew it one capful was what I like to say, the minimum dose that a lightweight female will notice it. So one serving, one cap

full. But we have had instances, which I am reluctant to say but you asked the question, where they used a 1 mL dropper, and they took 1 mL of our drink. So, half a gram of ketone ester, I don't know, they swear by it. They take a small tiny amount and they swear that it does something.

Dr. Joseph Mercola:

If they notice it.

Frank Llosa:

I'd love to prove it, but-

Dr. Joseph Mercola:

So it's something to consider is definitely, as I said, I'm not a fan of nutritional ketosis at all. There may be clinical cases that's therapeutically useful and even optimal. Not many though, from my perspective.

Frank Llosa:

I've been reluctant to say this, but I have been keto myself for about six years now, all the way straight through. And for me, I love it. When I'm not keto, I can't read my kids books to sleep, that's my main difference. At 7 p.m., I'm nodding.

Dr. Joseph Mercola:

Well, you have to make a transition for sure. You just don't go keto and stop. I'm glad to talk to you offline on how you might, if you want to consider that. I'm not suggesting you're unhealthy. I just think biologically it's not optimal from my review.

Frank Llosa:

I'm at a low level of ketosis, 0.5, 0.8 in the morning, just a steady state. And I've gotten all the blood work and the doctors are – and gut work.

Dr. Joseph Mercola:

Yeah. The issue is that chronic cortisol activation, which is difficult to assess through blood work. You can, but you need some sophisticated testing to do that. So that's the only concern, primary concern. You just don't want to hit the brakes that much, or the emergency switch when you don't have to. But anyway, you've provided a great product. I really thank you for doing that, and for advancing the science on this. But maybe before we leave, well, your website, you can give us your website. But there are other ketone ester-like products. There's one primary one, I don't even remember what it is. But what about your competitors? How would you compare them?

Frank Llosa:

Right. So, there are two other ketone esters. One is the C8 bonded to the R 1,3-butanediol. And that one maybe with food might have some benefit, but it is not nearly as bioavailable and actually more expensive, even though it might look cheap at \$5 per 25 grams. I've never had one customer switch to that and stay. It just never happened. I have had customers switch and said, "Hey, I read the bottle of yours and I read the bottle of theirs, and the ingredients look the same. Explain to me why did I not feel the same thing?" And I actually made a podcast out of it. I got them on video and we went through it and said the ester bond is important. Some companies will just pour the two ingredients together and just say, "Hey, good enough." Well, Veach would've done that 20 years ago.

But then the main competitor is actually – you opened up the can of worms. But the main competitor is selling R 1,3-butanediol and confusing people to think, or many people think that it's a ketone ester. It's not a ketone ester. It's R 1,3-butanediol. So, the same drink that we say gives you a buzz, and you said that you felt a buzz. They're selling as a brain nootropic sports drink to go drink and take three servings, and get on a bicycle and go 60 miles per hour down a Tour De France hill, I think, buzzed. And I think that's dangerous. We actually put on our cans not for sport.

So that company, they raised \$6 million to study ketone ester. But then in their marketing, they say, "Look, we got \$6 million from the government to study exogenous ketones." And they had the ketone ester four years ago, but they lost their license. So, when they lost their license, they're scrambling around all this venture capital money, "What am I going to do?" They came up with the R 1,3-butanediol and said, "Oh, we'll just pitch this as a ketone ester replacement. Meanwhile, I'm saying to get a buzz with it, they're saying to use it as a workout drink-

Dr. Joseph Mercola:

Not good.

Frank Llosa:

-and it's just confusing people. Those DARPA (Defense Advanced Research Projects Agency) funding, those are only doing ketone ester, they've not converted over to studying R 1,3[-butanediol].

Dr. Joseph Mercola:

And the license was from Veach's assistant?

Frank Llosa:

Veach's U.K. partners. We mentioned before about the U.K. gold medals. It's funny, in the NIH they were manufacturing ketone ester that was being shipped to the U.K. to help the U.K. win gold medals, while the U.S. probably just didn't believe it or didn't understand it.

Dr. Joseph Mercola:

Wasn't aware of it.

Frank Llosa:

Wasn't aware of it or didn't understand it, or there's just so much noise out there that what are you going to-

Dr. Joseph Mercola:

Okay. All right. Well, give us your site if people want to-

Frank Llosa:

For the ketone ester site, it's KetoneAid, K-E-T-O-N-E-A-I-D, KetoneAid. And the Hard Ketones is HardKetones.com.

Dr. Joseph Mercola:

Okay. Pretty simple. Straightforward.

Frank Llosa:

And soon we'll have a – I've been saying this for a while, but we're hoping to have a beer. A beer is our-

Dr. Joseph Mercola:

For those who like beer.

Frank Llosa:

-breakthrough product, that low-carb beer. Well, now you're saying maybe not even make it low-carb.

Dr. Joseph Mercola:

Well, I don't think there's a value to it. Now you want to be careful, but for some reason you believe it or notice a difference, fine. But just you have to be careful for chronic cortisol activation.

Frank Llosa:

Well, they can get their carbs from somewhere else, they can add it to the drink if they'd like. But we're trying to stay still consistently in the low-carb.

Dr. Joseph Mercola:

Yeah, there's definitely a market. I think it's a wise business decision, because there's still a lot of people who believe that. So, I think it's good from the business for sure.

Frank Llosa:

All right.

Dr. Joseph Mercola:

Okay. Well, Frank, any other questions or not questions, comments you have before you leave?

Frank Llosa:

I think we covered everything. I think one thing that people – the takeaway is that this isn't something – We don't even call it a supplement, we call it a food. And supplements people have to take for 10, 30 days to maybe feel something. This is something that you-

Dr. Joseph Mercola:

Feel right away.

Frank Llosa:

-feel immediately, or one or two days.

Dr. Joseph Mercola:

And as a food, you've shown or experienced, people experienced that it could be a resource to wean themselves off of an alcohol addiction.

Frank Llosa:

Yeah. For the Hard Ketone side, yeah. Even though a paper actually just came out talking about the ketone ester for weaning off of alcohol, I think they have the wrong molecules. So, they were able to find some benefit with the ketone ester, but the Hard Ketones-

Dr. Joseph Mercola:

Are better.

Frank Llosa:

-are exponentially better for that.

Dr. Joseph Mercola:

All right, well, thanks for all you do. Appreciate it.

Frank Llosa:

All right, thank you.

Dr. Joseph Mercola:

Bye now.