

Announcer: Bulletproof Radio, a station of high performance.

Dave: You're listening to Bulletproof Radio with Dave Asprey. Today's episode is filmed on location at the American Academy of Anti-Aging Medicine, which is where 27,000 physicians ... Well, few of them did not show up but 27,000 physicians are members of a group that's been working for 26 years to define aging as something that we can attack and change and reduce and maybe even reverse medically and with lifestyle.

Dave: It has given me the opportunity to see many great friends and to make some new ones and to meet people who've done decades of work to change the world.

Dave: Today's guest is one of those gentlemen. He is a neurosurgeon, 78 years old who is very, very well-known because he's the guy who created a test that 13 million people have taken to understand the impact of impacts on your brain.

Dave: He studied traumatic brain injury. He's the first neurosurgeon in the NFL and then you might have heard, if you have ever watched the movie Concussion, although the character in Concussion has very little to do with the real Dr. Joseph Maroon. Dr. Maroon, welcome to Bulletproof Radio.

Joseph: David, it's a pleasure being here and a pleasure meeting you for all of your phenomenal accomplishments and what you've done to assist with anti-aging programs.

Dave: Coming from you, that's a huge compliment.

Joseph: Thank you. Well earned.

Dave: Anytime you get a chance to meet a neurosurgeon who's practiced for decades and decades, it means that they've had the chance to accumulate some of those meant to see this incredible sea change that's happened in the field and you'll that almost anyone who has practiced medicine for many decades and "Whoa, here's what we did in the '60s. It was a little bit different than what we do in the '70s." They have this long view of the evolution of a field. The first thing I'd like to know, Dr. Maroon, is what's changed since you started looking at the brain?

Joseph: Well, in terms of concussion, I think you're exactly right. The most important thing is perspective as it is in anything in life. I've had the good fortune to have perspective from the '80s to the '90s to the present day in terms of what's evolved and there's been a huge evolution from how many fingers can you count the little ammonium chloride or smelling salts and then back into whatever the game might be rugby, football or whatever.

Joseph: Due to the observations of the potential long-term effects of concussions, there's been a major, major sea change of rules at every level from the NFL to Pop Warner, to USA today football with the exclusive purpose of providing a safe opportunity for kids at all levels, so to speak, to participate in a phenomenal game that incredible human life lessons are learned.

Joseph: General MacArthur said it very well. He said he had this plaque placed on the playing fields facing the playing fields at West Point and it said, "On the fields of friendly strife, are some of the seeds that on other days and on other fields will lead to victory." That's so true, team work, getting up when you don't want to get up, going through some degree of pain are all lessons learned.

Joseph: The whole goal of the rules changes is to provide safety and quite frankly, particularly at the youth level is never been safer and we're looking at other sports, girls' soccer we know now has an incidence of concussions equivalent to male football players.

Dave: Wow.

Joseph: It's a big problem. It's being addressed as best as possible without completely eliminating the sport and the lessons learned on the fields of friendly strife.

Dave: You're saying this based on a 13 million data points or at least more than that probably because you actually looked at the effects of traumatic brain injury on people. How do you develop that body of resource that became the standard in the field?

Joseph: Well, very early on coach Chuck Noll, who is the coach of Pittsburgh Steelers for many years and four Super Bowl championships, I told him that his star quarterback couldn't play against the Dallas Cowboys the following week and he said, "Why not?" I said, "Because he has had a concussion and the guidelines at that time said if you had a concussion, you had to stay out of minimum of two weeks." He said, "Well, who wrote the guidelines? What evidence-based knowledge did you use to put those together?" He was very challenging. He said, "If you want me to keep somebody out of playing football, I want objective data."

Joseph: Somewhat chagrined but he was correct. I collaborated with a neuropsychologist, Mark Lovell and we came up with a test subsequently called Impact, which is a neurocognitive test that assesses reaction time to 1:100 of a second memory, the ability to process information and went back and I said, "Well, now we have to baseline the whole team," which was a little resistance doing neuropsychological test on a professional football team.

Joseph: However, we did do that. He acquiesced and encouraged it and subsequently it has become the standard with every major sports organization 12,000 high schools is to get a baseline before you return to a contact sport with a neurocognitive test as one piece of information to make that decision.

Dave: It's kind of funny. We used to say years ago, "Oh, you had your bell rung," or these other things, "Get up and walk it off," sort of things. I had a couple of pretty substantial TBIs over the last two years.

Dave: One of them I had a bleed. I had amnesia for a week, light sensitivity, nausea, couldn't play Go Fish with my kids. I'm a pretty smart guy and it was really weird because it happened I had these symptoms and I was just wrecked.

Dave: The time before that, I hit my head really hard. I actually think I had a bleed that time but amnesia I can't remember the order of operations or after it happened that it's not real amnesia like from the movies but enough that it's all jumbled when I try to remember it. But I remember the day after that, I recorded five podcast in a row and recording five podcast in a day is a Herculean feat.

Dave: I almost never do that but it just lined up with my calendar and at the end of the day I said, "I'm a little tired," and I woke up the next day and I couldn't count my fingers, like I was completely zombified and then I swore a lot for a month or two and ended up having to do some neurofeedback as well as specific nutritional protocols to put my brain back together again and thank goodness I have access to hyperbaric and everything else.

Dave: I recovered and stem cells in my brain, whatever. I recovered faster and better than I'm supposed to but for people who've never had a TBI, I can tell you I went from I'm kicking ass to I can't play Go Fish and because I'm swearing at everybody, now what's your explanation for someone? Say, what would you tell a family member of someone who has their first concussion? What do you tell them to expect? How do you describe what it's like?

Joseph: First of all, what you're describing is terrifying. There's no question about it. Is this going to be permanent? Is it long lasting? Fortunately, 90% of concussions clear within a week, maybe two weeks. Eight to 10% of patients who have developed what's called the post-concussion syndrome and this can be associated with memory impairment, with mood disturbances, sleep disturbances and can really be very debilitating.

Dave: What about depression? Is that in there as well?

Joseph: Yes, absolutely. Micky Collins, who's the head of the concussion clinic at the University of Pittsburg, will see in that clinic close to 10,000 new patients a year with concussions from all kinds. They have absolutely a huge database and he is actually ... We used to think that you didn't have a concussion unless you lost consciousness.

Joseph: We now know that 90% of the concussions are not associated with loss of consciousness, only 10% are. He has subdivided the concussive syndrome into several separate segments.

Joseph: For instance, one of migraine, some patients just develops migraine headaches following a concussion. Others vestibule-ocular, unbalance, unsteadiness, feeling foggy, another is cervical cephalgia, pain in the neck, head. Another is somatic with headaches, nausea, vomiting. Each of these can be sub-characterized and then there's a tremendous overlap.

Joseph: Each of these can ... There are specific protocols for dealing with each. Before we used to think that we would cocoon patients. Put them in a dark room, no stimulation, you clearly overdid it in terms of taxing your brain, your prowess.

- Joseph: The next day, we advise rest for the first few days to let the brain recover and then very specific types of exercises and gradually increase with aerobic activity, which we used to say none at all for a week or two.
- Joseph: The consensus now is that's not the best form of therapy and we can go on and on about what does help. I'm a proponent of omega 3 fatty acids and natural anti-inflammatories. We've written papers on neuroinflammation as the underlying genesis of many of these syndromes and symptoms that occur.
- Dave: Neuroinflammation is an interesting topic because with my history of having high levels of toxic molds in my house, having high levels of chronic stress and probably mercury levels earlier in life. I certainly had some higher mercury levels. These are all things, autoimmunity that trigger chronic inflammation including neuroinflammation even things like ADHD and autism and Asperger's syndrome and Asperger's syndrome runs in my family and I certainly was somewhere on the spectrum when I was younger at least.
- Dave: Those are all tied together with neurons and glial cells parts of the brain getting inflamed and concussion is also tied together. What's the difference between what happens in the brain with the concussion and this other lifestyle-based inflammation?
- Joseph: Complex question and my complex answer to a straightforward question, what is neuroinflammation? Let's just go back to concussion for just a second. What happens to the brain? You asked this when you get traumatized when the brain gets sloshed around inside the cranium, so to speak.
- Joseph: What happens is the analogy is getting a splinter onto your finger. What happens when you get a splinter onto your finger? The natural immune response it gets red hot, tender and swollen. Why? Because various white blood cells go to the site, release cytokines, chemokines, proteases in a protective way, the body's protective mechanism. The same thing happens in the brain with trauma.
- Joseph: Microglial cells, which are the white blood cell protectors of the central nervous system, go to the area of trauma and then also release cytokines, chemokines, proteases, which initially cause an inflammatory response just like your finger.
- Joseph: Then secondarily, just like your finger, the body sends various growth factors, healing factors, anti-inflammatory agents to heal it. The same thing happens with the brain.
- Joseph: In trauma, if you go back to a football game or a soccer game or a rugby game like you played beforehand, then it's like dry bush caught on fire in a dry forest. There's a cascading problem with cytotoxicity. Also, there's another chemical called glutamate that's released. It's an immunoexcitotoxic phenomena.
- Joseph: Getting back to heavy metal poisoning, getting back to Alzheimer's disease, getting back to which is called type 3 diabetes, as you know, what happens in the brain to elicit the deposition of beta amyloid and neurofibrillary tangles, which are the hallmarks of

neurodegenerative disease in the brain? Underlying is the microglia have a major response in this role.

Joseph: What strategies are available for turning off the microglia or helping to heal in terms of BDNF, Brain Derived Neurotropic Factor, the so-called miracle grow with the brain, which as you know, is greatly facilitated with ketone bodies.

Dave: Oh yeah. Go Bulletproof Coffee.

Joseph: The commonality of inflammation with so many diseases of aging from Alzheimer's, cardiac disease, arthritis, you name it and the essence of many of them, the original substrate is inflammation. Whatever we can do dietary-wise, exercise-wise, and reducing and environmental factors, too much alcohol, smoking, and controlling stress are all epigenetic factors that lead to health.

Joseph: If the opposite, a bad diet, no exercise, toxins in our environment and uncontrollable stress, as we know, stress increases cortisol. What's cortisol do to the brain? It's toxic. It literally kills cells in the hippocampus.

Dave: If it's too high, if it's too low ...

Joseph: If it's too high.

Dave: But if it's too low, your hippocampus isn't going to like it because you have no blood pressure.

Joseph: Exactly.

Dave: A lot of people are so concerned about cortisol they drive it low and then they don't like their life either.

Joseph: I gave a talk actually this morning at this conference and the title of it was actually is Rewiring Your Brain.

Dave: Beautiful.

Joseph: The Connectome Neural Epigenetics and Neural Plasticity.

Dave: All right, I have to stop you right there. If you're listening to the show and you hear that title and you don't get all excited about it, that's because you're just not as cool as me. When I hear that title, I'm just like, "Yeah." But I understand if you're not. We're going to translate that for you.

Joseph: It goes to the heart of who we are. Actually it's a good question. If I ask Dave, "Who are you?" an appropriate answer would be, "I am my connectome."

Dave: Define a connectome.

Joseph: The connectome is literally the wiring structure of our brain. We have 100 billion neurons, nerve cells. We have over 100 trillion synaptic connections of those nerve cells and they come together in fiber tracts and the fiber tracts, several hundred thousands of these connect to the different parts of the brain. That is your connectome.

Joseph: The connectome is the wiring diagram, the wiring structure of the brain. There's a so-called the connectome project, which is a consortium of MGH, Harvard, USC and St. Louis University that are using MRIs thousands and thousands of patients and incredibly complex algorithms to image brains and literally now we can see the tracts of the brain. We can see the fiber tracts. More importantly, we can see where these tracts are broken.

Joseph: When you had your concussion, if you had a high definition fiber tractography examination, we might have seen some breaks in some of those fibers at the time with the subsequent neuroinflammatory response around those breaks.

Joseph: We can get ... I don't want to get off into the woods here, into the weeds but what we're learning in neuroanatomy, neurochemistry, neurophysiology, and imaging of the brain simply it blows your mind away.

Joseph: Now, I mean, I've been in this for quite a few years and what I saw initially, I mean, talk about localization, cortical localization, initially, if you couldn't speak, it was related ...

Joseph: There was a physician, Paul Broca in the late 1800s who had a patient whose name was Tan because that was the only word he could say is tan, tan no matter what the question, tan. When he died, he looked at the brain. In the left frontal cortex, there was a large lesion that he correlated and said, "This area corresponds to speech."

Joseph: Wernicke, another physician, looked in the posterior temporal lobe with the fellow who couldn't understand anything. We correlated brain localization with areas neuropathologically in the brain.

Joseph: Now, we know the connectome gives us a whole new understanding of schizophrenia, ADHD. What happens with abuse of the kid as a child? What happens intrauterine in terms of the mother who smokes marijuana excessively? What does this do to the child's wiring mechanism?

Joseph: In terms of addiction, the alcoholic mother who transmits these genes epigenetically to the child to wire the brain in a way that this kid doesn't really have a great chance.

Dave: Wow.

Joseph: All of these things are fascinating to me.

Dave: They're now visible whereas before we sort of thought that they were wives' tales because we have the correlation, but now you can actually see on your computer screen.

Joseph: Yeah.

Dave: The world is changing dramatically. You got into something ... Earlier, you said one of the things that happens or can happen when you get hit in the head is depression.

Joseph: Yes.

Dave: But about 50% of your life ago and I know this because you wrote about in your book called Square One, which is not a neuroscience book, but you read about how at 41, as you put it, went straight into the darkness of depression and you dealt that as a neuroscientist and now almost 40 years later you wrote Square One: A Simple Guide to A Balanced Life, sort of saying, "Well, here's what you've got to do based on all of my neuroscience and having been there myself." What made you depressed? How did you handle depression as a trained neuroscientist?

Joseph: That's an obviously a very, very good question. A thoughtful question, Dave, when I finished medical school, went to residency, went to practice, I attained the ultimate in success. I had it all.

Joseph: I had a title. I was chief of the neurosurgery at a hospital. I had enough financial resources to live decently. I had a good reputation and working with professional teams.

Joseph: Then one day, my father died. Our family broke up and I was doing brain surgery in the hospital one week. The next week I literally did not have the ability or strength or reserve, resilience.

Dave: That word.

Joseph: Resilience to continue. I dropped out and literally moved in with my mother and worked in a truck stop for a year.

Dave: Wow.

Joseph: Wondered if I would ever, ever get back to being a neurosurgeon and thought of quitting, had self-destructive thoughts very, very bad, dark place, dark place. I know what it is when people get there. People would say, "I was burned out and I had no insight into how I got there." I think the most important thing is the Buddhist awareness, mindfulness, having insight into where you are on a daily basis.

Joseph: What pulled me out was a banker who held the ... Trucks held the mortgage on the truck stop. I think he wanted to see if I'd be alive to pay off the mortgage. He called me one day and said, "Hey Joe, let's go for a run." I said, "Ron, I can't walk. I'm overweight, I'm dyspneic." Walking up a flight of steps that I found a pair of shoes and old pair of scrub. We went to the high school track in hen Wheeling, West Virginia. I made it around four times and I said, "Never again. I'm exhausted," but that night was the first night I slept in probably three or four months.

Dave: Wow.

Joseph: A light bulb went off. I went down the next day and myself and I did a mile in a quarter. Then a mile and a half, then two, then five and then I was like Forrest Gump, running through Wheeling, West Virginia. Without intentionally realizing I was self-medicating by elevating my endorphins ...

Dave: It was endorphins, okay, right.

Joseph: ... My endocannabinoids, my anandamide and serotonin levels ...

Dave: Wait, exercise raises an anandamides? I thought just smoking did that?

Joseph: Yeah.

Dave: There was a company that was extracting it from tobacco and offering it as a supplement, which was helping people with chronic inflammation and of course the FDA shut them down, but ...

Joseph: As you know anandamide is from the Sanskrit word bliss.

Dave: I had no idea that actually it has did that. Okay, you just taught me something. Thank you.

Joseph: Well, the runners high is probably cannabinoid-related receptor high.

Dave: Interesting.

Joseph: With the endocannabinoid as well as dopamine and elevated serotonin.

Dave: Yes, some endorphin, right.

Joseph: But any endorphins, but anyway with that I learned to swim and I learned to bike and I started doing triathlons all secondarily to self-medication.

Dave: Now, were going to fast forward 40 years. I forgot to mention this at the beginning. How many Ironmans have you done?

Joseph: I've done eight full Ironman.

Dave: When was the last one you did?

Joseph: Three years ago. Actually I did a half Ironman last year.

Dave: Okay, at 77 you did a half Ironman. All right. I would say that exercise is working for you?

Joseph: Absolutely.

Dave: Okay.

Joseph: But I do that not in a bragging way. It's a way. It becomes a way of life and I could not function at the level I do without that for so many reasons and basically the exercise led me back to a spiritual foundation that I had lost on my path to "success."

Joseph: My work was very out of balance. Basically, what I discovered is a book that said, "Draw a square on one side. Put your work on the other, your family and social on the bottom, spiritual and physical. Then in your mind, draw a line somewhat commensurate with how much effort or time you spend on each one of these."

Dave: I love it.

Joseph: Now, I hate to tell ...

Dave: This was in your 40s you found this book?

Joseph: Yeah.

Dave: Wow. It was called "I Dare You." Is the name of that book, right?

Joseph: Yeah.

Dave: Okay.

Joseph: If I had to draw your square today, it would be a flat line work.

Dave: I do a lot of work, that's for sure. No doubt about that.

Joseph: But you are attentive to your family.

Dave: Yeah.

Joseph: I suspect there is some, I don't know what your spiritual basis is, but you're a giving man.

Dave: Oh, yeah, I've done a lot of meditation in Tibet, meditation with the masters, EEG-assisted neurofeedback that puts you in a spiritual state.

Joseph: I love that.

Dave: It's very powerful. I have a facilitator that does that.

Joseph: I love that.

Dave: If without the spiritual practice, I couldn't run the level that I do or if I did I'd hate my life.

Joseph: The essence of the square, which is the book, is to balance the work, the family, the spiritual and the physical. Every day I get up and I say, "How am I going to touch each one of these sides to maintain it?"

Dave: You have this in your book Square One. The reason I'm laughing is that going back ... I guess I'm dating myself, now? When did I do that? A long time ago, 15 or so years ago, I do my MBA at Wharton and you're dealing with a bad relationship at home and having made and lost \$6 million, which is a highly traumatic experience.

Dave: It's not that traumatic to make \$6 million but it's pretty traumatic to lose it all of a sudden. A bunch of [Pell 00:27:20] stuff and I had a college professor named Dr. Stew Friedman, who's been on Bulletproof Radio, who had a book. He was on the top 100 execs at Ford Motor Company. His book I think was more of a hexagon or something, but it was "What do you do for a Community." It was measured just the way you put it, Joseph. You said, "How much energy do you put into it," not necessarily time.

Joseph: Correct.

Dave: Then what you're getting out of it and it became very clear to me. Oh, I'm putting a lot of energy into my career and wait, when I had \$6 million I was any happier than when I didn't. I included some of that wisdom in Game Changers, my new book that came out based on all these interviews on the podcast.

Dave: But what kind of ... It motivates me to do the podcast and part of what pisses me off frankly is that you had a book with this knowledge that was around 40 years ago, 35 years ago and that was probably based on the book that was around 20 or 30 years before that. This wisdom has been with us for a long time.

Dave: In fact Dr. Barry Morguelan, UCLA gastroenterologist surgeon who's been on the show, one of the 12 living grandmasters of the tradition in Chinese medicine that protected the emperor of China and was the root of the Shaolin practice. He'll draw the same thing from the ancient Chinese things that's thousands of years old, but so few people know this until like you they hit rock bottom and they pick up a book.

Dave: You wrote a book, Square One, to talk about your experience with this stuff and tell me how did you find that? Because if we can accelerate the way people go out and find this kind of wisdom that's been with us from our elders for a longtime but no one knows about it, it will help them. Tell me how did you find the book and how do you [inaudible 00:28:54] find Square One?

Joseph: Yeah. As you well know and many of the listeners well know, adversity sometimes is the best teacher.

Dave: Yeah. That's for sure.

Joseph: We avoid it. We don't want it. We don't want to experience or go through it, but when we're despondent and we don't have many choices, we reach out for different kinds of help or different kinds of self-abuse, drugs, alcohol et cetera.

Joseph: Basically, I picked up this book by William Danforth, he was the founder of the Ralston-Purina Company and in the early 1900s, 1920s or so, he wrote this book "I Dare You" and I he said, "I dare you to lead a balance life." He used this nomogram, this example and when I was living at that truck stop, despondent. Also my immune system was so suppressed. I had infectious hepatitis from eating truck stop food.

Dave: I'll do it.

Joseph: I'm lying in bed wondering is this the end. I just have piteously picked up this book that I kept around that I never read and I drew my square. Actually, my son was with me at the time and I said "Okay, let's draw our squares."

Joseph: For the first time, I had the visual of seeing that it was a straight line EKG. There was no family. There was no spirituality and there was no physicality. It was insight and this is what people on the road to success. Like you were at one point making \$6 million, graduate of Wharton, all the ...

Dave: All the stuff that doesn't make me happy?

Joseph: All the stuff that we like and we covet, but really ... Chuck Noll said it very well, the coach of the Steelers that I mentioned before. He said, "Football isn't complicated. You see all the diagrams and everything on the sports pages and on the TV." He says, "It's very simple. It's about blocking and tackling."

Joseph: Life is not really that complicated when you get down to the very basics of what we're talking about of work, family, spirituality and physicality, the four bedrocks. If you don't have strength in those, you're on a tangent and you're struggling. You can get by with one, but my axiom, Maroon's axiom number one, if two are atrophic, you're seeing your psychiatrist, your Rabbi, your minister, you're in trouble.

Joseph: Again, it's not complicated. It's simple. I had no insight how I ended up in a truck stop, but it was my decisions that I made along the way and my incredible drive to "be successful" in the eyes of the world. It wasn't my eyes. It wasn't the success of the world and I realized that, wow, I was way off. I got there, but it was like you losing \$6 million, I'm sure, a wakeup call.

Dave: That was a wakeup call for sure and just realizing, wow, I have nothing that makes me happy right now and the money didn't do that anyway. You got to do something with that.

Dave: You learned to measure happiness on your own yardstick instead of on other people's yardsticks was one of the things that was important.

Joseph: I did. I would add to that. One of my favorite quotes is, "The purpose of life is a life of purpose." You have to deeply go into your hardened brain and what is your purpose. I'm blessed at this point that I enjoy just like you, just like this podcast. We're going to touch some people out there that it might make a difference. We don't know for sure, but it might.

Dave: The odds are high at this point. A couple of hundred thousand people are to listen to this and let's have at least one of them benefits greatly.

Joseph: Yeah. We'll never know.

Dave: Yeah. We won't.

Joseph: But it's giving and it's altruism. Hans Selye you may have recalled, Hans Selye, the physiologist fighter or flight.

Dave: Yeah, about stress.

Joseph: About stress, he really wrote the books on stress. He had a great essay that he wrote on Altruistic Egotism. Don't kid yourself that you do something totally altruistic.

Dave: Yeah, it feels good to help other people. It's okay.

Joseph: It feels good. It feels good to help other people.

Dave: I'll just flat out and say it. If it didn't feel good to help other people, I didn't believe I was doing it. I don't have to do Bulletproof Radio. Bulletproof is a profoundly successful company even if I don't do this. I do this because I know it helps people because I like it and I think it makes me happier and plus I get to chat with you or I get to meet all sorts of cool people. It's a pretty good gig but without that altruistic component, the ROI for me personally wouldn't be there.

Joseph: Yeah. That's the same for me. As you said, I'm in the fourth quarter.

Dave: Yeah. There you go.

Joseph: I love every day what I'm doing, the opportunity to share some of the knowledge that I've gleaned over the years and pass it on. I see the bullets going by. I see my friends with this and with that and the patients that I see with traumatic brain injuries, brain tumors, Alzheimer's and it's going to happen to us, no doubt. We can't get out of here [inaudible 00:35:01], but in the meantime it's carpe diem. It's grabbing the gusto as much as you can.

Joseph: One other thing, I complimented you earlier on but what you're doing is so huge with your products and this is not a sales talk, but what's it about? It's about brain function.

Dave: Yeah.

Joseph: It's about maintaining a healthy lifestyle. It's about resilience, which you talked about and your products that the medium change triglycerides, the ketogenic types of diets are all probably the most healthful things you can do for brain function, cardiac function, eliminate diabetes and you've created this not with the idea of being the most successful man in the world, you did it because you were doing what you probably wanted to do for yourself.

Dave: I had to figure this myself because [inaudible 00:36:03] brain and work. It was kind of little altruistic. I mean, it was self-serving altruism there too. I got pissed off that no one told me this. If that was told when I was 20, like I wouldn't have to be a size 46 inch waist. I'm at 33 now, which is what I should have been. It's unjust that this information isn't out there and someone had to do it.

Joseph: What's the most common cause of blindness, amputations and kidney transplantations?

Dave: Diabetes.

Joseph: Diabetes. Thirty million people have diabetes, another 30 million have type 2 diabetes or more. How do you control that? With diet and with ketones and with the exercise.

Dave: It felt like a great mystery in 5, 10 years ago, but after getting the principles down and doing ... For me, writing books is one thing that makes me build frameworks to understand things really well.

Dave: At this point, I mean, I was looking to rent a house and the lady who was showing me the house weighed 400 pounds. I said, "I've lost 100 pounds," and it wasn't a judgmental sort of thing but like, "I've been there and I just kind of mentioned it." She said, "What do you do?" "I'm an author," and so I spent 3 minutes saying, "This is how it works. Let me give me you a copy of the book. I'll give you a little pack of brain octane and just enjoy it maybe learn something."

Dave: She mentioned, this is what made me bring this up. She said, "I had a brain injury. I just started gaining weight after I got in this car accident." I said, "Yeah, obesity is correlated with traumatic brain injuries. You have a brain thing going on. You can fix that when you get on a high fed diet." She said, "But I have all these cravings?" I said, "I just tried this stuff." She called us a week later and she said, "I have lost 20 pounds. My energy is back." What? Just 20 pounds. Of course, that's inflammation, that's not all fat and stuff like that.

Dave: How is it possible? She's been working around for almost 20 years with an extra 200 pounds of fat because no one, her doctor didn't tell her. No one told her. That stuff makes me mad.

Joseph: Well, we can get into the medical profession and ...

Dave: We don't have to rip on doctors. It's not the doctor's fault. It's much big food [crosstalk 00:38:16] doctors.

Joseph: The things that drive doctors mad, the electronic medical record, the hospital administration and expectations, the government, the rules, the paperwork and then putting doctors on time clocks. How many patients you have to see a day because you're now 56% of doctors are hospital employees? The accountants are dictating to some degree what the activities of the doctors have to be and the time allotted. That part of it is a time for another interview.

Dave: Absolutely. There's a short response to that, maybe a piece of advice for people listening. I want to just check it with you. I like to recommend to friends and people listening. I say, "Look, if you're dying, bleeding, or broken or have an aggressive infection, you go to one of those doctors and they're going to save your life and if you have something that's not working very well and you've been dealing it for a while, you go to a doctor and you pay them cash pay and they don't take insurance because the people who work on that stuff, they get you better, but they're going to need 2 hours of your time and no insurance going to pay for that and it's not worth that doctor's time to talk to the insurer.

Dave: Here [inaudible 00:39:29] there's tons of doctors who at least part of their practice is just they cut out the insurance, they cut out the accountants and they just do it. Is that good advice or bad advice?

Joseph: No. I think it's a good advice.

Dave: It's unfair advice, though.

Joseph: The question is unverified and the question is how practical. How do you find a doctor who is more interested in a holistic approach, which is what you're talking about? You're talking about someone who's going to talk to you about lifestyle, about diet, about exercise, about the fundamentals of blocking and tackling to live well, so to speak.

Joseph: My problem with that, Dave, is always the doctor can tell you to do this but how do you motivate people to do it when their lifestyle has been such for over many years. It shows like this. I think showing where it can be done and I go back to the comments that I've got from the people who've read my book. I have a whole list of file drawer of comments of how it has benefited them in various ways, how they've been able to see someone who is a failure, a real abject failure and able to use very simple guidelines to get back to the best part of my life. You are that same way. How many pounds did you lose?

Dave: A 100.

Joseph: You lost 100 pounds and then came back to have a brain that is resilient and sharp and creative, a mentor, a guide, someone that people can look at and say, "Hey, if he can do it, I can do it." I mean, I think that's important.

Dave: Yes, some motivation and a sense of control is important and I do write all the blog post on Bulletproof of all the things I do around that frame where I truly don't believe that most people want to be healthy. Most people want to be great.

Joseph: They want a pill. They want a pill to take to lose weight and to feel good and to ...

Dave: It's normal. We don't want the least possible work ...

Joseph: The least to take effort.

Dave: Least effort is good. Of course, we want that but we don't want to put in the least or most effort to be healthy. We want to be least or most effort to be way better than that and I think that was a part of the thought there and I imagine someone who walks into your office who has had a TBI, if you were to ask him, "Hey, do you want to be just back to normal or do you want to be beyond that?"

Dave: Most people will say, "I'd like to be better than I was before," and it seems like today you can take someone who ate French fries, smoked, drank, hit their head and then you can never stop that stuff and you fix those stuff in their head and they're going to come out of it better than they were before. Is that a reasonable thing?

Joseph: There's no question about it. I go back to when we were on the Savannah in Africa and it was feast or famine. During feasting, we would build up our fat and during famine we would break the fat down into ketone bodies, which is much cleaner fuel for us to use. Also, I've noticed fasting.

Dave: Yes.

Joseph: When you fast, what happens to your senses? You become much more sensual.

Dave: You really do.

Joseph: You smell things, you taste things, you're more aware of things, why? It's an evolutionary thing. When we were on the Savannah, if we didn't have a century input that told us where to get food, we die.

Joseph: That evolutionary facility carries over and once you experience that feeling good and thinking sharply, maybe you don't want to have that second or third glass of wine or their cigarettes because you know you're going to feel like crap the next day and I want to feel good. You have to want to feel better and function better.

Dave: Yeah. It's one of the most precious things and I think for me, I'd probably never felt that good because I grew up in a basement toxic mold and I ate frankly garbage but we didn't know. We're doing our best. It was the 80s. What do we know? Squeeze margarine was supposed to be good for you.

Dave: I was constantly neurologically inflamed and then I had a few experience. I'd like to feel like this more often and you just get that one little spark and that's why Bulletproof Coffee was the first thing I blogged about because even when I had chronic fatigue syndrome, I could do that with the Brain Octane lining all this stuff upright and it's like, "Well, today is a pretty good day even though I was feeling really bad."

Dave: This is maybe not as good as it could be but is way better and it was about that little sparks and I want to be able to take people or you really running at a 3 out of 10 and say, "Maybe, you get up to 7 out of 10 and just feel that and set that as your new bar," not even knowing that there's more numbers that are higher.

Dave: I'm hopeful that that's available for almost everyone. I mean, you've got way more experience looking at brains than I do. Is that goal feasible? I mean, can we get most people to reset their expectation of how good they can feel without even knowing that there's betterness out there?

Joseph: Well, I did that with exercise. I can over ... The best antidepressant is not SSRIs. It's physical activities, aerobic activity and this has been shown in innumerable studies, head to head studies with exercise versus drugs. It's more effective, lasts longer, doesn't affect libido and you feel better. That's basically what happened to me.

Joseph: I walked around that track four times and then I did it six times and eight times and pretty soon unintentionally, I didn't make a choice. I'm going to start working out. I felt better each day and I realized that I was getting healthier. My brain and body were getting back into balance.

Joseph: I would tell somebody who's depressed, I would say, "Definitely, do your 10,000 steps a day. Start with 5,000 and gradually increase. Don't worry about getting healthy, don't worry about getting better, just do it and good things will happen as a secondary effect."

Dave: That is as profound advice, you do that and I would maybe add, let me get your advice on this, reducing your exposure to bright lights at night so you can sleep better. When I started a glasses company because of that problem and for depression is simply a Circadian disruption is a massive thing and you have that in combination with the lack of exercise or with a TBI and it's just bad news. How dialed in are you at this point in your career? How important is the Circadian mismatch, the bright lights at night, the screens and all that?

Joseph: I think it's very important and that's, what's the last thing most people do before they turn out their light? They check their cell phone or their tablet, their iPad and I think these are all things that can disrupt the Circadian rhythm. Things like melatonin I think do help particularly in the older patients.

Dave: Yeah. It's anti-inflammatory and probably not getting enough of it.

Joseph: Exactly and in particular and also the vitamin D levels and temperate climates in the winter. Seasonal affective disorder is a very disruptive thing due to the Circadian rhythms, due to light and I think the lights with the optimum frequency are very helpful. I recommend these to patients.

Dave: I love it that you're recommending that and they got a lot of resistance for a while and we've got and in fact, I'm presenting it tomorrow morning an EEG scan of a person under LED lighting. They put on the glasses for sleep that TrueDark, my company manufactures it. They've got four layers of optical filters that cut out narrow frequencies of light that we know affects [DSTN 00:47:49] in the brain.

Dave: With TrueDark glasses on, you can see a drop in beta, a rise in alpha and it's like meditation just from the color of the light and that's with these glasses using an Oura Ring, I can double my deep sleep at night if I wear them for an hour or 2 before bed. You have to wear it for an hour and the brain thinks it's midnight but this is like a drug-like effect.

Dave: I mean, it's pretty potent stuff and you'll say, "We used to have dimmer switch and you didn't look at your phone but when someone is really depressed, you're much more likely to look at your phone or play some video games late at night and I think it makes depression worse and then of course you're not going to go exercise to your point and then you get sort of stuck in this spinning cycle of just nothing works.

Dave: I want to add some real strong value for people listening and let's go back and talk about traumatic brain injuries. I'd like to share the stuff that I have been talking with some para athletes who asked me for my opinions about what would you do before getting hit in the head just in case it happens.

Dave: I want you to shoot him down and tell me what's missing and you can do this because it's Bulletproof Radio. You're not treating a patient and it's okay to hypothesize and say, "We don't have science on this but that seems like a really good idea." Like your mileage may vary. Talk with your people. It's okay to go on a limb. Just tell us if you're on a limb. You're an expert in the field and I'm asking you to make up anything, are you good with that?

Joseph: Okay. All right.

Dave: All right. I looked at ischemia in the brain and what happens when you get hit? There's a big mitochondrial amount of swelling. You keep the mitochondria working really, really well, you get less swelling and I found a bunch of studies about that.

Dave: What I did after I get hit in the head and what I would propose is a good idea beforehand is you take the things that we know make mitochondria work with better efficiency so that when you get hit, if you do get hit, your mitochondria are less likely to swell up and die. I'm not rocket science. We're talking things like coenzyme Q10 and probably turmeric, although that doesn't have a direct mitochondrial effect but it can have other effects on water chemistry that are beneficial.

Dave: You're going to have some omega-3's but not too many because we might be concerned about bleeding and you don't want to have things like oxaloacetate, which we put in KetoPrime and in fact let's say Bulletproof is the company that put on the map, which is the last step of the Krebs cycle before it starts again so you get a more effective Krebs cycle.

Dave: You'd want to have things like PQQ and that's something we put on Unfair Advantage. PQQ is another thing that's shown in multiple studies to make mitochondria work better and you stack up the L-carnitine and D-ribose, which I have to put in some other products. You end up with everything you can find that pokes the Krebs cycle to make it an effortless Krebs cycle.

Dave: You do that you put in a few anti-inflammatory herbs like the turmeric and say, "You know what, if you're going to go out and if you did get hit in the head and your mitochondria able to withstand what would cause swelling and mitochondrial death over time, you would probably going to be better off than if you hadn't done it. Good idea, bad idea?"

Joseph: I'm smiling Dave because if you look at the things that I take every day.

Dave: I take up those everyday myself.

Joseph: Every day, I take every one of those plus a couple of hands full of blueberries and walnuts.

Dave: I take blueberry, polyphenols. We make polyphenol about 3 grams of polyphenols per day.

Joseph: Just huge, huge and then why do I do it and not just because of concussions, but I do it because the same things you said it's the essence of neurodegeneration. It's the essence of brain rot, so to speak. Honestly, it's amazing how kindred we are in this because I believe that most of the diseases that affect the brain are mitochondrial. The diseases are mitochondria. It's energy.

Dave: Yes. My last book, that was the whole hypothesis, yes.

Joseph: It's energy and if you're not making ATP, how do you make ATP? How do you reduce the reactive oxygen species and the free radicals by getting clean fuel, which again with ketones, those less debris ...

Dave: Yeah. There's a Brain Octane.

Joseph: I have fully subscribed to this. In fact, when I see patients who have post-concussion syndrome, I have a sheet honestly that lists almost every one of those plus Resveratrol.

Dave: Yes, that would be on that.

Joseph: I do add Resveratrol to this and I ...

Dave: I've done polyphenol morin.

Joseph: I give it to the family and I say, "These are the things that I would suggest you consider."

Dave: What do you think about fisetin? You ever play with that one?

Joseph: No.

Dave: It's an unusual polyphenol that's found in strawberries and seaweed.

Joseph: Okay.

Dave: I put it in Smart Mode or nootropic stack and it's a senolytic. It gets rid of dead brain cells but it has really good effects on cognitive enhancement as well and I think it's one of those up and coming ingredients that I was thinking might be somewhere in your stack but ...

Joseph: I'm very, very cognizant of curcumin and turmeric. I think this is a powerful agent and there are hundreds of studies ongoing and have been ongoing with as an antineoplastic agent. Also, anti-neurodegenerative in the Indian population, epidemiological studies have shown that those who eat, the Indian population have a lesser degree of Alzheimer's disease than others and it's thought to be related to the curcumin in their diet.

Dave: Right. I believe it and there's absorption and things like that.

Joseph: Yeah. Just tell me about absorption. You're using curcumin. Are you using liposomes, nano particles? How do you get the most absorption?

Dave: Well, you can certainly use liposomes and I do that in some products. With the turmeric, we make something called, Curcumin Max and it's got a standardized form of turmeric that's shown in multiple studies to absorb a better that's called a BCM-95, if I'm remembering correctly and it's a standardized amount of oil in there and that sort of turmeric rivals liposomes in some studies.

Dave: What I'm talking about here if you're going, "What the heck are you talking about rivaling liposomes, Dave?" What I'm talking about here is it's not enough to say I took a supplement because if a supplement, if you poop it out, you just wasted money. You're better off to take less of a supplement that costs more that gets in than you are to take a cheap supplement that doesn't do anything.

Dave: What I did is I put it inside a gel cap that has Brain Octane because Brain Octane is something the body loves and it actually can help absorption of anything that's fat soluble. Gerald Pollack, a guy who wrote a book on a water chemistry from University of Washington called The Fourth Phase of Water and figured out that the first thing your

mitochondria do is they change the structure of water using 1,200 [inaudible 00:55:01] of light and called heat.

Dave: They make the water more viscous at a membrane of a cell, which allows things like cell folding to have or sort of like protein folding to happen better. He showed in his labs, we funded some of the research that did this and this is not research of like a [inaudible 00:55:21] this core water biochemistry stuff and he found that you can get a very large exclusions.

Dave: A higher fraction of the water is biologically useful water that doesn't require conversion and turmeric and things like Ghee or things from Ayurveda that change water chemistry. We know if you're going to make ATP, you've got to have exclusions on water in the cells. We know that the Tibetans now, the reason, I believe, they're putting their butter in their tea and churning it, even though there's no electricity, [inaudible 00:55:52] eat the butter or drink the tea. They never do that because it doesn't work because you have to have those water basically small droplets of fat.

Dave: What we're doing in Curcumin Max is we're saying, "Let's take advantage affect that Brain Octane is one of those weird water dispersible oils and it has turmeric in it and we put some weird herbs from China called Stephania root and that also are shown in studies to work on unusual inflammatory cytokines.

Dave: The deal is, how do we get in there? What doesn't work, what scares me is black pepper extract and there are many people who say, "Oh, well, I saw the study that says black pepper raises the levels by 4,000% in the blood." Here's the problem, that pokes holes in your gutt lining.

Joseph: Black pepper.

Dave: Yeah. Well not just eating black pepper but the extract. What else are you getting 4,000 times more of pretty much everything. The black pepper stuff, I noticed this as I was evolving my own practice over years, every time I take a black pepper, turmeric they say this is supposed to be so good but after a while, it just didn't work right.

Dave: I think that can be one of those things where you need to drive absorption of what you're taking not absorption of other things. I'm a little skeptical of that and when you go to the juice bar and I say, "Put black pepper with my turmeric." Come on, there's not enough black pepper. The studies on extract, which is a pound of black peppers worth of extract, the little sprinkle and black pepper in your turmeric, if you like it, do that but it's not going to change things. Kind of a long answer, sorry, but I really care [crosstalk 00:57:16].

Joseph: No, no, but I mean with the turmeric, some people I know use all olive oil.

Dave: Yeah. That's a good way.

Joseph: They'll take the capsule, open the capsule, put it in a spoon, little olive oil and then a little black pepper.

Dave: Yeah. The black pepper is, it's a placebo I would say but ...

Joseph: That would enhance absorption.

Dave: The olive oil is going to do it, yeah.

Joseph: Yeah, right.

Dave: What do you do with turmeric?

Joseph: I take nano.

Dave: Yeah. There's good science for nanoparticles, yeah.

Joseph: Nano particles?

Dave: Yeah, absolutely. Anything that's water soluble tends to have very different effects on the body than things that are fat soluble and your cells are made out of fats. Sometimes having both is good.

Dave: All right. Let's talk about what you do after a brain hit? I took the Titanium needed to head at high speed at Burning Man. It was an accident. It was all a good fun and fortunately, I'm in a can full of anti-aging and functional medicine doctors and right away we pull all the fish oil that was in the camp.

Dave: I took very high dose of omega-3 fish oil. I took 10 of the Unfair Advantage ampules that fortunately I manufacture and these are full of PQQ in a liposomal form. It's liposomes and CoQ10, hundreds of milligrams of CoQ10. I took one friend's progesterone and I believe that was an oral progesterone, if I remember it right and then we took a bunch of the KetoPrime, which is the Bulletproof oxaloacetate and some turmeric. Whatever else I could find around the can. That's all I can't remember it right now. It's a bit fuzzy but I mentioned a lot of this stuff and then we used cold laser on my head.

Dave: This was the protocol. I did this for about a week on that same general stack including progesterone. I used it orally instead of topically. Maybe 20 grams of omega-3's a day and these are from fish like the real omega-3 is not the vegetarian vegetable omega-3's. What was I missing from that protocol?

Joseph: I don't think you're missing anything but you were incredibly innovative and creative in what you did because 99% of concussions, a great majority of concussions, at least that I've observed, are treated with none of those. The treatment is the saying, "To amuse the patient until nature cures him," were depending on the physiological properties of our own bodies to get us back into homeostasis. None of the adjuncts you're talking about are used in any significant way by anybody.

Dave: Yeah. They're not standard and I just said this is an emergency. "It just happened. I have to do something." I have the leaders of functional medicine all around me like I'm going to go for it because I got nothing to lose. I know it's going to hurt.

Joseph: Yeah.

Dave: But if you were a football player and you got hit in the head or a hockey player and I've talked to lots of them over the years, not nearly as many as you but if someone will say call some of the innovative ones. I mean, if you knew that someone was going to be hit in the head and they knew they had a good risk of it, would you have it on the sidelines if you could?

Joseph: No. Let me put it this way. There's quite a few studies. One of my associates, who is in the movie, Julian Bailes is a neurosurgeon at North Shore in Chicago, in University of Chicago, has done quite a few studies and experimentally pre-treating animals and not only he but others have ...

Dave: Yeah. It's such a good idea.

Joseph: ... with preloading the athletes with omega-3 fatty acids and it clearly experimentally reduces the effects of a consistent graduated kid.

Dave: Ketones would do the same thing. I'm assuming you give them some Brain Octane, the ketones go up, they're going to have lesser in effect?

Joseph: Yes. I believe it would do the same thing and I believe that omega-3 and fatty acids, fish oil omega-3's are somewhat preventive or may ameliorate the sequelae of the concussions very clearly and when I have patients who do have concussions, I really recommend as we discussed, many of the things but are there randomized-controlled placebo studies out there that says, "This is the thing to do. What you and I are doing are extrapolating from our knowledge about neuroinflammation, about trauma and about various agents that enhance mitochondrial function," and then saying, "Hey, it makes sense and there's no downside."

Dave: It's the no downside that got me excited.

Joseph: There's no downside. Some people would criticize both of us for what we're saying but I feel strongly that this is what and I do to people what I do to myself and my own family.

Dave: Amen. That's [crosstalk 01:02:14], not the first do no harm.

Joseph: This is how I practice and I've always, what would I do if I were on that table or I have this problem and that's how I work. These are the things we're talking about being very open and candid with your audience. There's no question about it.

Dave: Well, thank you for sharing that and I know as a medical doctor it's not always possible to say, "The harm is low. It probably is going to work. I would do to myself and I'm now

recommending you do it to you," but thank you for going out on a limb a little bit there to say that and I want to add just a ton of value for you listening.

Dave: I mean, you've heard a few of those recommendations before. I'll put these in the Show Notes for you but this is the stuff that you might want to do before you go out mountain biking this weekend and it's the stuff that if you fall and hit your head, you might consider but talk to your doctor first. That's okay too, if your doctor knows many of this stuff.

Joseph: Right.

Dave: All right. Given that we are at the American Academy of Anti-Aging Medicine, which gives us this wonderful opportunity to sit down and talk, I'm asking a different question than I normally ask on Bulletproof Radio. How long do you think you'll live? I'm really asking people who are leaders in the field. How long do you think you can do it?

Joseph: That I live?

Dave: Yeah.

Joseph: I don't give it any thought. After Csikszentmihalyi, the psychologist who wrote the book, Flow, he said, "The greatest moments of our lives are when our mind or our body is stretched to its limits in the voluntary pursuit, has to be voluntary, of something both difficult and worthwhile."

Dave: Great quote.

Joseph: After one of the triathlons I did in Hawaii, I went into a seclusion and just thought why am I doing this, what's it all about Alfie, where am I going? I came up with three most important things in life.

Joseph: Number one, a healthy mind and a healthy body, "mens sana in corpore sano," the Romans said it very well. Number two is relationships. Relationship with God, family and friends and number three is carpe diem.

Joseph: I just, as I said earlier, I see too many people coming down with terrible diseases my age, my friends dropping off. I look at every day as a gift and what can I do today Somerset Maugham, the writer early part of the 19th Century wrote a little book towards the end of his life entitled, The Summing Up and he looked back over his life and he said, "What's really, really important that I've done the summing up of my life?"

Joseph: In one sentence in particular stood out he said, "The meaning of life lies in what one wills to create." The meaning is in creativity whether you're an artist, an athlete, a doctor, whatever you are. You have the ability to create on a daily basis. I'm very blessed with what I'm able to do at my age. Every day, I say "Carpe diem," and when that bullet hits, I've had a good ride.

Dave: You're happy with as many as you can get if you like. That's a good answer and it's different than I've heard from others [inaudible 01:05:56]. I know lot of people name numbers and I've certainly named a number and I said, "Look, I think 180 is achievable and because I know I've seen someone do 120. With the stuff that we know, maybe I could get there. It seems like I have a better chance than not. I'll bet at 120 and I'm betting a little bit of technology over the next 75 years is going to help out.

Joseph: Dave, I don't want to disagree with you in any way.

Dave: I know. It's okay to disagree. Tell me I'm crazy a little bit.

Joseph: Let me just tell you that my goal as I tell people, I want to die young...

Dave: There you go.

Joseph: ... as late as possible. That's the goal. I want to die young as late as possible.

Dave: There's no point to make it to 180 if you're hang on by a thread.

Joseph: If you're hanging on, incontinent, demented and in pain.

Dave: I'm interested. There's no value in that. I like to say my plan is to die by a method and at a time of my choosing.

Joseph: I like that. I concur with that a 100%.

Dave: Yeah. Hopefully, that will be 180 or after or maybe a little be sooner if that's what I want. Dr. Maroon, thank you and for the work you've done in your life and just really studying what's going on inside our heads especially when they get hit and things have shifted from being a bit of the black box model into.

Dave: We know so much more about what's going on. We can measure the effect on how your brain responds. You've driven the development of that test and your book Square One is actually a profound read that's very, very different than you might expect but [inaudible 01:07:35] I picked up a little bit of knowledge in my almost 80 years and having face in big things and done some big things.

Dave: You're a classical example of what I call a game changer in someone who's done enough things and had a big enough impact to come on the show and share both what your work is about but also how you got there. Thanks for a fantastic interview. I really enjoyed again to spend time with you.

Joseph: Well, it's my pleasure Dave and I applaud you the same way for your, as I said in the book and wrote it in the book, your many accomplishments and your zeal in helping others.

Dave: Thank you. If you like this episode, you know what I'm going to tell you to do. I'm going to say, "Go to Amazon, pick up a copy of Square One by Dr. Maroon, spelled like the color and while you're at it, pick up your copy or your second copy of Game Changers." It's going to do a couple of things.

Dave: It's going to give you two awesome books to read. It's also going to make those two books show up together for the next person who wants to buy one of them on Amazon, which is always good. I'm only going to recommend stuff to you that I think is worth your time to read and certainly I'm only going to write stuff for you that's worth your time to read. Definitely, Square One meets that goal for you. Have a beautiful day.