

## **BRAIN POWER: Feeding Neurotransmitters Improves Mental Health – A Top 10 Episode with William Walsh, Ph.D.**

Announcer:

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Dave Asprey:

You're listening to Bulletproof radio with Dave Asprey. You might know because of my incredibly predictable habit of foreshadowing that we might be talking about nutrition. And we're going to be talking about health of children, as well as with adults. In this case with just a luminary in the field, an international speaker on brain chemistry and behavior, on learning and mental health disorders, and a guy who spent three decades as a research scientist and engineer looking at how you can fix brains, even brains with bipolar disorder using nutrients and foods.

And we're talking about none other than Dr. Bill Walsh of the Walsh Research Institute. Bill, welcome back to Bulletproof Radio.

Dr. Bill Walsh:

Well, hi David. Glad to be with you.

Dave Asprey:

Last time you came on the show, we talked about Nutrient Power, your most recent book that talks about things like methylation and biochemical imbalances. But that was about 400 episodes ago.

Bill Walsh:

Oh, yes.

Dave Asprey:

And you've been continuing to do your work, really incredible work on nutrients. And you've, I think discovered some new things, or maybe you just had more clarity on things around some of the more difficult to treat and scary things like bipolar disorder. I would love to know, what have you discovered since we last talked?

Bill Walsh:

Since we last talked, which was a really long time ago, we have learned a lot, neuroscience advances and my interest has always been on the brain and on people with brain disorders, depression, anxiety, autism, schizophrenia, the whole litany of brain science. And my focus has to be on the neurotransmitters themselves. And there are about more than 100 neurotransmitters in the brain of which there are about five or six that seem to be especially important in mental disorders. That for the first time in the last 10 years, we now are able with nutrients to directly affect neurotransmission of many of the most important neurotransmitters.

For example with serotonin, we know that people with low serotonin activity are prone and predisposed to depression and obsessive compulsive disorder, a few other nasty problems. We now are learning that... For years, people thought, hey, what you really need to do if you're low in serotonin is get tryptophan and take nutrients that help you synthesize the neuro-transmitters. Well, it turns out that's not a bad idea, but really the dominant factor is reuptake. The rate at which your serotonin in the

synapse goes back into the original neuron, it's called reuptake. And we now with the advent of epigenetics and knowledge, we now can tailor neurotransmission with nutrients.

And we're really quite good at that for serotonin and dopamine and norepinephrine, but what's really new is the recent research on the NMDA receptor, that whole system, that's where memory exists. And that's where people who have problems with their NMDA are the ones who are prone to addictions and obsessive compulsive disorder. We, for many years, for more than 25 years, we discouraged drug addicts like cocaine addicts and heroin people who were abusing alcohol or these substances, we discouraged them from coming to the clinic. Because of advanced science, we now know how we can help them. And it all has to do with the NMDA.

That particular group of people, they need to reduce the activity of that transmitter and guess what works the best? People have been trying for years to find a billion dollar drug that would really help them. They're finding that there are nutrients that seem to be far better than that. Things like N-acetyl cysteine for example, but there's something else we now know, it's something called an anti-porter. What happens is it has a unique capability to lower NMDA activity. It works on the glial cells that surround neurons. It acts as what's known as an anti-porter. It shoves cysteine into the glial cells and shoves glutamate into the synapse.

Dave Asprey:

A lot of the anti-aging drugs and some of the nootropics, the cognitive enhancers that I've been using for quite a while, they're NMDA receptor agonists, or they change the NMDA thing. So if you want to live a long time, you want to raise your IQ, or you just want to run at the level that your body's designed to run but may not be an NMDA, it's probably as important as some of these other neuro-transmitters like acetylcholine that we've maybe all heard of, at least if you've dabbled in nutrients, you probably have heard of that. Do you agree it's that important?

Bill Walsh:

Yeah. NMDA is where memory resides. The miracle of memory and we're beginning to understand how one can actually have memory. And there's something called memory extinction that resides in the NMDA. And that's what the problem that addicts and OCD people have. It's a matter of getting able to transition from one thing to another and get rid of the memories you don't want to retain and actions you don't want to repeat. It's also where plasticity comes. People are really looking at plasticity to help the brain improve in many ways, that's all in the NMDA receptor and we're learning that it has everything to do with the neurons at the NMDA receptors, but also the partnership with glial cells.

That's another major advance in neuroscience. We're now knowing that the glial cells are almost like another brain. And we have as many glial cells in our brain as we do neurons, and they collaborate in marvelous ways. And wow, is that leading to better and better understanding and better therapies.

Dave Asprey:

I'm so happy that you're talking about glial cells because in my last, or I guess two books ago, *Headstrong*, I went deep on that. And I look at glial cells in a very simplistic way as being the cells responsible for the immune system in the brain, but also for pruning synapses and for maintenance. And a lot of the current revolution in ketosis, it parallels a lot of the early writing that I had done on ketosis as a state of high-performance. And ketones feed neurons better than sugar does, better than glucose. Neurons will preferentially eat ketones. There's just one little problem. If you're in ketosis all the time, guess what likes glucose a lot more than ketones? It's your glial cells, right?

So you can starve the glial cells if you never eat carbs. And this is why cycling in and out of ketosis might be good. Adding ketones like Brain Octane to your food, that's a good idea maybe, at least I think it is, but the idea that you're going to never eat a carb again, what's that going to do? You tell me, Bill.

Bill Walsh:

Right. Zero carb diet is not a good idea. We evolved from the caveman and of course to do something that radically changes that original diet that people had for millions and millions of years is not a good idea because our body is adapted to that. And the glial cells are really interesting because first of all, that's where our brain cells come from, neurons come from glial cells. And I've often wondered, we have these 80 billion brain cells and yet they're being nourished every day. Nutrients come in and trash leaves, well, guess how it happens. Well, the glial cells do that. The glial cells, especially the astrocytes, which are a form of the glial cells, they've got [inaudible 00:08:31] that wrap around our blood capillaries and they have gap junctions.

And there's a really great system whereby the nutrients from your blood flow through those glial cells right into the neurons and the microglia, the form of glial cells that are tiny, well, those are the ones that are the immune system and they also are the trash collectors and the garbage collectors that get the junk out of the brain. And then you got the oligodendrocytes with this funny name, and they're the guys that make the myelin sheath. And they have to rewrite the neuroscience books. I just bought a book called The Neuron. And it's a famous book, it's about the third edition. And it just came out and I started reading it. And it's obsolete already. It's obsolete.

It's so exciting. The field of brain science is moving so fast. The disappointing thing, the disappointing thing is that it's not leading quickly into therapy. And it seems like all the research is still aimed at finding the next billion dollar drug that can help people. And we now have enough knowledge that from the new research, when you put it all together, we're learning that with nutrients and with diet even, we can make radical improvements in people with depression and anxiety and problems like that. And that we don't necessarily need a drug.

Dave Asprey:

Are we going to be normalizing the brain using lasers, electrical stimulation, neurofeedback, and some combination of nutrients and food that's personalized based on genetics and epigenetics and other things like that? What does the future look like? I'm asking because you have 30 years of experience. Your lens is more honed by wisdom than the average person. And you also discovered that nutrient deficiencies are tied to emotional disturbances and mental illness. So given your lens, you're probably the best guy I could think of to ask what it's going to look like in 20 years.

Bill Walsh:

I think that the next big real breakthrough is going to be preserving the integrity of our DNA. I think that's going to be the really big thing. And when we learn how to do that, we're going to, I think that conditions such as autism, schizophrenia, post-traumatic stress disorder, I think they're going to disappear from society. There are diseases and conditions that I call epigenetic disorders and these include cancer, heart disease, schizophrenia, and autism, and bipolar, and a few others. And these are incredibly complex diseases. And they occur because of environmental insults, usually together with a genetic predisposition and it's an event.

Cancer is really an event where suddenly your DNA gets overwhelmed, usually by oxidative stress, excessive oxidative stress operating on the guanine part of your DNA, which is the weak link in

your DNA. And it changes, it can change dozens or hundreds of genes. And so then you have a condition like cancer. And when that happens, you then have a cancer stem cell that nobody can get rid of. Anyhow, we're understanding exactly why this happens. And I think what is really leading to more than anything is prevention.

Dave Asprey:

Do you still stand by we're going to live to 150 to 200 years given the decline in food quality, soil quality, air quality, water quality, et cetera, et cetera?

Bill Walsh:

Well, I think I'm optimistic.

Dave Asprey:

[crosstalk 00:12:37].

Bill Walsh:

And the reason is I think we can sharpen our protection against those nasty guys. We know what the protectors are, and most of them are genetically, some of them are things that you can give nutritionally, but some of them also, and some of the nutrients can affect gene expression that can really sharpen our defense.

Dave Asprey:

So what is some things that people listening today might do in order to strengthen their defenses given what we know?

Bill Walsh:

Well, the first thing is to recognize that, is that every human being is biochemically unique. And for many years, I thought the biggest problem was deficiencies. And it was just a matter of finding out what you're low in and providing these really important nutrients that you're missing. Probably the first thing I learned that really surprised me in working with hundreds of and then later thousands of patients was that the greatest mischief is caused by nutrients that are in overload.

Dave Asprey:

Right. Like copper.

Bill Walsh:

And things like copper. Yeah. We have a beautiful system that is supposed to regulate copper in our body. So even if you chewed out a copper bar, you'd be normal in your bloodstream. But if you can't do that and your copper escalates, that's why people will get postpartum depression, causes anxiety. It's associated with violent behavior, mental illness.

About four years ago, I got really frustrated about bipolar disorder. And the main reason is I didn't understand it. I had more than 1,600 patients that I saw with our doctors with bipolar, but I didn't understand it. And when I wrote my book, I had a chapter on schizophrenia, on autism, on behavior. I did not have a chapter on bipolar. I didn't think I knew enough about it to write a chapter. So I decided to delve into it. And I spent years studying neuroscience around the world. And guess what I found, I

believe I have discovered exactly what it is. There's all these mysteries of bipolar that have plagued people for more than 100 years. For example, people don't understand why it's a late onset disorder.

Usually it comes after the age of 16 and it often comes suddenly. And once a person develops bipolar disorder, it doesn't go away. It's a problem that challenges the rest of their lives. And why for heaven's sakes do they suddenly start with mania? Why does the mania get worse early on? And then why do they cycle, or why do they switch between mania and then sort of an opposite condition of depression? After several years of doing this, I think it's all right there. The neuroscientists have the answers. And I believe we have solved all the mysteries of bipolar and we now know exactly what it is. And I'm writing a book on it.

And I went to the annual meeting of the APA. Big meeting of the world's psychiatrists. And I presented this at a new research section and I was really disappointed. Nobody seemed to care a lot. A psychiatrist would come up to me and say, "Well, this is really interesting, but I've got this patient coming next week who's got bipolar disorder or schizophrenia. How is this going to help them?" Well, the answer is no. We now understand what causes it. We know the mechanisms and this should lead directly to far better therapies.

Dave Asprey:

All right. So a lot of people, okay, maybe you have a little bit of this going on, even if you're not bipolar, but a lot of us have some problems with electrical potential in our brains. I think it's well, 48% of people under age 40 have mitochondrial dysfunction and everyone over age 40 has some of it, unless they're doing radical things like I am. And maybe I still have some too, I'd probably do given my 300 pound of former obesity and my health history. But is this something that you could solve just by having more salt? Sodium potassium ratios seem pretty important. It's just-

Bill Walsh:

Unfortunately, no. Basically it's hard to fight an enemy if you don't know who it is. If you don't know who an enemy is or what it is, it's really hard to combat it and fight it. I think what our contribution is, we've now unveiled what it really is. I think we've now disclosed what it is. And I think it's going to take researchers and clinicians. I think it's going to lead to greatly improved therapies. I do believe that the real answer will be in prevention. And the reason is we now understand why bipolar strikes and why it strikes late onset. And I think we already have lab tests that can identify people who are about to become bipolar. And we know how with nutrient therapy to prevent it. That's what's coming I think

Dave Asprey:

What are the nutrients that work when it's about to happen?

Bill Walsh:

Primarily antioxidants. See, what happens is that the weak link in your DNA for some people who are predisposed to this problem is the guanine. Well, we have 30 trillion of these DNAs containing, that's one of the four nucleotides that make up DNA. And when that starts to deteriorate, it shows up in the blood stream.

Dave Asprey:

Well, one of the things that is of concern to me, there's pretty good studies out there that show, I think the technical term is willy-nilly use of antioxidants. It reduces the beneficial impact of exercise because

you never get the oxidative wave that comes from lifting heavy things or sprinting. And because the antioxidants you took orally took away the pro-oxidants, like a brief exposure to high oxidative stress like with ozone therapy causes your cells to get healthier. Are you concerned that chronic use of antioxidants without an opposing force might have negative effects?

Bill Walsh:

Well, I'm absolutely certain that exercise is going to continue to be essential to everybody. No, I'm not. I think that's a good question, but I don't worry about that. I don't worry about that. And even if that was a real threat to wellbeing, I think you could alternate, couldn't you?

Dave Asprey:

Yeah, that's what I do actually. I don't overwhelm myself with antioxidants every day. And sometimes I intentionally expose myself to more oxidants. It's the chronic ones, or having pollutants in your body like heavy metals, things that are creating just free radicals, having glyphosate incorporated into your collagen matrix because you still eat industrial animal products instead of pastured ones. I think things like that that are chronic are just horribly destructive, but occasionally telling yourself if you can't make antioxidants, could you just die already and make some fresh cells that can make antioxidants? That seems like a good strategy.

Bill Walsh:

It does. And some people simply don't make enough natural antioxidants and they're the ones who die young and develop all kinds of diseases. And I think that the good news is nutrient supplements can do that job for us.

Dave Asprey:

I think that at this point, if you're in a position to be able to listen to a podcast, which puts you in rarefied era amongst all humans on the planet, that you probably ought to be taking your basic supplements. If you're not getting your magnesium and things like vitamin D, vitamin A, vitamin K, and certainly the right forms of vitamin E, probably the gamma form, you're just missing on a low-hanging fruit that has a high likelihood of being beneficial but isn't terribly expensive compared to any of the bad effects of not having those. Do you agree with that assessment? It sounds like you would, but-

Bill Walsh:

Almost. Almost. I agree with respect to certain nutrients, but there are some nutrients that can cause mischief-

Dave Asprey:

Oh, like which ones?

Bill Walsh:

... in some people, for example, foliates. Folic acid is vitally important. However, if a person has low serotonin depression or obsessive compulsive disorder, or a movement disorder, it'll make them worse. Supplements of that will make them worse. So there is a handful of maybe six or eight nutrients you have to be really careful of. But I agree with what you said in general with a few of these exceptions. You also would not want to do any methylation therapies on people who are born with over methylation.

8% of Americans are born genetically with too much methylation. So they could be harmed by things like methionine or SAME. Whereas people who have too little methylation capability, that would be like mother's milk for them.

Dave Asprey:

One mindset, and it's kind of a long question for you. But one mindset that I started with was I'm only going to test one thing at a time. And I realized there's more things that exist and I have months of my life to try them.

Bill Walsh:

That's right.

Dave Asprey:

So I started saying, "I'm going to try the things that all push this pathway in the same direction to see if I get a result and then I can stop taking some of them." Do you like that kind of what I call a pragmatic multifaceted approach or are you a single nutrient at a time kind of guy?

Bill Walsh:

I'm not. And I think if you did every lab test you could do, you wouldn't have a drop of blood left and you wouldn't have any money left. You have to prioritize. And with respect to the supplement combinations, I think targeted supplement formulations are a great idea for athletic enhancement, for muscle development, and growth, anxiety. I think that's a great thing. I don't approve of the multiples that are one size fit all for everybody. So I think we agree on that.

Dave Asprey:

Okay. So how is one person who doesn't have \$1,000 to spend on lab tests and carefully doing a bunch of stuff, let me put it this way. You're on a budget. You have 50 bucks a month to spend on supplements to make yourself function better. How would you possibly prioritize that without lab tests?

Bill Walsh:

Well, hopefully the person you're talking about is reasonably intelligent and has a computer and knows how to use it. And what I would do-

Dave Asprey:

Those are the lessons of the show. All right. [crosstalk 00:22:56].

Bill Walsh:

And listen to podcasts like yours and others. And try to identify maybe the five or six or the 10 most promising nutrients that might help them. And then to try them one by one and see if it really makes a difference in their life.

Dave Asprey:

If you were to go out and do that, you might screw something up. But if you don't do that and you continue eating whatever the heck it is you eat, you're already doing the same thing. You just did it without any knowledge of what's going in. So either way, you're putting something in your body, maybe

you could increase the odds of what you put in your body doing the right thing for you with just a little bit of research. And that's been the foundation for me that helped me turn that corner from weighing 300 pounds and having a brain that didn't work.

Bill Walsh:

I think we should all try to find out who we are, who we are nutritionally.

Dave Asprey:

I love that advice. If there was one lab test that you could suggest for people, the first lab test to get, what would it be?

Bill Walsh:

I would start with plasma, zinc.

Dave Asprey:

Interesting. Okay.

Bill Walsh:

Plasma zinc. And the reason is that so many Americans are low in zinc. It has so much to do with health and with biochemistry, and brain function, and physical function. I've learned that the average person who comes to our clinical processes, [inaudible 00:24:19] investigated more than 30,000 of them. The median zinc level of those people is 76 micrograms per deciliter, which is really low. Every one of those people would be better off and healthier if they normalize their zinc. Now, many people will get all the zinc they need from their diet. Many people will get the zinc they need from supplements. But I think if you're going to do one test, I would do a zinc test.

Because if you're low in zinc, that means your chance of getting cancer, chance of developing dementia, chance of developing heart disease is much greater. And I think it's just, I would guess that probably half of Americans would benefit from more zinc. And so if you could only do one test, it'd be good to find out if you have that problem or not.

Dave Asprey:

How do you know that when someone takes copper or zinc or anything else, where it goes in the body? Do you think we know enough about that?

Bill Walsh:

Every five years or so, the zinc experts of the world get together and they try to identify the best test that'll identify normality or a healthy level of zinc. And there's like nine different tests you could do. The one on the very bottom is the taste test. Because if you're zinc deficient, your taste is not very accurate. And right now if it's zinc, we know that they continue to say the plasma zinc is the best, but red pack cells is number two and you get different information.

Dave Asprey:

Yeah. So there's still some mysteries out there. And what I'm most excited about for the future is that our ability to do correlative analysis with machine learning and artificial intelligence is so good. Pretty soon, we'll be able to say, if your levels of this are high and your genes look like this, your levels of that



will be low. We don't need to draw a lab test. How long do you think you're going to live with a highly functioning brain?

Bill Walsh:

Well, of course, I'm not happy about the prospect that someday my brain may turn to green crackers. If you're asking about me personally, I'd be happy with another 15 years. I'm pretty old.

Dave Asprey:

Got it. And even with all of the nutrient knowledge you have, the ability to balance your brain, the ability to manage all these things, you think 15 years?

Bill Walsh:

I don't know. I'm just happy with every day.

Dave Asprey:

All right. Gratitude is great, but I would just encourage you because I don't think you're done contributing it, bump your number up a little bit.

Bill Walsh:

I think I have reverse Alzheimer's because I'm having trouble remembering things that happened 50 years ago. But when I study neuroscience and new things, it seems to stick faster than ever. So I-

Dave Asprey:

Beautiful. Well, keep studying, keep writing, Dr. Walsh. I am truly a fan of your work. You've done some things that really have alleviated massive amounts of human suffering and helped a lot of people who felt like there was no hope and people who are undermethylated like me definitely benefit from the knowledge that you brought forth. And I think there's a wave of change will happen even in our penal system when we realize what happens if we fix the nutrients of the people who are incarcerated and there's so much derivative work that'll come based on some of the original discoveries that you've made and are still making. So just keep it up.

Bill Walsh:

Thanks for your health.

Dave Asprey:

Oh, you're so welcome. Your info, you're at walshinstitute.org. People can find a list of the 600 and something doctors that you've trained in your techniques at the website?

Bill Walsh:

Yes. And we have a lot of YouTubes and podcasts and things. Hopefully people can learn about yours and all the others we've done. We've already had, I think a couple of years ago, we got to the point where more than a million people had listened to one of our informational lectures.

Dave Asprey:

Beautiful. Well, keep doing what you do. [Walshinstitute.org](http://Walshinstitute.org). And thanks again.

Bill Walsh:

Well, thank you, Dave. Great talking to you.