William Walsh: Advanced Nutrient Therapies for Brain Disorders
SVHI Transcript, Transcribed by Bulletproof
Originally Recorded: 11/2015

<table>
<thead>
<tr>
<th>File URL</th>
<th><a href="https://www.youtube.com/watch?v=pHT3iN_jJfc">https://www.youtube.com/watch?v=pHT3iN_jJfc</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>97 min (01:36)</td>
</tr>
</tbody>
</table>
Randy: Our first speaker is Dr. William Walsh, Bill Walsh, he's the president of the nonprofit Walsh Research Institute near Chicago, Illinois and directs physician training programs internationally, including in the United States, Australia and Norway. During his thirty plus years as a research scientist and engineer, Dr. Walsh developed a science-based nutrition program that has helped thousands of patients challenged by behavioral disorders, depression, anxiety, schizophrenia, ADHD, and I'm running out breath, okay, autism, Alzheimer's disease, and is used by doctors throughout the world. With that I just welcome Dr. Walsh.

William: Thank you, Randy. I should've told him before we started it'd be okay if he just said, "Here's Bill." [inaudible 00:00:51]. I'm going to ... I have like a device here that I'm going to use with this.

Randy: Is the sound working?

Audience: It's not working.

William: You've got to turn it on. [inaudible 00:01:05]. Hey, this works. Sorry about that. It's great to be here in sunny California. I came from Chicago and I understand that when I get back tomorrow they're expecting snow. I talked to a few people here at supper who had been in Illinois for a while and they all came here and I understand why. Why isn't this working? There we go. We're also a 501(c)(3) public charity. We have expertise in mental disorders. I'm going to talk only about mental disorders. I've worked with more than ten-thousand cases of behavior disorders, ADHD. I think I may still have seen more autistic patients than anybody in the world; we have seen six-thousand, five-hundred cases, I think.

Of course that's a lot of human misery, depression, schizophrenia, bipolar, and Alzheimer's and most recently Parkinson's, and we try to keep away from anything else. That's a full plate to work on these. We have an international physician training program that's been going on for thirteen years and my goal is to have a thousand doctors throughout the world trained in this therapeutic approach, nutrient therapy approach. We're about a third of the way there and we're going to be by the end of this year we think we'll have five-hundred around the world doing this, including a growing number of psychiatrists.

Then research, if you noticed, research is our middle name, Walsh Research Institute, and I've got two ongoing university studies: one on nutrient therapy for violent children and another one looking at the epigenetics of schizophrenia phenotypes. I've just finished and I'm about ready to publish an autism study where my group, we were the first people to ever do a detailed chemical analysis of autism brain tissues. We were using the famous Argonne Advanced Photon Source, which is a unique facility in the world. It cost 1.6 billion dollars to get this thing working, but you get really accurate nano-analysis.

I have the first data in the world for, for example, how much mercury is in the brain cells of autistic children compared to typical children, and we got some pretty
surprising results. I've seen a lot of patients, and here are the numbers. They're sort of up-to-date. I've always been a numbers person, I've always liked to collect as much data as I could and so I've got enormous databases, massive chemistry database. Laboratory testing of more than thirty-thousand patients and controls, but more than three million lab chemistries form people with these various mental disorders, and really importantly is it's not enough just to know their chemistry and to do the lab work, but you have to really know the patient.

Accurate diagnosis and treatment design, you really need to know as much as you can about these people, because there's a lot of individuality and differences in humans. Just to summarize it all, it doesn't take a genius to look at these numbers and find out that there are striking blood and urine and even tissue chemistry differences between mental illness populations and the rest of society. Now there are more than three-hundred important nutrients in the human body, but what we found, to our surprise, even from the beginning, is that respect to brain disorders, there's really only about seven or eight that dominate mental functioning.

This is really lucky because can you imagine if you had to do lab work for a hundred different factors or if you have to do a therapy that would balance a multitude of these, it would be really hard. We found out that there are some nutrients that have a powerful effect on activity at these primary receptor systems that have so much to do with mental illness and mental problems. Of course our nutrient therapies are aimed-

Speaker 3: Camera.

William: Oh you have a camera. I'll be happy-

Speaker 3: Thank you, that's good.

William: Is this better?

Speaker 3: Yeah.

William: Okay, I'll try not to stand in front of the screen. Anyway, our goal is to normalize these chemical factors that can really, if you have a chemical imbalance in something like a copper imbalance, if can really can affect brain function, and I'll start to explain why. What is the short list? What are these nutrient factors that dominate mental illnesses? Methylation disorders, over methylation, under methylation, zinc deficiency, that's the most predominate imbalance we find in mental illness. It's a rare, rare person that isn't either low in zinc or deficient in zinc, if they have mental disorder.

Copper overload is found throughout many different cases; it's the prominent cause, we believe of postpartum depression. It's the most common imbalance and dominate imbalance, or one of them, for paranoid schizophrenia. It's present in sixty-eight percent of children with ADHD. It runs through a lot of different mental conditions, and I'll explain why in a minute. Folate deficiency or overload, we're learning more
and more about folate and it has a powerful effect on epigenetics, which I'll be talking about a bit later. That's one of the reasons why it has such a striking effect on either deficiency or overload for some people.

Pyrrole disorder, how many people here have ever heard of pyrrole disorder? Oh, about fifteen percent, that's not too bad. I think within about five or six years everybody will know about it, because it's something that medical science is beginning to pay more attention to. Toxic metal overload and then the POOF is the polyunsaturated fatty acids. In the human body there are more than a hundred important fatty acids; in fact, more closer to three-hundred. In the brain, at the synapse, where the action is, there's only four of them that make up about ninety-five percent of the fatty acids.

These are DHA, EPA, arachidonic acid, and DGLA, two omega-3s and two omega-6s, and obviously they're extraordinarily important. We now know that DHA seems to be the most important of all, but we focus on these four. Sometimes if a person has a striking imbalance in essential fatty acids that can cause a lot of mischief. I forgot to ... The statement on the bottom is really important. It took me a long time to realize why it's ... I'm drifting, so thank you. You'll help me. It took me a long time to realize why these, out of all these hundreds of nutrients, why these?

Eventually it dawned on me these just happened to be the nutrients that have a major impact on either the synthesis of a neurotransmitter or the regulation of a neurotransmitter. That's why they're so important in mental health. Well, I get a lot of calls from psychiatrists, and even other doctors, and I've been getting these over the years, and very often it'll be I got this patient I've been working with and they went to your clinic or they went to one of the doctors you work with and now they're better. Can you please tell me what you did?

I like these calls, of course, so if I have the permission from the patient to talk about them, I'll talk about the chemistry, I'll talk about the symptoms and traits and the psychiatric diagnosis, and then everything is going great until they say, "Well, what was your treatment? What did you do?" The answer is the weapons we use are nutrients, amino acids, vitamins, minerals, and fatty acids. Then I get these questions very often. They'll say, "Well how could that possibly work? How could vitamins and minerals possibly help a person with a serious disorder, like a schizophrenia or severe bipolar or autism? Don't you really need a powerful drug to get the job done?"

I think this group here understands the answer's no. Really nutrients can have great power if you can identify a person's biochemical individuality, especially individuality related to brain function and mental functioning. These are the major areas that really affect this and give us the ability to have a powerful impact on people. In fact the book we brought, I was trying to decide what title to give it. I thought a long time and I realized if I had a single message I wanted to have people realize from this book, is that nutrients can have power if you know exactly what you're doing.
Anyway, neurotransmitter synthesis, and I'll give you a few examples in a minute. Epigenetic regulation of gene expression, this is something that's sort of new. This is something we didn't understand until five years ago and it is really important; especially the impact of nutrients on neurotransmitter reuptake. That's the dominate factor in many of the important neurotransmitter systems, reuptake. It's much more important than the amount of neurotransmitter present and protection against oxidative stress, and that's critically important, because every single disorder we work with has oxidative overload associated with it; every one of them.

Let's start with ... This is the last step in the synthesis of serotonin and it shows the 5-hydroxytryptamine converting to serotonin. I hope you can see that. There is an enzyme that enables that, but the major cofactor is B6. Now there are some people who are born with a genetic tendency for extremely low B6 levels, and they tend to be low in serotonin and therefore prone to OCD, depression, and that sort of thing. That's an example of a vitamin that is really important if you don't have the right amount of it. Now let's look at norepinephrine, another one of the major neurotransmitter systems.

Well all of your norepinephrine comes from dopamine. It happens in little tiny vesicles close to what they call the presynaptic membrane; that's the part of a neuron or brain cell that ejects the neurotransmitter into a synapse. Well it's enabled by one of the most famous enzymes in biochemistry, namely dopamine beta-hydroxylase, but the primary cofactor is copper, divalent copper. They've done studies with animals where two different groups studied ... They were wondering what happens to the brain if you don't have the right amount of copper in your system or in your brain? What kind of effect would it have on these really important neurotransmitters?

They each took animals and starved them of copper, so they got the copper level in their blood down to twenty-five percent of normal, and what did they find? They both reported the ratio between norepinephrine and dopamine changed by more than a factor of three, just extraordinary differences. Now most people have a system of proteins that have the job of homeostasis for copper, normalizing your copper, and if it's working well you could be chewing on a copper bar all day and your levels would still be normal. Some people can't do that.

These proteins are ceruloplasmin, metallothionein, but some people don't have those systems working well because of SNP mutations. How many people have ever heard of a SNP in a mutation? Well that's about sixty-five percent. We all have mutations by the way, and that's why he's taller than me, why some people have brown eyes; it's really mutations that make us different. There are people now who count the number of SNP mutations that exist in the human genome and it's now more than ten million. Each of us has thousands of SNP mutations and it sort of defines who we are, our tendencies, our traits, our inborn characteristics.

Anyway, in this case we've learned that if a person has really high copper levels they tend to have low dopamine, extraordinarily low dopamine and extraordinarily high
norepinephrine. We find this in about ninety-five percent of all women who experience postpartum depression. We compared seven-hundred and fifty women who'd given birth and compared those who had postpartum with the ones that didn't and the difference was copper. We published that in a peer review journal. Copper is really important, if it's not in balance, if it's not where it ought to be.

Well how about dopamine? Well dopamine comes from L-DOPA, the very final part of this, and, again, B6. If you have a B6 deficiency, and quite a few people do, you're not going to have enough dopamine, and dopamine is sort of a feel good neurotransmitter and without it at high enough levels you'll have troubles with cognition, learning, lots of important areas. I'll finish with a GABA, this is just a few of these, but GABA is really important; it's one of the two leading receptor systems in the human brain, the other one being glutamate, and it's a calming, again, sort of a feel good neurotransmitter.

Again, the formation of it, the synthesis depends on B6. Additionally, zinc is important for GABA to be at the right level; it's involved in the regulation of it. Zinc and B6, if you've got a zinc and B6 problem, especially a deficiency, you're going to have problems with the GABA. Okay, so that's so much for the synthesis of neurotransmitters and that's one reason and one explanation for why nutrients can be, in some cases, really a dominate factor. Well I want to mention something about metal metabolism disorders. This was the first imbalances we worked with.

I started off working with people in Stateville Penitentiary. I actually had been a prison volunteer for about twelve years and I got started in this work really out of curiosity, wondering why these people were violent. When I would talk to their families and find out there were other brothers and sisters who were fine and the families would say, well, they knew something was wrong with them by the time they were about two years old, which was a surprise to me. I found wonderful families that had produced a criminal.

Anyway, the first thing we found, and I was guided by the great Carl Pfeiffer in this. I had an early talk with him when I was studying the blood and urine and hair tissues of criminals, trying to find out what might be different about them, he suggested I study metals and so I started doing that. He was right, that's where we got our first good results. We often find zinc depletion, copper overload, although some people, the sociopaths, the antisocial personality disorder people, have really low copper levels. It's different, you have to be careful with what you're doing. Then deficiencies of many other metals and, of course, we find an overload of toxics.

My first formal experiment was done at Argonne National Laboratory and what I did is I would talk to an epidemiologist and he guided me to an experiment where we had twenty-four pairs of brothers, where in the same family you had a child from hell, so to speak, who had multiple incidents of assaulting people physically, and in the same family an all-American boy. Both boys and so we had the great opposites in the same family with the same general diet and coming from the same parents, going to the
same school. The first thing we found, the violent kids, this is over twenty-four different families; the toxic levels were much higher in the violent kids.

It took us while to understand why and then the reason is that we all have systems in the body that protect us against toxic metals, and some people don't have that capability as well as others, and that's characteristic of many people with mental disorders, but certainly with people with behavior disorders. Pyrrole disorder is something discovered by the great Carl Pfeiffer, in collaboration with Abram Hoffer many years ago, and they just ... I won't go through the details of how they discovered this, but it's a condition that is generally inborn. It's genetic, runs in families, cause great mischief, and it results in an extraordinarily low level of B6 and zinc.

From what I just showed you, for the synthesis of neurotransmitters you can see why that might be important. It's my favorite imbalance because it causes great harm and misery for people and it's the easiest to correct. So what happens? You have double deficiency, B6 and zinc, reduced synthesis of serotonin and dopamine and GABA, depletion of glutathione, metallothionein, cysteine, SOD, and other really important natural antioxidant protectors we have. Just giving these people B6 and zinc, just normalizing their blood levels, often can result in the elimination of the symptoms and many of these people can throw away their psychiatric meds because they don't need them anymore.

It's great when that happens. It doesn't always happen. Again, this is my favorite imbalance. Well I mentioned oxidative stress, well what can go wrong? Well some people are born with low levels of natural antioxidants, these protectors we all have. Again, glutathione, metallothionein, and there's a long list of about eight or nine of these that are really great, that come to the fore if you get, for example, a toxic metal, they're supposed to protect us against that, keep it from harming us or any form of oxidative overload. Well illnesses, injuries, and emotional traumas, I keep drifting, sorry, can increase oxidative stress and they do.

Exposure to toxic metals, pesticides and pollutants could also increase it, so that's what can go wrong. Well in the brain it's a little different from the rest of the body. There are three antioxidants that are extraordinarily important and they work as a team. I call them the three musketeers. The three musketeers of antioxidant and protection of the brain, glutathione, it's the first level of defense. The problem with glutathione is it comes from your diet and it has a low capacity; it doesn't take much to sort of run out of your glutathione and your body doesn't restore and make it fast enough.

What happens is metallothionein is nature's backup system, and when your ... Now metallothionein is what they call inducible, which means if you have a need for it the body will genetically express more of it and it'll come to the fore to help. It doesn't work unless there’s oxidized, you might say, oxidized glutathione that’s already been used and no longer works. That's what turns on metallothionein, it's really a clever system. Then selenium, we know that without selenium there in ample amounts it
can reduce the kinetics of all this by fifty percent, so these three work together beautifully in the brain and not so much in the rest of the body.

Well, brain disorders and oxidative stress, I think this is extraordinarily important and it's one of the few things I can recommend for anyone with a mental problem and has to take antioxidants, because virtually everybody has, well, I would say ninety-five percent of all the patients I've seen over the years, have that as part of the problem. Clinical tests, there's a lot of different tests you could do for oxidative stress. There's a lot of really exciting new ones, like 8-Oxoguanine, if you know that one, or Malondialdehyde, which is another great test.

We can usually get this done looking at things like plasma zinc, serum copper, serum ceruloplasmin, and look at the ratio between the relationship between ceruloplasmin and copper, that can give us a lot of ideas of what ... It's a nice marker for oxidative stress and urine pyrroles are a good market for it, but there are many other alternatives; these are the ones we usually use. It's present in ninety-five percent of patients with one of these disorders. Useful supplements, and this is just a partial list, there's about twenty of these. I listed about seven of them here. Just vitamin C, E, zinc, selenium, alpha lipoic acid, NAC, glutathione, and many others.

Methylation, this is something that's quite different and new, and that is our understanding of the importance of methylation. We've determined the methylation status for more than thirty-thousand patients, so we've got a lot of experience with this, and what we've learned is that most people with a mental disorder, not all of them, but most of them, it's around two-thirds, have a serious methylation imbalance. If you correct it and address it and treat it, most of them report improvement.

Speaker 4: Could you explain what methylation is? Just some explanation.

William: I'm coming to that. It's a good question though. Methyl is the simplest organic chemical; it's copper with three or four hydrogens attached.

Speaker 5: Carbon.

Speaker 6: I think it's carbon.


Randy: Yes, you did say it.

William: Thank you very much, Randy. Yeah, they both start with C. Anyway accurate diagnosis of methylation status, whether it's under methylation or over methylation, is really important, and we're getting more understanding recently of why. There have been two advances in the last five or six years that I think really have aided us and made our treatments and our understanding much, much richer and more defined and it's methylation processes and emerging field of epigenetics.
Now I know a lot of people didn't raise their hand when I asked them if they knew what epigenetics is; I'm going to give you flavor of it, maybe more than you want, a little later, but I'll explain what it is, why it's important and for some of the doctors and our experts in the audience, I'll get a little bit deeper into it. It's a new capability; it's a new capability in nutrient therapy. For the first time we can do something we couldn't do ten years ago, we can actually regulate enzyme gene expression. That's where our enzymes come from; they're expressed by genes.

We know how many genes we have the 23andMe. Well we've got these twenty-three thousand genes, every gene's got one job and that's to make one protein. Some of these proteins are really large complex proteins. Anyway, we can now regulate this. We never could do this before. That's really important; especially for mental illness, I think. We can control serotonin and dopamine reuptake, where we couldn't do that before. Some people are born with a tendency for too much serotonin reuptake, and what does this cause? This causes, it's a classic factor in depression, OCD and some forms of schizophrenia.

Anyway, these are things we can do now that we couldn't do well before and I think it's really exciting to be able to have this new knowledge and these new weapons. I'm reminded of quote from Maya Angelou, "I did then what I knew how to do. Now that I know better I do better." Methylation, I'm getting there. Methylation and mental health, it's a dominant factor in epigenetic processes and these are processes that, among other things, regulate neurotransmission activity at important receptors like serotonin, dopamine and norepinephrine. It's a dominant factor is reuptake.

Anyway, there's a lot of therapies where people might take tryptophan to try to improve serotonin levels and do other ways to try to increase the amount of serotonin. That's not the name of the game. We found out thirty years ago that the dominant factor is this thing called reuptake, and what that is is when a brain cell fires and a serotonin or a neurotransmitter is ejected into a synapse, the reuptake has to do with how quickly it goes back to the original cell.

That's really the important issue and that's why people and why the pharmaceutical companies in 1985, which is when they first discovered this, they stopped using things like MAO inhibitors, which simply increase the amount serotonin and they started using reuptake inhibitors. That's where the SSRI antidepressants came from and that's why we've also learned that the methyl/folate ratio has a really powerful impact on a reuptake, on these transport proteins. The transport proteins are proteins that snake in and out of the membrane of your brain cells and they're the pathways for the returning neurotransmitters when they get reuptake.

More than sixty percent of anxiety, depression and psychosis patients have a serious methylation imbalance. Methylation disorders, two types: you can have under methylation or over methylation. Well, in the general population roughly twenty-two percent of all human beings, at least in America, which is where most of my database
is, are under methylated, and most people who are under methylated don't run into trouble. This is an inborn condition, it runs in families and I'm going to show you a bit later what the classical tendencies and traits are of people who under methylated. They tend to be competitive people, they tend to be driven, they tend to be perfectionists.

There's a very high percent of doctors are under methylated. CEOs, great athletes are under methylated compared to the rest of the population, but they also can run into severe depression, low serotonin depression, they can run into OCD and even schizoaffective disorder and some psychotic cases for some people. Okay, eight percent are over methylated. Seventy percent have normal methylation. However, there are some conditions where you have really a high preponderance of under methylation. Autism spectrum disorder, back in 1991 I was the first person to report, to discover and to report, that most autistics are under methylated. Within a few years some methylation scientists, like Jill James and Richard [Duff 00:29:39], started studying this and now everybody agrees, at least everybody who has studied it, realizes that under methylation is a distinctive feature of autism. Antisocial personality disorder, I found this out in working with Carol Pfeiffer and with the thousands of violent people we studied, ninety-five percent are under methylated. Schizoaffective disorder is ninety percent. If we get a patient diagnosed with schizoaffective disorder we think they're going to flunk the blood test that tell us about methylation. Oppositional defiant disorder, nearly seven-eighths. Anorexia and bulimia are high and it's the highest, most common phenotype of depression.

Okay, incidents of over methylation, the opposite, too much methyl, which some people have, eight percent of the population. Panic and anxiety attacks, that's nearly two-thirds of all panic and anxiety patients are over methylated. Paranoid schizophrenia, it's more than half of paranoid schizophrenics in the past have been really over methylated, which results in high dopamine activity. ADHD, it's one of the leading causes of ADHD, and these are people who tend to be space cadets and tend to be hyperactive and they're space cadets and they can't concentrate.

Behavior disorders significant number and eighteen percent of depressives are over methylated, and God help them if they take an SSRI, because that would make them worse and does make them worse. What's the cause of this? How can a person become under methylated? Well basically you're born with your methylation status. This is all established in the nine months of gestation, so before you're born this all gets setup. Now, what happens is that over millennia, over thousands and thousands and thousands of years, through then mutations that have developed in enzymes that are genetically expressed; that's what SNPs are, single nucleotide polymorphism is the term.

We all have some of these, but if you happen to have it in your methylation cycle, which is a complicated cycle, and I'll show you a picture of it, but I won't go through all the gory details, because that would put half of you to sleep. There are these mutations, the well-known MTHFR. How many people have ever heard of MTHFR?
Oh, that's about half of you. Very good. There are other enzymes in that cycle that could also weaken the production or the availability of methyl. Methyl is this carbon with three or four hydrogens; it's involved in at least eighty really important reactions in the body, so you need to have the right amount of methyl there. There are a couple of other things that can also cause under methylation.

If you've got a histamine overload it gets metabolized or it reacts with methyl and that can really knock down your methyl level, to some degree or protein deficiency or malabsorption. Really, number one is the enzyme mutations. This is the famous methylation cycle. How many people are familiar with this? That's about twenty percent. I'm not going to go through the gory details, but this is a complex, beautiful system in the body, that is operating all day, every day in every cell in your body. By the way human beings have thirty-seven trillion cells, that's the closest estimate they've had recently.

In every cell you've got this going on and it starts with dietary protein, which gives you methionine, which is this guy up here, and that converts, with the assistance of magnesium and adenosine triphosphate, and enabled by an enzyme, it becomes something called SAMe. How many people have heard of SAMe? Almost all of you, okay. Well SAMe is a chemical that is easily disassociated. It easily gives up its methyl. It's the primary methyl donor for all these eighty reactions that are so important in the human body. Well what happens then is it gives up the methyl, the CH3, for one of these reactions, forms SAH, which is a chemical that is also strikingly important and has a lot more to do than just the cycle.

It's important with epigenetics, it's important, and it's an inhibitor of methylation reactions. Then it goes to homocysteine, who most of you are probably familiar with; if you've ever get a doctor who's worried about your heart function. Part of the homocysteine goes back to the methionine, with the assistance of this folate cycle, with the famous MTHFR enzyme. Every one of these green enzymes, these green circles, is an enzyme genetically expressed. For most people they might be working fine, but if you happen to have, for example, an MTHFR that's out of whack, that has a mutation, which really means MTHFR is a large enzyme; it has more than five-hundred amino acids.

Really all that means is that you've got one of these amino acids is misplaced or isn't where it's supposed to be. Just one of them. Most mutations have no effect on humans, but in this case there are some parts of that complex molecule that, for example, if you have one of the SNPs can diminish the function of that enzyme by between twenty-five and fifty percent, depending on the individual. Anyway, this is like the Indianapolis Speedway, and this is constantly circling and cycling and cycling. Anyway, if one of these enzymes isn't functioning at its peak, you tend to have a tendency for lower methylation availability. That's what could go wrong and could cause under methylation.

If you were all biochemists I would've gone through every one of these steps, but this is the most important one. SAMe synthesis comes from dietary methionine, that's
one of your amino acids in every protein you eat. Then with the assistance of the enzyme it provides SAMe. This is the SAMe donation. I won't say anything else about this. Well what can cause over methylation? There's a lot of people studying under methylation, people are being obsessed with that and they're now doing a lot of genetic testing to see do you or don't you have the MTHFR SNPs, one of these bad SNPs. Now there's a tendency that if you've got it a nutritionist or a doctor might want to give you Deplin, which is also known as methylfolate, to overcome that.

Well frankly that's not a good idea, and I'll try to explain why. How can you get over methylation? Well we've got this beautiful engine, that cycle, that ends to provide ample amounts of methyl, but what happens to the methyl? It turns out that the lion share of your SAMe goes to creatine synthesis; one reaction. The other eighty reactions, lesser amounts. Now this is somewhat individual, for some people it's only forty percent, but it's usually more than half of all the SAMe you're producing from the cycle goes to creatine synthesis. Well let's look at that. This is creatine synthesis. Again, I apologize for the people who don't care about the biochemistry.

It comes from protein named, oops, I knew I'd do that, arginine and glycine, with an enzyme, makes a chemical with a funny name called guanidinoacetate and then this is where most of your SAMe goes to creatine synthesis; one reaction. The other eighty reactions, lesser amounts. Now this is somewhat individual, for some people it's only forty percent, but it's usually more than half of all the SAMe you're producing from the cycle goes to creatine synthesis. Well let's look at that. This is creatine synthesis. Again, I apologize for the people who don't care about the biochemistry.

We actually have a methylation tug-of-war and you have SNP mutations, like MTHFR, and this is only showing five of them. There's probably eight or nine important ones. Those are SNPs that can cause over methylation. The question is who wins the war? You cannot tell from genetic tests. You can do 23andMe and you won't be able to tell. It'll tell you, it'll give you a good idea of maybe these; it doesn't tell you anything about these. We're not able to do it clinically. I'm not able to use genetic testing yet with any kind of solidarity.

The lab tests that we use ... First and only there are two tests, blood tests, that can give you a really good idea of who won the war. Do we have too much methyl, too little methyl or are you okay with methyl? The SAMe/SAH ratio test, which was developed by Dr. [Zaidia 00:39:10] about seven or eight years ago. That's a great test. For many years we've been using whole blood histamine, and it's a marker for methylation. We have two blood tests that gives you a pretty good idea. As I mentioned, the genetic tests, eventually, I think, they're going to get there, but you cannot now decisively determine methylation status from them.

Okay, fortunately we're aided in diagnosis; we don't have to base everything on the labs. There are characteristics associated with under methylation and we have more than thirty of these that we've identified. I've actually reported all these at the annual meeting of the American Psychiatric Association about fifteen years ago, and, by the
way, nobody paid any attention to it. Anyway, what do you see? These people are
strong willed, they tend to be oppositional to authority, they don’t like people telling
them what to do. Usually there’s a family history of high accomplishment. Seasonal
inhalant allergies; seventy-five percent have seasonal inhalant allergies.

If they take on game or a sport they get very competitive. They want to win, it’s not
just fun. They really want to win. Calm demeanor, but many of them have high inner
tension. High fluidity. Copious amounts of tears, saliva. If you walk down a street and
somebody disgustingly spitting on a sidewalk, he’s probably under methylated. OCD
tendencies, they like to be in control and if they have depression they’re the ones that
do really quite well on SSRIs, although often with really nasty side effects. They tend
to have a high libido; a very high sex drive compared to others.

Over methylation, so this is the opposite side, this is when you have too much methyl;
these people are different in terms of their traits. This really assists in methylation
diagnosis. They tend to have high anxiety and panic tendency, hyperactivity and
nervous legs. They tend to be pacing a lot. Whenever I’m interviewing somebody or
doing a medical history I like to look at their legs and see if their legs are bouncing
around, because that’s a clue, one of the clues. Many of them have a sleep disorder,
that’s because they have high norepinephrine, high adrenalin. They have trouble
getting asleep.

They have low libido compared to the general population, so it’s not always a good
idea for an under methylated and an over methylated people to marry each other.
About five or six percent have seasonal allergies, but most of them don’t. Food and
chemical sensitivities are really predominate in this group. If you’re over methylated
you’re very likely to have great food sensitivities. Dry eyes and mouth. Excellent
socialization and empathy. These people make wonderful neighbors. They have
empathy, they care. A lot of them they volunteer to help other people and sometimes
they seem to care more about others than even themselves.

They’re not competitive, they don’t tend to be champions in sports or in careers, but
they’re wonderful people in general. These are all generalities. They’re
noncompetitive in sports. Noncompetitive in academics. There are a lot of really
bright over methylated people that don’t really go too far in school. They just aren’t
competitive. If they take an SSRI or an anti-histamine, they get worse. I’ll say a little
bit more about that later. Methylation and epigenetics, you really have to think about
them together, because methylation is the most dominate factor in epigenetic
processes, and I’ll explain what epigenetics is in a minute.

SAMe, methionine, folates and a number of other nutrients have a really powerful
epigenetic impact on reuptake, on neurotransmitter activity and synapses and that’s
sort of the name of the game in a lot of these mental disorders. More than sixty
percent of ADHD, anxiety, depression, psychosis patients have a serious methylation
imbalance. It’s right around two-thirds. It’s really important. I already ... Oops, went in
the wrong direction, sorry. I’ll probably do that again. What is epigenetics? Okay, we
all have these thirty-seven trillion cells and most of the cells, not all of them, but most of them have a nucleus with a DNA in it.

You've got about thirty trillion DNA double helices inside your body right now, and they're not just sitting there, they didn't just determine whether you've got blue eyes or green eyes, they're working for you all day every day. What they do is it's like a blueprint for making proteins, which your entire body needs. The problem is ... Well, first of all, they're capable of making a specific protein and that's what each one of them does. However, every part of the body requires a unique combination of proteins. Well think about that, you've got the same identical DNA, in every part of your body, but you have to have different chemicals every part of your body, so how does that happen?

It happens during the nine months of gestation and especially in the first three months, chemical bookmarks, by the way they're methyl bookmarks, parts of your DNA get methylation attached to certain areas of your DNA and generally methylation inhibits the expression of that gene, so it shuts off the chemicals you don't want in your liver, your kidney, whatever. If that didn't work we wouldn't be alive, we'd be a big amorphous blob of identical cells and we wouldn't exist. Epigenetics is a good thing, it's the reason why a baby can be born and have the right chemicals, hopefully, in every part of the body.

Unfortunately environmental insults, at any age, including before birth, can alter these bookmarks or the position of them and produce mental disorders and other disease conditions. We now know that cancer is primarily an epigenetic disorder. We know that heart disease is primarily epigenetic and I'll mention some of the other disorders that we now know are epigenetic disorders. What that means a gene regulation disorder, where you get an environmental insult and your genes aren't making the chemicals they're supposed to make, that we all need, at least in certain areas.

There's two kinds of epigenetic processes, and one of them is DNA methylation, and this is what happens before you're born, when those methyl bookmarks are put on and determine what chemicals you get in your liver, in your eyeballs, your skin, every part of your body. Then something called histone modification, how many people have ever heard of histones? Gee, you're going to learn a little bit today, I hope. I hope this is something you'll be interested in. This is sort of a cartoon that shows the two main components. There's the DNA methylation. Now this happens before you're born. The methyl gets attached to parts of your DNA and we know exactly where in the DNA now.

Those DNA marks are in there like concrete, you just can't hardly get them out of there. In fact until ten years ago it was believed that it was impossible to ever take one of these methyl marks, well they call them book marks or marks, off your DNA. We can't use that in treatment yet, although cancer researchers are trying to do that, trying to alter genes that have now got altered positioning of these methyl marks.
They're coming along pretty well with cancer, but basically it's not something we can use yet.

Now this shows gradually what happens when you compress your DNA. Your DNA in every one of these little, tiny nucleuses, nuclei, I guess, is wrapped around proteins, little balls of proteins and they're called histones. The combination of the two is called chromatin. That's what chromatin is, it's the proteins plus your DNA. Anyway, you can modify the histones and then so let me go on. It's established in the womb, DNA methylation. It always happens with cytosine, it's one of the four nucleotides. Your DNA consists of a sequence of four different chemicals called nucleotides.

Cytosine is one of them and guanine is another one, and what happens is that there are what they call clusters of CpG islands, that's cytosine, guanine with a phosphors in the middle. That's where this all happens and it can reduce expression of those proteins. It can shut them off or diminish the ... Where you want it to happen, hopefully. These insults can alter it, cause problems and it can happen throughout life. Environmental insults can alter it and cause a gene regulation disorder, which by the way I think includes autism and schizophrenia. Okay, so this is your DNA and this is a cartoon showing, well, gee you've got methylated in that area.

Your DNA is extraordinarily long. If you were to take your DNA and stretch it out, it's about six feet long, but it all gets incredibly compacted into this little, teeny, tiny nucleus and it wraps around these proteins. Well what are histones? These are support structures for this really fragile DNA. DNA are just individual molecules, incredibly fragile and they wrap around these histones, which are composed of eight linear proteins and they're twisted together like a ball of yarn. Some of the proteins stick out of the yarn and they're called histone tails. Originally they thought the only reason for this was structural support for the packaging of your DNA.

Later we have found out, starting really, maybe, in earnest about fifteen, twenty years ago, that you can inhibit or promote gene expression, depending on chemical reactions at these histone tails that are sticking out of the ball. Now we have nutrient therapies that are really neat, that can modify histones that control reuptake of neurotransmitters. That's new and it's really great and it has really added to our ability to help people. This is sort of a picture of a histone; this is one histone and there's eight proteins twisted around, like I said, like a ball of yarn and you can sort of see the red DNA wrapped around it. It wraps around like, I think it's 1.4 times for every histone.

Well it turns out what happens at these histone tails that stick out, it's really a competition, usually, between methyl and acetyl. If you get methylation of the histone, and by the way SAMe is the donor for the methyl, you tend to shut off expression, but if acetyl, acetyl groups come from something called acetyl coenzyme A, that the doctors and the scientists here and the nutrition experts know all about. They're both chemicals that are in high concentrations throughout the body, but really what determines whether a gene expresses or is silenced depends on that competition at histone tails.
Acetyl promotes expression, methyl inhibits expression and with nutrient therapy we can impact that ratio and we can affect ... That gives us a real handle that we never had before. In order for a gene to express it has to uncoil, see you often have these histones and your DNA all jammed together, but in order for expression to occur there are some large molecules that have to get to an exposed area of the DNA. These are RNA polymerase and what's known as transcription factor, these are big guys, big chemicals, but they have to have access. I think of them as sort of swimming around in your nucleus, looking for a gene to express.

If they see one that's bare very likely they'll cause expression. Now the way this works is you've got a gentle attachment of the histones, the DNA to these histones and it's electrostatic. The DNA is a weak acid; ribonucleic acid. The histones are basic, so there's a gentle attachment, it's electrostatic. Anyway, if acetyl wins the war, well acetylation decreases the histone pH, so you have less of an attraction, causes the uncoiling, and that's how that tends to promote gene expression. DNA does the opposite. DNA decreases the pH, causing a greater attraction, so it all tends to jam together.

I've got a couple of pictures that sort display ... This is what happens if acetyl wins the war. If you're under methylated then this is what happens, your genes open up and you get an expression. Then again if you have a preponderance of methylation you get the opposite, it all gets compacted and that shuts off gene expression, because these big molecules that you need can't get there. Now it turns out that for a while people thought that what was really important is how much methyl do you have and how much acetyl do you have.

The answer is no, it's not that; it's enzymes that dominate and, yes, these are the donors of ethyl and methyl, but their concentrations are relatively unimportant and it's the enzymes, the acetylases, these are enzymes that tend to put acetyl on and the deacetylases are enzymes that tend to take it off. Methylases and demethylases, they dominate this attachment and so our therapies, our new improved nutrient therapies are really aimed at ... We can adjust serotonin, dopamine activity, etc.; we concentrated on the enzymes. We know what we're doing; we have a road map for doing this, which is really neat.

Now one of the most important thing are these reuptake transport proteins, I mentioned them earlier. These are the proteins that snake in and out of a brain cell, our of a neuron, what they call a presynaptic membrane; the membrane where you have vesicles that are attached and embedded in the outer edge of this, in the membrane, and they snake in and out of this membrane. Anyway, when the neurotransmitter's ejected in to the synapse there's a tendency for it to come back really quickly. Electrostatic tendency to come back really rapidly and this could happen really fast because some brain cells fire more than several times a second, so you can imagine how fast that reuptake is in some cases.
This is a primary determinate of neurotransmitter activity. It's not the amount of serotonin, not the amount of the other neurotransmitters; it's the amount, the population of these proteins at the synapse. I think of it like they remove the neurotransmitters like a vacuum cleaner inhaling dust particles. These are formed by gene expression. The amount present depends on the methyl/acetyl competition at specific DNA regions and that's how we're able to do things we couldn't do before.

What do we know? What are some of the results of this? Well we now know that niacin and niacinamide act as dopamine reuptake promoters, they lower dopamine activity.

The great Abram Hoffer was the person who discovered that niacin can really provide massive benefits to certain schizophrenics. He had a theory for why, a mechanism and a theory for why, but we found out five years ago the real reason: niacin and niacinamide are deacetylase inhibitors. They inhibit the enzymes that tend to remove acetyl, so they tend to enhance acetyl, diminish the amount and they oppose methylation and so you get a lot more of these transporters, in this case the dopamine transporters, called DAT, D-A-T. What it does is, the bottom line, is it lowers dopamine activity, which is really important if you're a schizophrenic who has really high dopamine activity.

We also know that methionine and SAMe are serotonin reuptake inhibitors, they do the same thing that the Prozac and Paxil and Serzone do. They do it by a different mechanism. An SSRI will get into your brain real quickly, it'll attach to these proteins, these transport proteins, and it'll sort of tend to disable them or slow them down and that's how they inhibit reuptake. We can do it with nutrients, by slowing down the genetic expression or production of these transport proteins. It takes usually a month or two, but we gradually slowly change them and if we can reduce the number of them, the population of them and do that with methylation therapy that is the way to enhance serotonin activity, which might be exactly what some depressives need.

We've also learned that folates, all forms of folate, whether it's folic acid, folinic acid or methylfolate, they act as serotonin and dopamine reuptake promoters. If you're under methylated and you're depressed, if you took folates your methylation would get better, but the patient would get worse. The patient would get worse because the harm caused by lowering serotonin activity is greater than the benefits of improving your methylation, and that's something that most nutritional people don't know around the world. I'm trying to get the word out, because there's a lot of people who are not treated properly because of that.

We know that zinc and glutathione increase glutamine activity at NMDA receptors, those are specific receptors that a lot of mental illnesses, that include things like OCD, certain forms of schizophrenia, that you want to increase glutamine activity at that particular receptor without increasing glutamine in all the glutamate receptors that you've got. Anyway, many nutrients influence neurotransmitter activity and brain function. This is a big part of it. I just want to emphasize this again, folic acid, folinic acid, L-methylfolate folate, they're effective methylating agents, but they increase expression of this SERT transport protein, these are the serotonin transporters.
They lower serotonin neurotransmission, and that's not what you want if you're a low serotonin depressive. Most of these people are under methylated. Most under methylated depressives are intolerant to folates. However if you are under methylated and you don't have a serotonin issue, the best way to help a person is to give them folic, folates, and B12. Folates are great for most people. This is the exception to the rule, if they have low serotonin activity or dopamine activity, it's contraindicated, you can't give them the folates.

For low serotonin activity our approach is we enhance methylation and suppress acetylation of DNA and histones, especially the histones. Again, these react as reuptake inhibitors; they lower gene expression of the SERT and therefore increase serotonin activity. We have to avoid folate supplements, even though we'd like to use them to improve the methylation, but we just can't do it, because the patient will get worse. Then we have augmenting nutrients. I've run through a bit of this.

Now there's a lot of disorders that we are now understanding are epigenetic and that's where an environmental insult alters gene regulation and you start getting chemicals in various parts of the body that aren't supposed to be there or you'll stop making some that you need there. Anyway, there are characteristics you see in epigenetic disorder. Number one, many cases of sudden onset after normalcy, like a mental breakdown or like autism regression or the onset of cancer or the beginning of cardiovascular problems. Persistence of the condition after onset; it doesn't go away, it causes a dramatic, really nasty disorder and it doesn't easily go away.

It's really hard to help people that have an epigenetic disorder. A multitude of characteristic symptoms, because you don't usually just change one gene, usually you might be changing fifty or a hundred or even five-hundred genes, so you've got a lot of different systems that you have to work with and help. It's a heritable illness that runs somewhat in a family, but it violates the laws of genetics. Usually you have abnormal methylation or severe oxidative overload, because those are the insults we now know that usually cause an epigenetic disorder and cause your DNA to be forever altered.

Cancer, right now most cancer experts agree it's an epigenetic disorder and what kind of cancer just depends on which of your cell lines, which of your individual different types of cells gets altered. Heart disease, schizophrenia, autism, post-traumatic stress disorder, there's another example, Wilson's disease, we believe some forms bipolar disorder and the last one is the least certain, although some believe that Alzheimer's disease is epigenetic, but that's not yet nailed down at all. Epigenetic disorders in our experience, our clinical experience with thirty-thousand patients, a high degree of difficulty.

The reason is it also includes autism, schizophrenia, most bipolars, and post-traumatic stress disorder, and for some reason the D's not there, they have numerous dysregulated genes, many systems need correction. You might have immune function problems, biochemistry problems, GI tract, oxidative stress, your brain may have
developed differently, this is familiar to anybody who's been studying autism. It's also true of these other epigenetic disorders, and you need multiple interventions and progress is usually partial and complete recovery relatively rare. Those are the hardest ones. The non-epigenetic mental disorders, there's moderate clinical difficulty. These are relatively easy to correct.

This includes ADHD, behavior disorders, anxiety and depression. Normalization of one or three chemical factors is usually all you have to do for these people to get immensely better. Our outcome studies, and we've done many outcome studies, published some of them, we usually get between seventy and ninety percent efficacy with nutrient therapy for these. Medication support sometimes is still necessary, but it's usually unnecessary. What we do is we like to keep ... If a person comes to us on medication for whatever reason, we insist they stay on it for three or four months, we do our nutrient therapy to normalize whatever imbalances we found that were, you might say, out of whack.

Then after we've completed that after three or four months, and if the patient's better, we then have the doctors slowly, gradually try lower and lower levels of the medication to see where they're at their best. Our goals is not to get rid of medication, it's for the patient to be at their very peak. Eighty percent of the times in depression, for example, they say they're at their best with zero, but twenty percent of the people tell us, "Well, we lose something and some of the depression comes back if we go to zero." We say, "So be it" and for them they might be at one-fourth the dosage they used to be at and they have fewer side effects, but so be it. We're not trying to get rid of medication.

Let me just quickly run throw a couple of the conditions. Now I started with behavior. I've worked with ten-thousand cases of people with severe behavior disorders, including more than eight-hundred felons. I've got a number of famous criminals in my database. I've got Charles Manson and Richard Speck and James Oliver Huberty from California. I spent a lot of time working with coroners and medical examiners after terrible crimes and I've done a lot of forensic studies. In fact you ever watch these forensic programs on TV? I was the expert on the first one about twelve years ago and I sort of give the history of forensics.

Anyway, I got more than one and half million blood and urine tissue test results, lab results, for people with these problems and they're strikingly different from other people. I just want to show you one outcome study that we published in a peer review journal. We took two-hundred and seven consecutive behavior patients, we took all kinds, male, female, young or old, but with a serious, severe behavior problem; usually with some violence or destruction of property. We, of course, identify their chemical imbalances using our clinical procedure and it's a medical procedure. Don't do this at home, you need somebody to guide you that's experienced.

Then we individualize nutrient therapy to correct these imbalances, to normalize these aspects of chemistry. What we did is we measured the frequency of physical
assaults and the frequency of property destruction before and after treatment. We measured how many times per month is the way we decided to do it. This is what we published in the journal. You can go ahead. No problem. There are places to sit. As with all treatments there's always an issue of well can you get compliance and we had a lot of violent oppositional defiant teenagers. It's hard to get an oppositional defiant teenager to do anything, much less swallow some capsules, take some vitamins.

We had a fair number who just never took a single pill, but of those who did, the majority actually did. We called compliance if they took it for a month. We called that effective compliance. This is the outcome and fifty-eight percent of the families reported that they were symptom free, and many of the kids were extraordinarily violent. A lot of the families reported ten violent assaults daily. I think we had twenty or thirty of them in this group. Partial improvement, thirty-three percent. Some of those were wonderful partial improvements. I had a lady from Connecticut tell me that her son had been violent ten times a day and now it's once a month and life was better. That was one of our partial improvements.

We struck out with nine percent. One percent of them said they actually got worse. Okay, and similar results for the destruction of property. It was not quite as spectacular, but still only twelve percent failed to improve, of those who actually took the treatment. At our clinic whenever a violent child would come into our clinic we would rejoice, because we knew it was going to be easy find out what was wrong. We knew if they took the treatment the chances that they would get a lot better were terrific. They were easy compared to an autistic child or a bipolar patient.

One thing we learned ... I first started on this because I was a prison volunteer and I ran an ex-offender program for twelve years when I was very, very young, in my youth. I worked with ex-convicts coming out of maximum security prisons, trying to help them find jobs, integrate into society. That was before I knew anything about biochemistry. Anyway my goal was to turn these people into pussycats by fixing their chemistry and I failed. We still have disappointing results for adult criminals if they are abusing drugs and alcohol, and most of them do. They also tend to have an ingrained self-image that's pretty bad.

Many of them tell me they think of themselves as monsters. I've heard them say those exact words. It's hard to get that out of a person, I think. With violent children and teens, if they are not really heavily into drugs and alcohol, our success rates, our outcome studies, show really great success and it seems to be enduring. We've done a lot of people with the same chemistry as Charles Manson, which is sociopaths have a classic pattern of chemical imbalances. If we can fix it when they're young, before their lives are ruined, before they get into real trouble, it seems to be enduring.

I've gone to corrections ... In fact California; I've been to your department of corrections like five times. I've been to the governor's office. I've been to the juvenile corrections' head people in Sacramento and given all these results, because I think this is probably the best answer for reducing crime and violence in America and that's to identify the violence prone children. No problem finding them; most of them are
violent by the time they're six years old. Every high school can tell you who the really troubled kids are, the ones who are headed for the penitentiary. No trouble finding them, then you just need to do identify them.

As I said, identify them and give them effective treatment before their lives are ruined, so I'm hoping some time they'll do that. I've presented this at the American Psychiatric Association. I've gone to the Society for Neuroscience. I've presented this to the United States Senate, they even invited me to lunch at the senate lunch room, that was kind of fun. Nothing's happened. People can't believe that this has anything to do with violence. Since 1990 our focus has been on youths and I've sort of given up on trying to help the adult criminals. The adult criminals tend to get better for six or eight months and then five years later they're back in prison.

I get a lot of letters apologizing for stopping their nutrients. Clinical depression, this is what I presented at APA eighteen months ago. American Psychiatric Association annual meeting, the big meeting of the year; seventeen-thousand psychiatrists from all over the world. I got invited to give a talk on phenotypes of clinical depression. Basically I wanted to explain to the psychiatrists that they were doing depression all wrong. There was a large auditorium full of these psychiatrists and psychiatrists are wonderful people. I mean whatever you might think, in my experience, these are people who are doing their very best to help their patients.

There's a mainstream psychiatry misconception, and it's repeated again in DSM-5, the new diagnostic manual that has disappointed so many of us, depression is regarded as a single entity with variations along a central theme. The central belief is that it, oops, I did that again; central belief is that it involves low activity at serotonin receptors, that's the general belief. The treatment of choice anywhere in the world, if you go to a psychiatrist, unless it's an older one who likes to put people on a couch and delve into their early life history, the treatment of choice usually is a SSRI or some other antidepressant aimed at increasing serotonin activity.

I've got this huge, I think, the world's biggest chemical database. What've I learned from my database? We find there are classifications; there are different kinds of depression. In fact our database says there are five major high incident depression biotypes and they're completely different disorders. They have unique neurotransmitter abnormalities, unique symptoms, and a separate treatment approach is needed for each one of these biotypes and there's five big ones and here's what they are. these biotypes and there's five big ones and here's what they are. these biotypes and there's five big ones and here's what they are.

The largest group, thirty-eight percent, are under methylated depressives. These are people who really do quite well on SSRIs, because of the under methylation they're prone to low serotonin activity and the SSRIs for them work quite nicely, although very often with side effects that people can't stand. Then if you look at this group in the green, these people have a copper overload as their primary problem and often the only problem. Ninety-five percent are females, and I'll explain that a little later.
I've now worked with more than seven-hundred of these people and they tell me that... Every one of them was given many, many different SSRIs.

They've run the whole gamut, Prozac, Paxil, Zoloft, on and on and they say nothing happens. They don't get worse, they don't get better. Nothing happens. Then there's the pyrrole people, these are the people who have this pyrrole disorder I talked about. It's only fifteen percent of the total, but that's lots of people. For them it's the only thing wrong in many cases. Since part of that imbalance is really low B6 activity, these people are extraordinarily low in B6. B6 is needed for serotonin activity, for synthesis, and so they usually report a partial improvement with an SSRI.

Then you have the people with toxic metals. It's a small number and the number is shrinking with time in the United States, but for them it's everything. There are some people who have depression only because of lead, mercury, cadmium or some toxic metal and I think we've probably had a few hundred cases of that. They're easy to fix. We usually just send them back to their regular doctor or a mainstream doctor, have them pop them into a hospital and they'll do a chelation for maybe four or five, six days and then they'll be fine.

Okay, however, now we come ... And then there's five percent that don't fit into any of these categories. I mean human beings are quite diverse, but the most interesting group, I think, is this twenty percent. These are the people we call the folate deficiency depressives and these are the people, and we've seen hundreds and hundreds of them, they all say the same thing, it's they have depression, although usually anxiety is more dominate than depression. If they get an SSRI they get worse. They get terribly worse.

Let me just quickly go through the differences in traits. If you're under methylated depressive, usually, and these are generalities with many exceptions, strong will, OCD tendencies, calm exterior, high inner tension, competitive, perfectionistic, seasonal allergies, seventy-five percent, high libido, seasonal affective disorder we hear a lot. If they're diagnosed correctly with seasonal affective disorder you know they're probably going to flunk the methylation test. SSRI medications usually are effective, although not necessarily free of side effects.

Phenotype number two, and this sort of thing really helps us with diagnosis, very often after doing a medical history we can predict the chemistry quite accurately. We know what the lab results are going to be before we run them. These are people who have elevated norepinephrine and reduced dopamine and it extremely changes if their copper level is double what's normal, those differences are going to be gigantic. More than ninety-five percent are females. Inability to eliminate access copper. During a pregnancy a woman's copper level goes from typically a hundred micrograms a deciliter to about two-hundred and twenty. It more than doubles.

The little growing fetus needs that copper for angiogenesis, to supply blood vessels for the rapid growth. After the baby's born, after delivery the copper's supposed to go right back down to normal. Well that's enabled by a couple of proteins that are
genetically expressed that some people don't have functioning very well. For them the copper remains high and that's what most postpartum depression and postpartum psychosis is. We've seen hundreds of these cases. Very easy to help them, because all you have to do is eliminate the excess copper, which you have to do really carefully and cautiously.

It takes often two or three months. High anxiety, a tendency for panic, onset usually during a hormonal event and that's puberty, birth of a child or menopause, very often these are the people who tend to get in real trouble. It's usually more anxiety than depression. They're intolerant to estrogen. A lot of doctors will recognize that there seems to be hormonally related, especially by the changes in how they are during their cycle and they'll be giving them hormones and estrogen makes them dramatically worse. Progesterone makes them a little bit worse. You don't even want to give these people these nice progesterone creams that are great for a lot of women.

About a third of them have ringing in the ears. They have sensitive skin, intolerance to cheap metals and for them nothing good happens or nothing bad happens with antidepressants. Pyrrole depression these are the people easiest to see. I can recognize these people walking down the street and I have this feeling I want to run up and tell them they really need to do ... But of course I don't want to be thrown in jail. They have severe mood swings. They can have mood swings up and down, five or six times a day. A lot of them are misdiagnosed as rapid cycle bipolar. Explosive anger, extreme anxiety, and they live in a world of fear.

Very poor short term memory, which is related to a reading disorder and little to no dream recall. You need B6 in order to have short term memory functioning. These people, many of them, have never had a dream in their entire lives and many of them, no matter how smart they are, do poorly in school because they might be able to read several pages in a textbook, understand it perfectly, and then they forgot what they read and they have to go back. It makes learning really difficult for these people, so they tend to underachieve greatly, no matter how smart they are. They tend to be very sensitive to light and noise. These are children who don't like to go to fireworks displays.

Very poor morning appetite and even as adults these are people who might want to skip breakfast and some of them will skip lunch. They just aren't hungry in the morning. They get nauseated by the idea of food. If they put on weight they have an abnormal fat distribution and this is how I can see them walking down the street. These are people, if they have a severe pyrrole disorder, they have thin neck, thin wrists, thin ankles and a lot of weight around the upper thighs and they're sort of pear shaped or apple shaped and that's because of arachidonic acid, which is very depleted in these particular people. These are the people who get somewhat better with SSRIs.

Well it's bringing me to ... I mentioned toxic metal depression, one of the characteristics here is that you don't have triggers for it. These are people who are
depressed all the time and it never seems to change; they just feel down in the dumps. It's about the same, they have usually abdominal distress, their depression is unrelenting. It doesn't seem to matter whether good things or bad things have happened, they just feel bad all the time. The cognitive deficits happen in children, not in adults. If you're lead poisoned the child will have problems cognitively. It doesn't happen if you're over twenty.

Metallic taste in the mouth often happens and they tend to have atrocious bad breath no matter what they do. Irritability and anger, food sensitivities, high oxidative stress and for them SSRIs don't do anything, usually. That brings us to the most important one and these are the low folate depressives. I think I mentioned some of these characteristics before, noncompetitive in sports, they usually do not have inhalant allergies. Anyway there's these characteristics. One interesting one is many of them have very high musical or artistic ability or interest. They tend to underachieve. Almost all of them have a sleep disorder, a low libido.

They get worse and I believe this is the primary cause of school shootings in America and I'll explain why. I'll just give you a quick example of how you treat under methylated depressive. Let's say it's a hundred and sixty pound adult, we would give them SAMe and/or methionine, they both work well. Methionine becomes SAMe in the body. This reduces the expression of the transfer proteins SERT and inhibits serotonin reuptake. We give them B6, this enhances synthesis of important neurotransmitters. We provide antioxidant support because we know all these people have high oxidative overload, which affects the brain negatively.

Then we have augmenting nutrients and I won't go through the details of what they are, but there are other nutrients that sort of augment the treatment. What do we do for these people? We use therapy using vitamins, minerals and amino acids that are natural to the body, they're drug free and we need a separate treatment approach for each biotype. Eighty percent of the families, after we've done the treatment, report major improvements in the ability to eliminate psychiatric drugs. Twenty percent say they still need some medication support.

Now with respect to school shootings, I've studied ten-thousand cases of behavior disorder, myself and a lot of other people have studied school shooters, like what happened in Columbine or in Connecticut, and we've been studying the fifty most recent school shootings since 1990. Out of the fifty most recent cases forty-two of them did not have a behavior problem until they were teenagers and were put on a SSRI and they got worse. Medical science knows this. If anybody who gets on SSRI when you go to leave the pharmacy you have an insert with the medication that warns that it can cause suicidal ideation in young teens or on some of them they say homicidal ideation.

These are the people, I'm convinced, these are the people, these low folate depressives are the ones who, as teenagers, are diagnosed with depression, they inappropriately get a SSRI, they get dramatically worse. Very often the doctor will say, "Well, he's still depressed," so they increase dosage and then disaster strikes. I don't
think we're going to be able to eliminate school shootings by getting rid of the guns. There are more than three-hundred million guns in America and even if we could agree to do it, it would take forever.

We're not going to be able to eliminate school shootings by identifying what people should not have a gun, because a lot of people have mental breakdowns and they might have guns and then two years later they're mentally incapacitated. I don't think there's much chance of that working, but I think this would work and so this is the main thing I told these psychiatrists at the APA meeting, there are inexpensive blood tests you can do that can identify these people and you ought to do that before you give any teenager, or really anyone, a SSRI. Find the people that it's going to make worse.

Anyway, a lot of the psychiatrists that were there, when my talk was over, there were four of us on a big platform and they announced that ... The other three speakers I thought had give nice talks and the guy said, that was moderating it, said that we were going to stick around if anybody had more questions. When it was all over a large group of them kept roaring to the front and they all came to me, which is kind of embarrassing. They just wanted to know and we know have, I think, ten of these very doctors at that meeting have gone to our training programs and are now doing this themselves. I want to say just a little bit about schizophrenia. I've been talking too long, I think. I hope I haven't ruined your evening. Schizophrenia similarly

Randy: We'll take questions.

William: What? What?

Speaker 7: Five more minutes.

Randy: We'll give you about five more minutes and then we'll take some questions.

William: Okay. I can do that. I can talk fast. Same thing with schizophrenia. Same misconception. Schizophrenia is considered a single condition by most doctors and we have this huge database and we find there are three major, whoops, three major biotypes of schizophrenia. Again, we have the same guys. It's over methylation, under methylation and pyrrole disorder; with four percent have nothing wrong with them except gluten intolerance. That may not seem like a lot of people, but that's more than a million people in America who are suffering their entire lives with full blown schizophrenia and if they only knew, if they could only take the gluten out of their diet they would probably be just fine.

These are other forms. It's more complicated with this, these are other things that ... Thyroid, for example, all by itself a thyroid, low thyroid activity itself can cause full blown schizophrenia, and so can these other conditions. Again, we have under methylated and they have some of the same tendencies. The under methylated schizophrenics they're usually call schizoaffective disorder and they usually have a
thought disorder, they believe they have delusions and they believe things as a dominate symptom. Many of them don't hear voices at all.

The over methylated schizophrenics, and that's a larger number, these are the ones that have auditory hallucinations and they have sensory disorder. Our chemistry can identify them. Pyrrole disorder, that's quite a few schizophrenics simply have a really severe version of this; with all the same symptoms I'd mentioned before. Gluten intolerance, so again, it's the same biochemical treatment. We identify the imbalances and we have treatment programs that are medically designed and supervised to fix these.

I just want to mention there is now growing evidence that schizophrenia is epigenetic disorder and I've got a grant, a nice grant, and I'm now working with a university in Australia and we're studying the epigenetic and the genetics and the DNA methylation of the three different phenotypes of schizophrenia. No one's ever done that. We want to prove two things. We want to demonstrate that it's epigenetic and that they're completely different types of schizophrenia that need different treatment. I think I'm going to skip through some of this because ... A look at the future, what does this mean?

This is actually a really exciting time for me and for other people working in this field, because I think in twenty years there's going to be just radical improvements in mental health. We're going to be able to identify misbehaving genes, cancer, autism, schizophrenia, other epigenetic disorders. There's going to be new therapies that are already having success in cancer, which is where most of the epigenetic research is going on, and they're going to be able to normalize these deviant gene expressions. That could possibly represent an actual cure that wouldn't require any additional treatment. That's off in the future.

Another thing is that I think this is even more important. The bad news of epigenetic disorders is they're so complex and hard to treat. The good news, they seem to have a high likelihood of being able to prevent them, because I believe future newborn babies will be screened for these errors and they'll have treatment that can prevent these disorders. I think the first one's going to be autism. I believe there's a clear path for eliminating autism from society. I'm writing another book and the title of it is "The End of Autism." I think we can do that today. I just want everybody to know this and start working on this.

The answer is prevention. We can identify the one or two percent of newborn babies that are prone to autism and with lab tests that are now available, and I think a lot of the nutritional people in here know all you had to do to prevent it and it's really eliminate oxidative overload and inflammation and that'll protect the DNA and you won't have this event. I want to say one more thing, three weeks ago the 2015 Nobel Prize in chemistry was given to these three men, who you've probably never heard of, and what they did, I think, is extraordinary and it's going to change mental and physical health throughout society.
It's on DNA repair mechanisms and that's at the root of many of our disorders. I think it's the most significant advance since Watson and Crick discovered the DNA double helix. I think that it really has to do with new therapies to maintain DNA integrity. For one thing it's going to slow the aging process. We know that our DNA is under assault every day. Every one of our little DNAs is ripped apart every day. In fact they know it's between ten-thousand and a million times a day every one of our DNAs, but we have these wonderful, complex repair mechanisms, like in every little nucleus in your body and you got more than thirty trillion of them.

It's like having a bunch of repairmen in their fixing it. It's remarkable how a person can become quite normal. Anyway, I think this is the future of health and it's something that ... This may not happen while in my lifetime, but for some of you, I think for one thing, we know this what aging is. Aging is your DNA deteriorating. I think the time will come when the average healthy person, instead of having a life of maybe eighty it might be a hundred and twenty of useful, healthy life.

Summary, nutrient imbalance play a critical role in most mental disorders. Recent knowledge and understanding of methylation and epigenetics is providing a road map for better therapies. I think this is an effective weapon in the arsenal of a mental health practitioner. This is a book that I wrote that talks about a lot of this. We're having a physician training program in Irvine, California. I certainly don't want to do it in the winter in Chicago. We expect between sixty and eighty doctors, including a couple dozen psychiatrists to attend this. We have more and more people who are trying to learn how to do this. Thank you very much.

Randy: Wonderful, so questions. Right here.

Speaker 8: Hi. Thank you, Dr. Walsh, for your work. A quick, two part question. One what do you think about what we've done for the last couple of decades with the wholesale supplementation of folic acid in bread stuffs and cereal? Is that causing problems for people? The other is are you familiar with the recent study that showed an association with in utero zinc deficiency and autism and what you thought about that? Thanks.

William: Yeah, those are good questions. The first question is what do I think about widespread dosage of folic acid to women, especially women who are pregnant. We know that if a woman has folate deficiency and they get pregnant that the incidents of a couple of disorders is ... By the way these are epigenetic disorders and that in spinal bifida, for example, and we know that autism, these people are much more likely to have the child have one of these nasty problems.

Because of that, the medical authorities of the USA are now putting folate into cereal for everybody, but what I think is forgotten is that some people are born with excess of folate. I think what we're doing is we're eliminating spinal bifida, reducing the incidents of autism and probably causing other disorders, they should only-

Speaker 8: Do you have an idea of what we might causing?
William: What would cause it?

Speaker 8: Yeah, I mean what we are causing, so we might be treating or preventing the spinal bifida, but what other problems are we creating do you think?

William: Well we know that the folates tend to enhance gene expression and I think you're going to get expressions that might even be cancer and other disorders. We're not sure which ones, but it's going to change gene expression. Now another thing is when my wife had her first child, when she first got pregnant, her diet got better, she wouldn't be around anybody with cigarette smoke, she stopped drinking alcohol, she started exercising and she got really healthy.

It was too late and people that do this is, it's too late, and the reason is that these epigenetic effects, these things primarily are in place after twenty days of gestation, of twenty days of conception. That's before most people know they're pregnant. Really what people need to do, if you think you might get pregnant, you should get really healthy before and that's the way to do this right.

Randy: Okay. Good. Good. I want to remind people as we're kind of moving around a little bit, if you have not checked in at the front desk when you came in please do so. Okay, next question.

Speaker 9: This certainly calls into question crime and punishment, but we won't go there. We all know that cancer is, first and foremost, a disease of aging. Indeed, people talk a lot about so called program death, please comment a little. Why does it happen later in life?

William: Well it happens ... If you were to take a look at a micrograph, a high magnification of your chromosomes, at the age of two they're beautiful, they're intact, you get that nice shapes. If you look at a person who's fifty years old, typically, your chromosomes are falling apart and you get fragments, it's kind of shocking; you wonder how a person can still be functioning. What's happening is your DNA is gradually deteriorating.

Speaker 9: Your repair mechanisms are failing?

William: Yes, I think that's what cancer is. It is when environmental insults exceed your ability to repair your DNA. Exactly. Now with this Nobel Prize information we're going to learn how we can protect our DNA.

Speaker 10: What about brain health and blood sugar?

William: Well usually people who have a tendency for high glucose levels that can trigger behavior upsets in a lot of violent kids. It can cause worsening and schizophrenia and depression. It's rarely the cause. I don't think it's hardly ever the cause, but boy it sure can make these problems worse. It's a serious aggravating factor.
Speaker 11: I have a question. I work for a functional medicine doctor and we have certain blood tests and so forth that we work with. I’m bipolar, where would I go if I wanted to go ahead and get all these tests and get the analysis done?

William: There’s a few labs that can do a nice job of this. We’re not connected with any particular lab. I’ve got one lab near Chicago where I sweet talked them into doing an inexpensive profile that only costs about three-hundred dollars that a person can take that can identify most of these imbalances I’ve been talking about. It’s only for mental illness, not for other conditions.

Speaker 11: Where do I get the information?

William: It’s off of my website.

Speaker 11: Okay.

William: It’s in the resources and it’s also in the back of the book under resources.

Speaker 11: Okay.

William: It’s called the DHA Laboratory. There are other labs that can also do good lab work.

Randy: So last question and then after this those people, if you still want to ask a question you can come up and speak with the doctor individually.

Speaker 12: You mentioned the methylfolate ratio.

William: Yes.

Speaker 12: Can that be done by clinician? What tests do you need to do it and what are its implications?

William: Well I think for one thing you can get a lot of information just from the symptoms and traits, but if you want to do it best of all you might do the SAMe SAH lab test that can identify your methylation characteristics. Although the lab doesn’t help you too much about how to interpret the results, but it’s actually a great test. Whole blood histamine can do it too. That’s for methylation. If you’re looking for something like folate deficiency, SpectraCell is really good at showing functional levels of some of these nutrients, like methylin and folate. There are lab tests out there that can do a nice job at this. Thank you very much.

Randy: Thank you, Dr. Walsh.