# Depression: Is It In the Genes?

Presenter: Dr. Ben Lynch, MD

*The following transcript and information is not intended to take the place of medical advice and/or treatment from your personal physicians.*

**Sean:** Dr. Ben Lynch, thanks for joining us.

**Dr. Lynch:** Thank you, Sean.

**Sean:** You're a naturopathic doctor, right? What you do is you travel around the world educating doctors and the public on MTHFR genetic mutations. Why do you do that?

**Dr. Lynch:** I do that because when you find something that affects the majority of the population and not many people know about it, it's time that somebody get up and take the stand to inform and educate the public on it. If you know something that is super significant and nobody is doing anything about it, well, that's what I do. I get up on the podium and get on my soapbox. I let people know that this is significant and we need to take care of it.

**Sean:** If it's significant why is no one else doing anything about it? Why are you that lone voice it seems?

**Dr. Lynch:** Well, I'm no longer the lone voice. When I first started this about four years ago, I appeared to be the lone voice. There were a few other people doing it but not to this extent. Now the ball is definitely rolling. Now you see all sorts of people talking about MTHFR. The problem is some of them might not be doing it properly. I make sure that I keep educating myself. It's a big topic.

You can't just focus on one gene. When you focus on one gene it's an issue. I've expanded well beyond MTHFR. I began with MTHFR. Then I realized there's more than one gene in the human body. There's about twenty-some thousand others. It's super significant. I am very happy to say that a lot of other health professionals are getting on the same bandwagon and tooting their horn as well. It is making a difference.

**Sean:** Is the info getting out to the public or is it staying in that doctor practitioner realm right now?

**Dr. Lynch:** Absolutely getting to the public. At MTHFR.net, the traffic is probably about 4,000-5,000 people a day at that site from all over the world. People are gaining awareness just from the website as well.

**Sean:** Very, very good. The website is seekinghealth.org?

**Dr. Lynch:** Seekinghealth.org, which is a lot more in depth information.

**Sean:** In your opinion, or when you hear that someone is depressed what does that make you think of?

**Dr. Lynch:** To me, that is just a dysfunction. We're not born depressed. Or maybe we are born depressed but we're little and we don't understand it. Depression to me is just a symptom that something is wrong. You can't label yourself saying, "I am depressed." You might feel depressed but you as an individual are not depressed. You are you. Depression is a sign that there is some neurological dysfunction going on in your head and we need to fix it. Figure out what's causing it and get at it and take care of it.

**Sean:** Possibly caused by what? What are those factors?

**Dr. Lynch:** Oh, geez.

**Sean:** Give us a few of them. We've covered a lot in these session. Give us some of them just in case this is someone's first session they are watching.

**Dr. Lynch:** Ok. Stress. Prolonged stress causes depression. Oxidative stress, if you're in a toxic environment. Say you're commuting an hour in traffic everyday. You're breathing in the carbon monoxide and all the other toxins from the road and tires and gas. That is causing your glutathione levels and your antioxidant levels to drop. That alone can also contribute to depression. Then you've got your dietary intake.

If you are not eating very well, if you're just sucking down protein because you're a weight lifter, then yes, protein contributes to muscle mass but you're not really getting the tryptophan you need to prevent a deficiency in serotonin. You've have to have some balance of carbs in there or at least have a more well-rounded diet and get your leafy greens in. So diet is a big one. Lack of sleep. Then of course you have genetics. Genetics is a big part.

**Sean:** Yeah, that's what I want to talk about with you today, you being the genetics guy. Can someone be born predisposed genetically to depression?

**Dr. Lynch:** Absolutely. To give you an idea, I have MTHFR. I have the significant one. My MTHFR enzyme only works at a 30-40% capacity.

**Sean:** That means you have one gene?

**Dr. Lynch:** It means I have a copy that is bad from each one of my parents. I have one of the not so bad copies and I have another one that is more significant. In total I have about 60-70% reduced function of this enzyme, so my folate levels are low.

**Sean:** We'll go through that whole pathway in just a minute and really break it down for people to understand. I'm sorry. Go ahead.

**Dr. Lynch:** I, myself, looking at my genetics, I am susceptible to depression. Looking back, there would be moments where I would feel depressed. I'd get in this lull. I'd listen to music like The Cure and Pink Floyd. You just kind of gravitate towards that. I'd be carb loading. I'd eat a whole half gallon of ice cream after work. I'd sleep in until 11 o'clock in the morning. It's like, "Come on. Snap out of it. Snap out of it." But I couldn't. Then I found this years later and it really made a big impact.

**Sean:** Were you depressed for no reason? It just came out of the blue?

**Dr. Lynch:** It was gradual. It was gradual. I had a very good childhood but my parents were really hard core. Both professional and very demanding that I excel. I was top of my class in high school so I had a lot of pressure with that. Then I was rowing at the University of Washington. I was a high

caliber athlete there. I had to perform and had anxiety with that as well. Depression was like this with me. I didn't really understand diet or supplementation or lifestyle. I mean, I was 18, 19, 20 and didn't have a clue. Yeah, I was intermittently depressed.

**Sean:** That's a lot of pressure there, it seems like. If someone had the genetic mutation, are they definitely going to be depressed?

**Dr. Lynch:** No. No.

**Sean:** Talk about epigenetics and all that.

**Dr. Lynch:** You have a light switch on the wall. Let's say that light switch is MTHFR. The MTHFR, that light switch turns the light on. When that light is on it means you have light and everything is working. If you're looking at MTHFR...you have to have an action to turn on that light switch. That is, a finger to flick it, right? Or a clap.

But just because you have a gene, you have to have an action for that gene. The epigenetics control it. The epigenetics are the software for your computer. Another way to look at it is to say MTHFR is your computer. Then you have this software which runs is, which is the epigenetics. The epigenetics is what's most important because that is how the genes are controlled.

**Sean:** The epigenetics. Are those influenced by diet, lifestyle, environment, things like that? If they're living a bad lifestyle, eating bad foods, drinking bad drinks, you can have bad "on" switches turned on?

**Dr. Lynch:** That's right. If we go back to my story, I had intermittent depression. I had a very happy childhood but there were moments where I wasn't doing well. I did have those depressed feelings. I didn't know it was depression. If you look back and as I look back as a physician now, I was definitely depressed. But I snapped out of it. I'm still out of it. Ive been out of it for years. I am susceptible to go right back in there again. I know that, so I take action. I take good care of myself.

**Sean:** We're going to talk about those actions in just a minute. If someone were genetically predisposed to depression how would they know?

**Dr. Lynch:** If you look at family history, look at your mom, your brother, your sister, your grandma. If you see a general trend in your family of schizophrenia or depression or anxiety and it goes does the line. Ask your mom and dad or your grandma, your grandparents. See if it runs in your family. If it does, well, lightbulb. Go check it out. That is the first one is family history. It's why doctors ask, right?

**Sean:** Did you bring your football?

**Dr. Lynch:** I did bring my football. It's right over there.

**Sean:** You actually did bring a football, huh? When you were on my radio show a few months ago, it was called "MTHFR Made Easy." I know a lot of people go online and type in "MTHFR." Even I did when I was prepping for your show. It looks so complicated. Can you and I just take five minutes and make it simplified for our audience? What does it mean? What is it?

**Dr. Lynch:** Can you pass me that football over there for a second?

**Sean:** He did bring the football.

**Dr. Lynch:** That's right. This is my grandfather's football. It even says "The Duke" on it.

**Sean:** Old school, huh?

**Dr. Lynch:** Old school. I tried pumping it up so we could throw some passes but we can't. Anyway I got sidetracked by the ball.

**Sean:** It's OK. This is all going to make sense in a minute. Start off on the pathway and why that football is relevant.

**Dr. Lynch:** Let's say that football is the body's most active form of folate. We know folate, right? Folic acid is all in the news. There's folic acid awareness month or folic acid awareness week. We know that. The problem is, is folic acid might be the pigskin, but we want to make the football. There's a bunch of different steps in there. We have the pigskin. We have the laces.

We have the pig, excuse me. So there's all these steps that you have to do to make the final football. That final football is what can create the touchdown and win the game. In order to get to that football or say methylfolate, the body's most active form of folate, you have to go through all those genes and have all different types of nutrients to make that final thing happen.

**Sean:** What is the first step? What is the first thing to go into that pathway?

**Dr. Lynch:** First thing to go in that pathway, we could say leafy greens, what we eat.

**Sean:** It's folate, right?

**Dr. Lynch:** It's folate.

**Sean:** Folate goes in. MTHFR is an enzyme, right?

**Dr. Lynch:** Right. The last one out of five. If you envision a staircase going up or down, there's five or six different stairs and you want to get to the bottom or the top. Let's just keep it simple. Five stairs, going down. The bottom is where you want to get to. You have to take a step to each one. MTHFR is the last step.

**Sean:** The last step. The last enzyme there.

**Dr. Lynch:** You want to get to the very bottom. The bottom is the most important.

**Sean:** Let's say this. Folate goes in to the top. It wants to become methylfolate. It wants to become methylfolate because of what?

**Dr. Lynch:** Because methylfolate is the body's number one form of folate in the blood.

**Sean:** Cool. It starts as folate, becomes methylfolate. It goes through step one. This transformation happens there. There is an enzyme there that makes it happen. Step two, another enzyme. Step three, another enzyme. It's transforming. Step four, another enzyme. Then it gets to the MTHFR enzyme in order to become the football, the methylfolate. But if there is a genetic mutation there then that fifth step isn't working very well, correct?

**Dr. Lynch:** That's correct.

**Sean:** So we get not adequate football. We get inadequate methylfolate which the body will use for other things, correct?

**Dr. Lynch:** Thats correct.

**Sean:** This football gets passed into another cycle after it becomes methylfolate. Then what happens there?

**Dr. Lynch:** It gets handed off. It gets handed off along with methylcobalamin, which is B12. It's the body's number one active form of B12. There's three of them. To keep it simple, methylcobalamin is number one, most active in circulation. It tag teams with the methylfolate. You've got the football going to the quarterback of the B12. Those two together make a really significant team. They can give the ball to the running back, which is then SAMe, the primary methyl donor in the body which does a whole bunch of different things.

**Sean:** Got you. I want to break it down one more time. It goes through the first cycle. It goes through all of those five steps. If the MTHFR enzyme in that fifth step is adequate, it is what it's supposed to be, then you get the football, which is the methylfolate. That gets passed off. Now, that passing off to the second cycle, pass it off to wide receiver or the running back to run the play, what does that have to do with mood?

**Dr. Lynch:** A lot. A lot.

**Sean:** Like what? I hope the audience understood that. There's one cycle. There's a second cycle. It's the product of the first cycle that gets passed off to the second cycle. Then that is going to influence people's moods.

**Dr. Lynch:** That's right. They don't even have to know that. It's interesting. It's fun to puff up your chest and say you know the science but it doesn't really matter. The thing they need to know is methylfolate supports the production of SAMe. We know in research that SAMe is a great antidepressant. It's fantastic. There was a study that showed SAMe is more effective than some drug. I can't remember the name.

But it was 60% more effective than a drug for depression. SAMe works on making dopamine, serotonin, norepinephrine and melatonin. Everybody knows those. Those create your ability to think, how you feel, sleep, ADHD, depression and all that. It's all there. If you don't have adequate SAMe and you're not making adequate neurotransmitters to be able to do these things … we'll stick with depression because that's what we're here for, then people are going to be depressed.

That's why when you give SAMe to some patients, their depression lifts. It also explains why when you give methylfolate their depression lifts. It's thousands and thousands of people are getting great, great benefit from this every month. I know because I create these nutrients needed and the reviews are phenomenal.

**Sean:** What percent of the population has an MTHFR mutation?

**Dr. Lynch:** If we look in just the United States, it depends on the paper. Just in the United States — we're not saying the most significant but we'll say some type of MTHFR — sixty percent.

**Sean:** Sixty percent, that fifth step is not working well. They're not able to properly convert their folate into the methylfolate that is needed for their neurotransmitters and that SAMe to work.

**Dr. Lynch:** That's right.

**Sean:** That's a huge problem, right?

**Dr. Lynch:** Yeah. There was another paper I was reading that one third of depression is associated with a folate deficiency. One third.

**Sean:** We're going to get into more folate in just a minute. Folic acid as well, because that's a huge issue there. Are there any other genes that can be responsible for depression beyond MTHFR?

**Dr. Lynch:** Directly, yes. We'll stick with directly. Indirectly, there's a whole slew of them. Hundreds and hundreds of them, indirectly. Directly, I'll just keep it simple. I'll stick with three. There is MAO-A, monoamine oxidase A. That works with your serotonin and your melatonin. We all know about how important serotonin is. There are drugs made, SSRIs, to increase serotonin levels. Then you have CBS. CBS is the number one genetic reason for elevated homocysteine. If someone has elevated homocysteine, their ability to make neurotransmitters and have them work goes way way down.

**Sean:** Let's go back to MAO. MAO-A, you said it was? I have here in my notes that it controls the formation and elimination of dopamine, norepinephrine, epinephrine, but also serotonin as well. What does that mean?

**Dr. Lynch:** It's just like MTHFR. It works in a step-wise fashion. It can take something and it transforms it into something else. That's all an enzyme or a gene does. It just transforms it. 5-HTP, a lot of people know to supplement that. Doctors will recommend to supplement 5-HTP to get rid of depression. Why? 5-HTP, with the MAO-A enzyme transforms the 5-HTP into serotonin.

**Sean:** If that enzyme isn't there, you just get a bunch of 5-HTP but you don't get the serotonin.

**Dr. Lynch:** "Doc, I get no effects from 5-HTP."

**Sean:** Got you. What about the elimination part of the serotonin?

**Dr. Lynch:** The elimination part of serotonin uses different enzymes. MAO-A helps produce serotonin. There's other enzymes that require SAMe, which also requires methylfolate and the

MTHFR enzyme working, to convert that serotonin into melatonin. If people can't sleep, that's another reason. Then you have other enzymes that help get rid of serotonin as well.

**Sean:** People that can't get any effect from 5-HTP, it could be because they're not making the conversion due to a problem with the MAO gene. People who possibly can't sleep it can be the MAO gene as well.

**Dr. Lynch:** Yeah. Now let's go back to MAO a little bit. MAO is an x-linked gene. What that means is women have two genes for MAO, because it's x. They have two x chromosomes. Men, we have an x and a y. Women can burn through their 5-HTP faster because their MAO-A enzyme, they have twice as much as we do, as boys. Men, excuse me. Men, right? What that means is women are more susceptible to depression because that MAO-A is clearing out that 5-HTP faster than the men.

Women might have to take more 5-HTP and have a functional MAO. If it's too functional, there is actually a genetic problem which clears the 5-HTP faster than the normal person. If you're a woman and you already clear it faster than men and you have this gene working too fast, then you're clearing out your serotonin too fast, and you get depression.

**Sean:** Before we get into testing, because I'm sure the viewers are going, "How do I know if I have this or not?" CBS. Can you go through that one more time, why that's important?

**Dr. Lynch:** Yes. CBS is the number one gene associated with high homocysteine. Everybody knows high homocysteine is a risk factor for cardiovascular disease. They don't understand that it's a risk factor for being depressed. They don't get it. Doctors don't get it. This is why I travel around the world getting this word out there because they need to understand that homocysteine is absolutely associated with depression.

If you have the CBS problem, and that's a slow down of the gene. MAO-A, we talked about how it was too fast. MTHFR is too slow. CBS is also too slow. That too slow causes high homocysteine. That high homocysteine then comes over to your neurotransmission production and it puts the breaks on.

**Sean:** It blocks it. It blocks the shot.

**Dr. Lynch:** It blocks it, yeah. I don't want to get into the science of why but, yes. It just messes it up.

**Sean:** If someone had lab work done from their doc and their homocysteine was high, this could be why.

**Dr. Lynch:** Yes. That could be one of the reasons why.

**Sean:** Let's get more into testing. How does somebody know if they have MTHFR, MAO or CBS mutation?

**Dr. Lynch:** Genetic tests. They're everywhere now. MTHFR is the easiest one to test for. It's one that I recommend people test for because it's the most common and there is the most information on how to address it. You go to your doctor and say, "Doc, I'd like you to test for my MTHFR." They go, "Excuse me?" Just say, look, Quest, LabCorp, any lab testing company now will test MTHFR for you.

The problem is you need to make sure your insurance company pays for it. If they don't pay for it, it costs an arm and a leg. If it costs an arm and a leg, there's other lab companies that will provide testing for you. There's a number of them. May I mention them?

**Sean:** Please. Go for it.

**Dr. Lynch:** There's SpectraCell Laboratories. They do a great job in compensating your insurance and a reimbursement for you. So SpectraCell. Molecular Testing Labs is also really good. Molecular Testing Labs is great because they also do a cheek swab. A lot of people don't like needles, myself included, and kids have a lot of fear of needles. If you want to take care of your kids and make sure they're not going to get depressed or make sure they're not just genetically susceptible to being depressed, you can test for MTHFR with the cheek swab through Molecular Testing Labs.

Then we also have 23andMe. For $99 you can get a 23andMe vial. You spit in this thing, 5 mL of spit which is quite a bit. You send it in and get a whole bunch of data back. 23andMe, they say they don't do genetic testing, they say it's ancestry only. But they actually do genetic testing. I'd rather people not do 23andMe. I'd rather people just do one gene at a time because it's daunting. It's overwhelming. If they come back and they say, "Oh my god, I have all these genetic problems. I'm a mutant." Well, newsflash. We're all mutants. That's how evolution happens.

**Sean:** That has to scare people though. Getting those test results back.

**Dr. Lynch:** It's very scary. Right. I'd rather people just test for MTHFR and work with that. Then expand your knowledge slowly and when you're ready for it.

**Sean:** MTHFR only? What about MAO and CBS?

**Dr. Lynch:** MAO and CBS is more specialty. Doctor's Data has a lab test for that. They have a methylation genetic test that you can get. Or 23andMe.

**Sean:** You said 23andMe, $99. Doctor's Data, roughly...?

**Dr. Lynch:** $350.

**Sean:** $350. It's worth knowing.

**Dr. Lynch:** It is absolutely worth knowing.

**Sean:** We'll get to the do's in just a second. I want to be clear, though. If someone does come up positive with a mutation, that doesn't mean they're going to be depressed, right?

**Dr. Lynch:** No. No. It's just susceptible.

**Sean:** Got you. Let's talk about what to do if someone does come up positive with a MTHFR mutation.

**Dr. Lynch:** First one is you eat salad. Eat leafy greens. Preferably organic.

**Sean:** Why?

**Dr. Lynch:** Because leafy greens contain, in some amount, the body's number one active form of folate, which is methylfolate. It contains the football.

**Sean:** Okay. That final thing, that last step to becoming methylfolate, it bypasses that right? Leafy greens already have the methylfolate

**Dr. Lynch:** That's right. Leafy greens have about 100-200 forms of folate. But they're natural. They also contain the methylfolate. Eat more leafy greens. It's number one. Organic and washed, please. Number two is you throw away folic acid and you get rid of the folic acid enriched foods.

**Sean:** Why get rid of the folic acid?

**Dr. Lynch:** We get rid of the folic acid because in order for folate to get into the cell it needs to be carried. Folate is what we want. Folic acid has to go through all those stairs. We can bypass all those stairs. We can jump over those if we take methylfolate or eat our leafy greens. So why take folic acid and have to go down a bunch of flights of stairs where you can trip and fall and break your neck? So we eat the methylfolate or we eat the folic acid.

We eat the methylfolate, we take care of the problem. There is no folic acid in greens. There is no inactive form of folic acid in leafy greens. There is in enriched foods. Flours, breads, cereals, energy bars, supplements and so on. The reason why you want to get rid of folic acid is because it blocks the ability for the active form of folate, the methylfolate, to bind to the cell receptor to get in to the cell.

**Sean:** So if this is a cell, here is the receptor right here. You're taking folic acid, this gets gummed up. It's not available for the folate to bind to.

**Dr. Lynch:** Yes. If I had that football, I'd try to put that football on the cell receptor right there but I can't because you have folic acid on it.

**Sean:** So we've got the folate, the good stuff that we want, the methylfolate. We have a receptor for it. This is supposed to go, "Bing!" But it can't because this is folic acid and that's already in there. It blocks the receptors. This thing just can't get in and do what it's supposed to do, like make your neurotransmitters and all that fun stuff.

**Dr. Lynch:** That's right. The reason why we want to get folic acid out of there is because yes, it blocks receptor, but a lot of people are thinking, "Well, but folic acid helps some people." Some of that folic acid does become the methylfolate. Some of the folic acid does manage to get down the stairs, but let's say that folic acid broke their leg. Folic acid has their leg busted and is trying to go down the stairs. It's super slow. It gets down there, some of it does, but the rest of it stays in the blood and it will stay there and it will block the receptors. It's too slow.

**Sean:** So it's inefficient —

**Dr. Lynch:** It's super inefficient.

**Sean:** —going down the stairs and getting the transformation to the methylfolate and it's blocking the receptors up there so this is made, it still can't connect.

**Dr. Lynch:** Yeah. So imagine you're going down a subway channel. You have got three people with broken legs with crutches trying to go down the subway channel. How many people are behind them, right?

**Sean:** It's just backing up.

**Dr. Lynch:** They're backing up and the subway cars are empty.

**Sean:** Mm-hmmm. Makes a lot of sense. Number one, eat your leafy greens. Number two, avoid folic acid. What's number three?

**Dr. Lynch:** Number three is to supplement with methylfolate. This hasn't been around for that long but now it's available. There's no reason for people to take folic acid if their folate levels are low. You can take methylfolate. Get down the stairs fast and make the body's number one form of folate. Start making your SAMe and making your neurotransmitters.

**Sean:** Do you feel like doctors should check for an MTHFR mutation before they put their patients on an antidepressant or on 5-HTP or something like that?

**Dr. Lynch:** You're talking to a naturopathic physician here. I'm all about prevention. I like to optimize patient's health. That's my number one goal. Me, personally...and what I also think all physicians should do is yes, I think physicians should have a baseline genetic panel on all their patients coming in. Because MTHFR does more than just help with depression. There's cardiovascular disease, cancer, diabetes, so on and so on. It's really significant.

So yes, i think doctors should test for MTHFR and do genetic panels on their patients. Should they do that prior to prescribing antidepressants? Well, antidepressants don't work very well. Newsflash. How many times do patients go to the doctor, take an SSRI or some type of antidepressant and not have it work? Sixty percent. Sixty percent fail the first time trying to go to the doctor and take an antidepressant to improve, to get rid of it.

It doesn't get rid of it, it just palliates it. What they should do if they don't have access to genetic testing or they're just not into that, they're not here yet in the modern day, then they can look at homocysteine levels. They can look at serum folate levels. They can look at red blood cell folate levels.

**Sean:** What's the difference there? Serum and red blood cell?

**Dr. Lynch:** Remember we talked about, eat your leafy greens and you have folate in your blood. You have methyl folate, the number one form of folate in the blood in circulation. Well, that methylfolate doesn't do anything unless it gets into the cell. RBC, red blood cell folate, is in the cell. If you order a serum folate and its high, serum folate is an umbrella term. It catches everything. Actually we can just say its a garbage can for all forms of folate including folic acid.

Serum folate includes folic acid and so does RBC, unfortunately. We want to know what is in the cell of the patient. So looking at the red blood cell folate is far superior than looking at serum folate. Serum folate, though, if it's low you can guarantee that RBC folate is low. Then you've got serum B12. Serum B12 is important because remember, methylfolate and methylcobalamin work in tandem. A lot of the population is B12 deficient.

A lot of them. Because a lot of them are on antacids. We're eating all of this unhealthy food or we're stressed out or have H. Pylori, we have reflux. Doctors are giving antacids left and right which is then depleting your B12. You could eat all the leafy greens you want. You can take all the methylfolate you want but if you're B12 deficient, there is no hand off for that football. Your SAMe doesn't get made and you've got issues.

**Sean:** What does somebody do about that, if they're low on B12?

**Dr. Lynch:** They supplement with methylcobalamin.

**Sean:** Good. Anything else?

**Dr. Lynch:** You can take an injection. You can eat red meat. And absorb it. If you're taking antacids then you're going to have issues.

**Sean:** So someone goes to their doctor. They get tested for MTHFR and it comes up positive. What does a doctor typically do?

**Dr. Lynch:** The standard typical doctor will prescribe a medication that is about 7 1/2 to 15 milligrams of methylfolate. It's pure methylfolate. That can be very useful for some. There's quite a few studies that show depression lifts. But I've had quite a number of patients ranging from kids to seniors where they will become severely aggravated and break windows and beat up their parents.

**Sean:** Really?

**Dr. Lynch:** Seriously. Other ones will have seizures and go to the ER.

**Sean:** Give us some frame of reference, if you don't mind. If you do know this number, how much methylfolate will be in a salad?

**Dr. Lynch:** Good question. How much methylfolate is in a salad, I don't really know. I can tell you that the standard recommended daily allowance for folic acid is 400 micrograms.

**Sean:** 400 micrograms. You said that the doctor might prescribe 7.5 to 1.5 milligrams.

**Dr. Lynch:** Milligrams.

**Sean:** Milligrams. That's a whole step up. Micrograms to milligrams. That's a lot of folate.

**Dr. Lynch:** It's a lot.

**Sean: T**his is why they're getting aggressive and breaking windows and stuff like that?

**Dr. Lynch:** That's right. Remember, folic acid is the inferior form. Now you're given the jet fuel. We have the raw oil in the ground with folic acid. When you give the jet fuel of methylfolate with many amplitudes up, there can be tremendous success with that but there can be tremendous detriment.

**Sean:** The people who are successful with it, are these people who might have homozygous MTHFR, so they have two genes?

**Dr. Lynch:** Yes. Remember there are five different steps or more for methylfolate to be made. There can be other genes besides MTHFR that are problems. Maybe their first step is messed up and their second is too. Maybe the receptor genes, genes for building the receptors, those can be messed up. There's genes for carrying the methylfolate. Those can be messed up. I've seen those a number of times.

Then there's another one. There's antibodies. Autoimmune disease. Autoimmunity causes folate receptor antibodies. Just like the folic acid was binding to the receptor and preventing the

methylfolate from binding, so does the antibody. What's the number one cause for those folate receptor antibodies? Dairy products.

**Sean:** Really?

**Dr. Lynch:** In the research, they remove dairy products namely milk. Especially cow but also goat. Most importantly cow milk. They removed the cow milk from the person, the folate receptor antibodies go away. Gone.

**Sean:** Interesting.

**Dr. Lynch:** There are tests for folate receptor antibodies but I've never ordered them. I just tell patients if they're not responsive to 15 milligrams of methylfolate then to get off the dairy and take some proteolytic enzymes to get rid of the antibodies. Then try again.

**Sean:** I want to make sure the audience is clear on what I meant by homozygous for MTHFR. Can you talk about that?

**Dr. Lynch:** Yeah. When Sean asked a good question about if people need more methylfolate, you asked "Is it because they're homozygous?" That means they have two copies of a significant form of MTHFR. You have heterozygous, which is one copy. The issue with that, with MTHFR, is if you're heterozygous you have about a 40% reduced capacity to make methylfolate. If you're homozygous, you have about a 70% reduced capacity.

**Sean:** Both parents give you the gene, homozygous.

**Dr. Lynch:** Both parents. That's right.

**Sean:** 70-80%. Is that why those people who have two copies may be able to take 7.5-15 milligrams of methylfolate prescribed by their doctor and not have these crazy side effects?

**Dr. Lynch:** That's right. That's one of the reasons. Then there's a bunch of other reasons why too. All of the different genes that are above contribute to that as well.

**Sean:** Let's shift gears a little bit. We've talked a lot about MTHFR. I'm sure the viewers are wondering about MAO and what that has to do with anything. Go deeper with that if you don't mind.

**Dr. Lynch:** A lot of doctors, if a patient is depressed, they reach for an SSRI prescription pretty much right off the bat. They give it to their patient. The patient may respond or they may not. MAO-A is what controls serotonin. If the doctor is giving an SSRI drug, which stands for selective serotonin re-uptake inhibitor, all that terminology means is it keeps the serration inside the brain longer. They give that drug to try to keep the serotonin in there longer. If they don't have enough serotonin in the beginning, an SSRI, what's there to keep in there longer if it's empty in the first place?

This MAO gene, especially in women, it will burn through the serotonin quickly. If a woman or a man is given an SSRI and they feel no effect, maybe they don't have enough serotonin in the first place because their MAO-A is working too fast. What you can do then is go above the MAO-A. What makes serotonin? Ask yourself, what makes serotonin? If there's nothing there to recycle, what makes it? 5-HTP. Then 5-HTP along with vitamin B6 with the MAO enzyme, makes serotonin. Those two things are important.

If you take 5-HTP and you feel no effect from it, your depression doesn't lift, you're probably deficient in B6. If you take B6 because a doctor says, "Take B6, it's great for getting rid of depression," you feel no effect, you probably need to add 5-HTP. For those people who have that MAO enzyme that's working too quickly, it's specifically called R297R, that's the name of the MAO enzyme that works too fast. They might have to take 5-HTP three times a day because they're burning through it that fast.

**Sean:** Right. OK. They're burning through it too fast. The 5-HTP…OK I got it. That makes sense to me. They need it more often to replenish because they're just burning through it.

**Dr. Lynch:** They're burning through it but we have to be careful. If you're taking an SSRI medication right now and you're hearing this and you reach for 5-HTP and you take your B6 and you start increasing your serotonin and you're taking the SSRI which is keeping that serotonin in there, then you might have what they call "serotonin syndrome," which is a mad hatter syndrome. You become off the walls and beat up people and maybe have seizures and all that. My point with that is don't reach for 5-HTP if you're on an SSRI.

You have to go to your doctor first and say, "Hey, this is what I found out." Be cautious. It's very tricky. SSRIs are a real kicker. They can cause problems. Now, on the other flip side. If you're given an SSRI and it's working and you want to get off of it and your'e learning that you can take 5-HTP and B6 to make your serotonin, you can get off the SSRI. You have to talk to your doctor again to get that permission before you just do it yourself. Most likely if you're taking an SSRI and it's working, you probably can get off of it by taking those two nutrients.

If you're given an SSRI and it didn't do anything for you, we already discussed one point. Another point is you might be low on folate. A lot of research has looked at if you're given an SSRI and there is no success with it, a lot of that unsuccessful outcome is because of folate deficiency. These researchers gave an SSRI to a group of patients and they gave an SSRI with folate to another group. The SSRI with folate, their depression was a way better outcome than those just on SSRI. That's another great thing to look at. Why is that? Because the folate makes the SAMe which then goes and supports your serotonin production.

**Sean:** And your neurotransmitter production. That makes a whole lot of sense. Eat your vegetables.

**Dr. Lynch:** Eat your vegetables.

**Sean:** Green leafy vegetables, right? Very, very good. Good stuff. You have a couple of websites. MTHFR.net, seekinghealth.org as well. You have a special gift for our viewers. You put together a course for them, right? It's going to be at seekinghealth.org/depression. Talk about that.

**Dr. Lynch:** What that is going to be is, I want to get into depth on this. You an I are doing a great job discussing the beginning ins and outs but there's no magic bullet for everybody. Depression have multiple causes.

**Sean:** All these sessions are pretty much about a different cause.

**Dr. Lynch:** That's right. What I'm going to do is go into more detail about what I've been talking about with you. That will be available on there as well, seekinghealth.org/depression. I'll get more in depth and show you the diagrams. I'll walk you through the diagrams so you can understand what the heck I'm talking about. Because pointing in the air, there is nothing here.

**Sean:** Footballs and stuff. Not only do you have seekinghealth.org, you also have seekinghealth.com. What's there?

**Dr. Lynch:** Seekinghealth.org is the education. I believe in education. We need to empower people as much as we can and train doctors all over the planet. While seekinghealth.org is the education, I believe that empowering people including doctors to understand the genetic component, which drives certain things is super important. But while doing that I'm also fiddling in the research that there are tools that need to be made.

In my research I find that 5-HTP helps, B6 helps, methylfolate, methylcolbalamin, all these things contribute to certain areas, then I need to formulate certain things. Those formulations are found at seekinghealth.com. We have certain things that are standalone like 5-HTP or B6 that are standalone. Then we have methylcobalamin and methylfolate that are standalone and in combination. I provide tools for people to try to improve their own health and then have doctors prescribe them as well.

**Sean:** Got you. Very cool stuff you're doing. Dr. Ben Lynch, thank you so much.

**Dr. Lynch:** Thank you Sean.