

Methylation Problems Lead to 100s of Diseases

Suzy Cohen



This is the expanded version of what was in my Question & Answer column, which printed in newspapers nationwide and abroad in translated languages. I am basing it on what I learn through my Functional Medicine seminars as well as teachings by physicians in the field who study methylation and other detoxification pathways in the body.

Dear Suzy,

I met you at a book-signing for your book, “[Thyroid Healthy](#)” and you said something that stuck. You told me that if I have allergies, fatigue and multiple chemical sensitivities that I may have a “methylation” difficulty. You also told me not to take Green Coffee Bean extract. Can you please tell me more? –S.J., Vail, Colorado

Methylation, it’s a big word that you probably don’t think applies to you, however, read on because knowing about methylation could improve or save your life. Methylation is the process of taking a single carbon and three hydrogens, known as a methyl group, and applying it to countless critical functions in your body such as: thinking, repairing DNA, turning on and off genes, fighting infections and getting rid of environmental toxins to name a few.

Methylation defects are tied to a wide variety of conditions:

Diabetes

Fibromyalgia/Chronic Fatigue Syndrome

Cancer

Pulmonary Embolism

Addictive Behavior, even alcoholism

Insomnia

Autism or down's syndrome
 Frequent miscarriages
 Bipolar or manic depression
 Allergies or Multiple Chemical Sensitivities
 Atherosclerosis
 Spina Bifida or Cleft Palate or Neural Tube Defects
 Multiple Sclerosis and other Autoimmune Disorders
 Hashimoto's or Hypothyroidism (visit [The Thyroid Summit online](#))
 ADD or ADHD
 Dementia/Alzheimer's
 Schizophrenia
 Anxiety
 Neuropathy
[Lyme Disease*](#)
 Chronic Viral Infections

* Usually in severe cases, the symptoms are due to toxin build-up; please note the methylation defect does not cause Lyme, which is a tick-borne illness. But the infection causes ammonia, quinolinic acid, acetylaldehyde, etc... and methylation defects reduce the person's ability from properly detoxifying, repairing the damage and fighting the infection and co-infections. This explains the severe symptoms that come and go in some people, and why some folks herx so badly and others don't.

One process of methylation turns on and off genes, this means it affects your DNA (genetic code). The ability to methylate helps you process toxins and hormones. For example, estrogen... you make it in your body, and you also get it from xenobiotics (chemicals in shampoos, pesticides, herbicides, plastics and more) if you can't break down estrogen and get it OUT of your body, you could develop all sorts of disorders.

Methylation also plays a role in making and breaking down various neurotransmitters, such as energy producing epinephrine and sleep producing melatonin. Most people are concerned about making enough neurotransmitters but don't sell yourself short. If there's a problem breaking neurotransmitters down, then they will hang around in excess which may cause unwanted issues such as seizures, insomnia, panic attacks and fits of rage to name a few. See how methylation might apply to you or someone you love?!

Consider the people who might have a methylation problem: Children with autism, anyone with a seizure disorder, neurological condition, Alzheimer's disease, cancer, severe Lyme disease, chronic infections, low T cells or reduced NK cells, diabetes, allergies, fertility issues, miscarriages, cardiovascular disease, chronic fatigue, anxiety or any psychiatric illness. Oh, and if you are extremely sensitive to medicine, or to laughing gas (given by the dentist) you might have a methylation problem, too. See my list above for other conditions associated with methylation problems.

Methylation snps (pronounced "snips") are referred to in the scientific literature as genetic "defects," but they are really just a trait, more of a 'genetic personality.' (Gosh, I hate to call a common genetic trait a "defect," I like the word "personality" better but no matter what I think, you will still see it in the literature referred to as a "defect.")

Whatever you want to call it, problems in the methylation pathway are not always genetic traits. In any case, it may cause a deficiency of methylfolate in your body, and thus a deficiency of glutathione, which leads to toxin build up in your bloodstream and tissues. Glutathione is known as the 'master antioxidant' of the body. Low levels of glutathione can look like chronic fatigue syndrome or fibromyalgia, increased immune activation, multiple chemical sensitivities, and progressive diseases like ALS, MS, Parkinson's, etc.

What is a Big Methylation snp That You Should Know About?

About 45 percent of people have this genetic trait, what is referred to as a MTHFR defect, so feel free to blame mom and dad for that. That's about 1 in 2 of people that have 1 copy of the C677T MTHFR gene (you can find out if you have this gene by testing, I'll tell you more about that in a few minutes). But it's not just about genes. Disturbances in this pathway can occur for other reasons, I am pretty sure you are going to find yourself in the next list.

A Dozen Other Things Interfere with Your Methylation Pathway

If you lack these vitamins, minerals, your ability to drive the methylation pathway is limited. Why? Because these nutrients are needed to help make the most active form of folate in your body known as methylfolate.

These include:

Zinc

B2/riboflavin

Magnesium

B6/pyridoxine

B12/methylcobalamin

Folate (from food or folic acid)

1) Poor diet, poor probiotic status, digestive issues, medications, medical conditions like Crohn's or Celiac, and other genetic traits may cause any or all of these nutrient deficiencies.

2) Xenobiotics – which are chemicals found in our air, water, food, home, work, schools, parks, beds, cosmetics and more.

3) Taking medications that are drug muggers that deplete you of the nutrients in #1 above. Some of the worst offenders (in terms of stealing your methylation nutrients) are methotrexate, metformin, antacids, acid blockers, proton pump inhibitors, corticosteroids, estrogen-containing drugs and nitrous oxide.

4) Drinking alcohol will pretty much shut down your methylation and wipe out your glutathione stores.

5) Green coffee bean extract is incredibly high in catechols and those use up your methylation pathway nutrients fast!

7) If you have Lyme disease, and many people do whether they know it or not, the *Borrelia burgdorferi* germ uses up all your magnesium (this supplement is a unique and highly absorbable form) to make biofilms and hide. Low mag reduces your ability to methylate. As an aside, this explains why some 'Lymies' have bad reactions during antibiotic treatment. Those drugs kill the organism but then your body is faced with poison such as 'dead bug parts' as well as ammonia which spikes when *Borrelia* dies off. Point is, you can't remove easily the toxins from your body and it backs up in your system (by [christopher](#) at www.dresshead.com). If this is you, then use really low doses if you have to take antibiotics, until you've opened up your methylation (and other detoxification) pathways.

8) If you take nutrients that deplete methyl groups (like high dose niacin, or the prescription version of that called Slo-Niacin and Niaspan).

9) Heavy metals (think mercury in your diet, or your teeth) or lead in your bloodstream, cadmium if you smoke, high copper, arsenic, etc.

10) High levels of acetaldehyde, this is a potent neurotoxin released by *Candida*, and also a by-product of drinking alcohol (even red wine). Don't drink if you're a poor methylator. Most of you know who you are, meaning you are a lightweight when it comes to alcohol. Yep, it is likely you are a poor methylator. I will share

more about the Candida toxin known as “acetylaldehyde” shortly.

12) Anxiety or a lot of stress. I’m not sure why, but a pessimist or “I can’t do it” kind of outlook seems to make things worse. I think it has to do with your belief systems and how they impact your genes. In my summary, I’ll give you some links to an author and lecturer that has clues on how to change your outlook. (Dr. Bruce Lipton).

Because people with a methylation difficulty have trouble eliminating poisons, these build up in the body and that’s what contributes to many health concerns. Opening up the methylation road block helps clear your body of poisons and that should help reduce symptoms.

If you can’t methylate properly, you cannot produce CoQ10, carnitine, creatine or ATP (energy). You will also have nerve pain termed “neuropathy.” That’s because the methylation process helps make the protective wrapping around your nerves.

It All Starts With Your Gut

High-quality probiotics are incredibly important to people with a methylation problem because if you let Candida overrun your gut, you get excessive amounts of Candida’s toxin called acetylaldehyde. I should tell you that acetylaldehyde is also a break down product of drinking alcohol. So job one is to repair the digestive tract and stop drinking alcohol. Optimize gut flora. The less candida you have, the less acetylaldehyde. You may have yeast overgrowth and not even know it. People who have been drinking a long time have been mugged of Thiamine and probiotics. Read my Drug Muggers book for ways to correct that.

Here are the symptoms of a HANGOVER, as well as YEAST overgrowth:

[Migraine or headache](#)

Brain fog or poor concentration

Depression, anxiety or irritability

Weakness or fatigue

Tender points or soreness

These symptoms also happen in people who have reduced methylation!

If you’ve taken an antibiotic for more than a week, you are low in probiotics. If you have had your appendix removed, you are deficient in probiotics (and thus at higher risk for Candida). If you drink a lot of coffee, if you have recurrent vaginal yeast infections, if you have a lot of flatulence, if you crave sweets or have a white coating on your tongue... you are deficient in probiotics. You can take what you like, the one I recommend is Dr. Ohhira’s Probiotic.

I’ve negotiated a coupon code “suzy12” from the owner of this website which gives you free shipping via US mail, and a generously sized sample beauty bar of Kampuku... think of it like probiotic soap, it’s amazing for skin conditions. I personally use this, and love it. Now, back to how to this yeast story.

Why does it matter so much if you have Candida? If you do, you make a lot of acetylaldehyde. Think of that as your hangover chemical, it makes you feel drunk and foggy, and messed up. And that compound will inhibit another enzyme very important and central to methylation called methionine synthase.

Anyone Gluten-Free or Grain-Free?

If you’re gluten-free or limit your intake of grains, you may be low in B6. Vitamin B6 is important to help you drive the transsulfuration cycle which means you may be low in your master antioxidant, glutathione.

What Are Your Options

Let's assume you have a methylation defect and you want to correct that. The most famous practitioner is Dr. Ben Lynch, a naturopathic physician from Bastyr University who also has a Cell and Molecular Biology degree from the University of Washington. Dr Lynch has devoted years to researching this intricate pathway. You should visit his site which is www.MTHFR.Net and learn more about this.

If your physician is unfamiliar with methylation but expresses curiosity, I would definitely point him/her to the work done by Dr. Ben Lynch. His website, www.MTHFR.Net offers many free recorded presentations. Make a double shot, get your laptop out and get ready to type as fast as you can, there is a ton of information on his site and you'll be taking notes like crazy! He even has a forum where you may go share and learn from others. Dr. Lynch is my methylation guru and after you visit his site, he'll be yours, too! He does not receive grants for all the tireless research he does on methylation and detoxification, so all his research is supported by his own little company.

Another pioneer in this field is Dr. Amy Yasko. She helps autistic children, and these kids often have methylation difficulties, as well as other gene snps that affect their ability to detoxify. Interestingly, kids with autism are often low in homocysteine and the master antioxidant, glutathione! One day I will interview her, and write a column on autism, but that is not the focus of today's article. In the meantime, for those of you with autistic children, here is a link to Dr. Yasko's forum.

I study with the best doctors of our time, and I have heard them tell me that you can over-ride a methylation defect by giving high dose folic acid. I disagree with that. And so does my methylation guru Dr. Lynch. He says not do that, in fact, he does not ever recommend folic acid. Ever.

So please do not just shovel in more and more folic acid. Do not take a lot of folic acid thinking you will just push the pathway into making glutathione! It won't work. Again, I know many respected, well-intentioned physicians who suggest that to their patients but I disagree. It doesn't usually work, at least in the long haul, and besides, it can cause more problems. You need to address this problem slowly, after all, it took you years (decades) to get to this point! Folic acid, just so you know, is not what your body uses. Natural folate comes from the foods that you eat, this is not exactly the same as folic acid supplements. The body uses methylfolate, or sometimes abbreviated as [5-MTHF](#), not folic acid.

Opening up the roadblock after you've been storing toxins for years can burden your body very quickly. You want to open the roadblock sloooooowly. There are two ways you can address your genetic personality or methylation "defect" as it is referred to. I'll label them as Option 1 and Option 2, and this is just a very basic guideline, I would absolutely have a doctor who is trained in this handling your situation.

Option 1

Take one of the following three specialty formulas (sold online, or through your doctor):

MethylGuard by Thorne Research

Methyl Protect by Xymogen

[HomocysteX Plus](#) by Seeking Health (Dr. Ben Lynch's formula)

Any of those will help support you if you have a methylation deficiency. Thorne Research, Xymogen and Seeking Health products are sold through physicians so you are not likely to find any of these at your local health food store! That said, I occasionally see these products sold online, or through physicians who have a webstore. I found some sites that sell directly to consumer, I found Thorne's Methyl Guard here. And I found HomocysteX Plus here. Sweet! You can get 10% off at checkout on your total purchase on HomocysteX Plus by using the coupon code: Suzysfans I love making things easy for you. Xymogen, a fine company does not sell online unless you have your doctor's access code and he is a Xymogen rep.

You would slowly ramp up the dose on those. For example (and this isn't right for everyone)... you could take 1

capsule daily for a week, then 2 daily for a week, then perhaps even 3 daily thereafter. The point is that you are slowly titrating.

A key point: Dr Lynch highly recommends you have on hand a bottle of niacin in the form of extended release nicotinic acid.

Why? Because, remember, niacin uses up methyl groups provided by the methylation cycle. If you speed up your methylation too quickly, taking some niacin as nicotinic acid will help calm your methylation cycle down quickly!

To help clarify and emphasize the importance of this point, and the need for niacin take a moment to read this article on how Dr. Lynch balanced out a gentleman who became 'overmethylated.'

These products contain the methylated form of folic acid (which is not the same as plain folic acid sold at pharmacies and health food stores). It's called 5-MTHF or another activated form called "Methylfolate." Methylfolate drives the whole transmethylation cycle! Please note, the active, methylated form of folic acid is not the same as plain folic acid sold at pharmacies and health food stores. It's called **5-MTHF**. Along with that, take other methylated donors, such as the methylated form of B12, this is called methylcobalamin or methyl B12. If you have my [Drug Muggers book](#) there is an entire chapter of this nutrient, where I list all the drugs that steal it, and the best brands.

These products also contain other methyl donors, such as the methylated form of B12, this is called methylcobalamin or methyl B12. If you have my Drug Muggers book there is an entire chapter of this nutrient, where I list all the drugs that steal it, and the best brands.

There's an enzyme called methionine synthase and its purpose is to convert the compound homocysteine into methionine (this is a good thing, you want that). The other thing it does is convert 5-MTHF to tetrahydrofolate (which is needed to make other forms of folate that help make and repair your DNA). The problem is people with methylation problems don't have enough 5-MTHF. If methionine synthase isn't working well you get elevated homocysteine and all that goes with it. One way to get around this limitation is to supplement with the following:

- 1) Vitamin B6 or P5P (pyridoxal 5' phosphate)
- 2) Methylfolate (an active methylated form of folate)
- 3) Methylcobalamin or adenosylcobalamin or a combination like this formula Active B12 (these are natural forms of B12, and neither one of those is the same thing as cyanocobalamin).
- 4) Betaine Anhydrous (Trimethylglycine) donates a methyl group for methylation. Beets and quinoa, and lamb, very high in Betaine. Betaine HCl is used for increasing acidity in the stomach and is also the form that is more capable of reducing homocysteine.
- 5) Vitamin B2 or Riboflavin

All these nutrients are found in Methyl Guard by Thorne, Methyl Protect by Xymogen, or HomocysteX Plus by Seeking Health. You only need to choose one of these. HomocysteX Plus is a bit different in that it also contains another active form of vitamin B12 known as adenosylcobalamin, this is critically important for those precious powerhouses in your cells, you know, the organelles called "mitochondria." They prefer adenosylcobalamin. Dr Lynch added this special form of vitamin B12 to HomocysteX Plus because it is so important for your mitochondria. So when you see 1,000 mcg on the label of that product, you are getting 800 mcg pure methylcobalamin and 200 mcg pure adenosylcobalamin. You will not see any cyanocobalamin in any of the products I've included here, that is an inferior form of vitamin B12 that I do not recommend.

Option 2

It's a little more complex, but for someone with a chronic illness, or severe allergies or sheer curiosity, it may be the best way to go to uncover the underlying cause of your condition:

1. Do a lab test to see if you really have methylation (or other) defect. The MTHFR gene helps make methylfolate which is the main driver of the methylation cycle. This is an important gene to test for first! The two most common gene snps for MTHFR are C677T and A1298C. You may be homozygous, or heterozygous. That means you may have a gene from both your mom and dad, so 2 genes in total (that would mean you were homozygous and you need added support)... or you might have just 1 gene from either parent, making you heterozygous (better). Or you do not have the defect at all, that is a possibility too. So you can do a simple lab test to determine MTHFR snps. It would end there, or you could do a broader, comprehensive genetic test.

More comprehensive genetic testing helps you find other areas of concern. The 23andMe genetic test is a saliva test which you can do in about a minute! It only takes a little bit of saliva, not a lot. This test costs \$99.00 USD and is sold directly to you, the consumer. You do not have to have your doctor order it, in fact, it is intended to be sold direct-to-consumer. It can find out if you have any of 40 inherited conditions and it tests for almost a million genetic snps! Do not worry, the report they give you is not a million pages, nor is it that hard to understand. At the very end of my article, I've listed all the genes it tests for, they are abbreviated so that you can study them or ask your physician and learn more.

The topic of genetic testing is all the buzz word lately, especially on the heels of Angelina Jolie undergoing a prophylactic double mastectomy due to her genetic predisposition. I taped a video for you about that, which you can view here "Breast Cancer Protection."

You can learn more about genetic test by reading this article from Dr. Lynch's site entitled "MTHFR Test Options? Oral Swab, Blood Test or Saliva."

As for gene testing, there are various companies. Some charge thousands, back in the 90's I took a gene test that required blood and it cost me \$2,000. Last week, Sam (my hubby) and I ordered the 23andMe gene test for under \$100 (each) and it will test 10 times as many genes! We've come along way! For that reason, considering the price and the enormous amount of information given, I recommend that you do gene testing through www.23andMe.com

As I said, this test requires saliva, no blood. When you get results, don't panic if you happen to see various gene snps that increase your risk for say, heart disease, cancer or dementia. I have to warn you, we ALL have gene snps, it doesn't mean you're going to get anything. It just means the potential is there, and in my opinion it's better to know your weakness, and protect yourself than to NOT know and get a disease you could have easily avoided with a few key nutrients. If you're freaked out by the idea of knowing your genetic personality and predispositions, then skip the 23andMe test. Opt for a simple test through Quest or Labcorp that can uncover the methylation defect, and nothing else. I'm only trying to help you, I don't want you to submit to any type of test that makes you feel uncomfortable.

What about your medicine cabinet, ever wonder why some medicines make you feel worse? I've been a pharmacist for 23 years (and 6 years of school), so let's 'drive in my lane' for a few minutes and I'll show you why bad things happen when you take seemingly good medicine.

Medicines that Make MTHFR Much Worse

1. Acid blockers and Antacids (even the over-the-counter sort): Because they deplete your probiotics, and suppress your ability to make methylcobalamin. They reduce your ability to absorb nutrients which are needed to drive the methylation pathway.
2. Cholesterol-binding drugs such as Cholestyramine or Colestipol: These drugs not only are drug muggers for

vitamin A, D, E and K, but they also reduce absorption of folate and cobalamin from your food. This enhances the methylation problem, allowing for more toxins to build up.

3. Nitrous oxide: From the dentist, it inactivates an enzyme, causing more problems.

4. Niacin: High doses will deplete SAME and reduce B6. It's a good thing to remember if you are over-methylating! You can put the brakes on with niacin.

5. Anti-seizure drugs: ** Do not stop any of these!!! You need to ask your doctor what to do if you want to wean off, and which drug you CAN take if you can't take these. The worst offenders for people with methylation defects include carbamazepine, oxcarbazepine, phenytoin and valproic acid. These drugs are folate antagonists, they are drug muggers of folate... that is how they work. They deplete folate, but that's not a good thing if you have a genetic snp that reduces your ability to methylate. (*see my caution below)

6. Estrogen drugs like birth control and menopause medication: They are drug muggers of folate.

7. Sulfa-containing drugs like Sulfamethoxazole and trimethoprim (brand name Septra or Bactrim) or sulfasalazine, or triamterene (found in Dyazide). These inhibit the enzyme DHFR which makes methylation problems worse. DHFR or Dihydrofolate reductase is an enzyme that reduces dihydrofolic acid to tetrahydrofolic acid and ultimately allows for the creation of 5-MTHF, the goal.

8. Methotrexate: * This is a popular Rheumatoid arthritis drug, and it's a drug mugger of folate. That is how it works, it antagonizes folate. (*see my caution below)

9. Metformin: As you learned in my Diabetes Without Drugs book, this is a drug mugger of methyl B12 (methylcobalamin). Make the situation worse because you need methyl B12 to drive the methylation pathway forward.

* Even though these drugs are drug muggers of folate, you do not want to supplement with folic acid (or 5-MTHF, or methylfolate) AT THE SAME TIME, because you are negating the effect of the drug. This could cause breakthrough seizures in a person with epilepsy who is supported on an anti-seizure drug that is a folate antagonist (see list above). Supplementing may be ok, and that's a maybe, only if your physician approves (some will, some won't), and the restoration of folate would only be done if you space away your supplement from your drug so as to not interfere. Folate is found in leafy greens too.

What else can you do?

I also suggest other tests, these are up to you as to whether you can afford them or not. Urinary Amino Acids, Urinary OAT, NutrEval, GI Effects, a Basic Chem Panel. You'll also want to evaluate liver function, both Phase 1, and Phase 2. Your doctor will know what to order.

Support mitochondria and repair cell membranes. You can do that with phosphatidylcholine and CoQ10.

Try molybdenum (there are many salts, glycinate is ideal), and a low sulfur diet, this will help eliminate sulfur sensitivities. One thing though, and this will sound contradictory... sulfur foods are fantastic if you can tolerate them. But many people cannot. If you cannot, molybdenum is going to be what helps you. I've read where people with brain fog and a feeling of being drunk take molybdenum and over time it helps relieve this. In this case it may have something to do with molybdenum's ability to process acetylaldehyde (a Candida toxin, and an ethanol by-product). Just FYI, and this is totally random, but am pretty Lyme literate as well as an ILADS member, and that feeling of drunkenness (when you haven't drank at all) is often related to Babesia infection, a parasite transmitted by ticks, often hand-in-hand with Lyme caused by *Borrelia burgdorferi*. Many people have undiagnosed Lyme because the testing is so hit-or-miss, and that's an understatement. You can read more about Lyme if that interests you, I wrote several articles on it because many people with autoimmune disorders, fibro or CFIDS, [Hashimoto's](#), Multiple Sclerosis, Lupus, etc.. actually have Lyme. Not everyone of course, but some.

Avoid foods that contain excitotoxins, such as MSG. Read Dr. Mercola's enlightening article here, [MSG: Is This Silent Killer Lurking in Your Kitchen Cabinets?](#)

Minimize or avoid foods high in tryptophan

Take Methylfolate, methylcobalamin, betaine and MSM (another methyl donating supplement).

23andMe Gene Testing

Over 923,000 SNP's are tested at 23andme. Below is a list of some of the gene snps that it can uncover and detect for you , honestly, you get your money's worth. When you scan this list, it looks like some kind of error message that might pop up on your computer screen, lol! It may look intimidating, but trained doctors are able to interpret this rather quickly. And if you want to do it yourself, there's a service offered called "Genetic Genie" and here's the website <http://geneticgenie.org> After you receive your 23andMe results back, you can visit this website, and plug your results in, and get your free methylation and/or detoxification profile.

MTHFR C677T, MTHFR A1298C, MTHFR P39P, MTHFR R594Q, MTHFR rs1021737

SHMT C1420T (has a 9% no call)

AHCY 01, AHCY 02, AHCY 19

CBS C699T, CBS A360A, CBS N212N, CBS I278T

VDR Bsm, VDR Taq

MAO A R297R

ACAT 1-02

COMT V158M, COMT H62H, COMT -61 P199P

MTRR A66G, MTRR H595Y, MTRR K350A, MTRR R415T, MTRR A664A

MTR A2756G

BHMT 02, BHMT 04, BHMT 08

23andme tests for 31 CFTR genes

GSTM1 rs12068997, GSTM1 rs4147565, GSTM1 rs4147567, GSTM1 rs4147568, GSTM1 r1056806, GSTM1 rs12562055, GSTM1 rs2239892

APOE rs429358

CTH S4031

GSTP1 A114V, GSTP1 I105V

NAT1 A560G, NAT1 C190T

NAT2 A803G, NAT2 T341C, NAT2 G590A, NAT2 G191A, NAT2 G857A

SOD2 A16V

IL-13 (IgE) C112T

GTSM3 (IgG) GTSM3

3 genes in the HLA region that are linked to Selective IgA deficiency

Factor II

FVL

2 HLA genes related to Mold/ Pollen/ Hay Fever

Other common Lab Values Tied to MTHFR Mutations

I've built this section primarily for doctors who are familiar with specialized testing, from Doctor's Data, Genova/Metametrix, Vitamin Diagnostics, etc. You might see the following in a patient with a MTHFR defect, but it's not a given:

Elevated histamine

Elevated UMFA

Elevated folic acid or folinic acid

Low 5-MTHF

High ammonia (or symptoms of that, ie brain fog, strange 'smell')

Low glutathione

Normal to elevated homocysteine

Digestive problems galore

Low 5-HIAA

Elevated FIGLU

Reduced Histidine

Reduced Homovanilate

Explore your DNA with your family. Now 20% off on all additional kits.

Summary

Testing is recommended, even if it is just to determine which MTHFR variant you have (C677T which is associated more frequently with cardiovascular problems, or the A1298C which is associated with more neurological/cognitive problems)... it's important to know what you're dealing with. Testing for these can occur with most of the common, popular labs.

Gene testing can detect MTHFR enzyme and other enzyme defects, it is a more thorough analysis. It is slightly more expensive, but it gives you a lot more information. The test is done via saliva. It frightens some people because they think they will get the disease, but really your genes are just a picture of the potential. Your genes guarantee nothing, it is your environment, personal outlook, exercise regimen, lifestyle and dietary choices that determine more than a particular gene. (Please please do not go surgically remove your body part if you happen to have a high risk for breast cancer, or testicular cancer, or pancreatic cancer, etc etc..) Genes are just switches, they can be turned on and off with your lifestyle.

Empower yourself by understanding how you can literally turn on and off genes by how you perceive the environment. Read Dr. Bruce Lipton's book called *The Biology of Belief* or watch his video for free, on YouTube called "The New Biology, Where Mind and Matter Meet." I personally met Dr. Lipton in California in 2010 (at the Harmony Festival) and interviewed him after he published "Spontaneous Evolution", you can watch our video here (ignore the music in the background) because this video is important and he will tell you why your beliefs, and attitudes about life literally change the chemistry of your blood... how when you're in love, or when you're stressed out... how all that controls the chemistry of your blood and as a result controls your genes. He even talks about terminally ill patients who have a spontaneous remission, he says it is possible. Watch here. We are not victims to our genes!

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