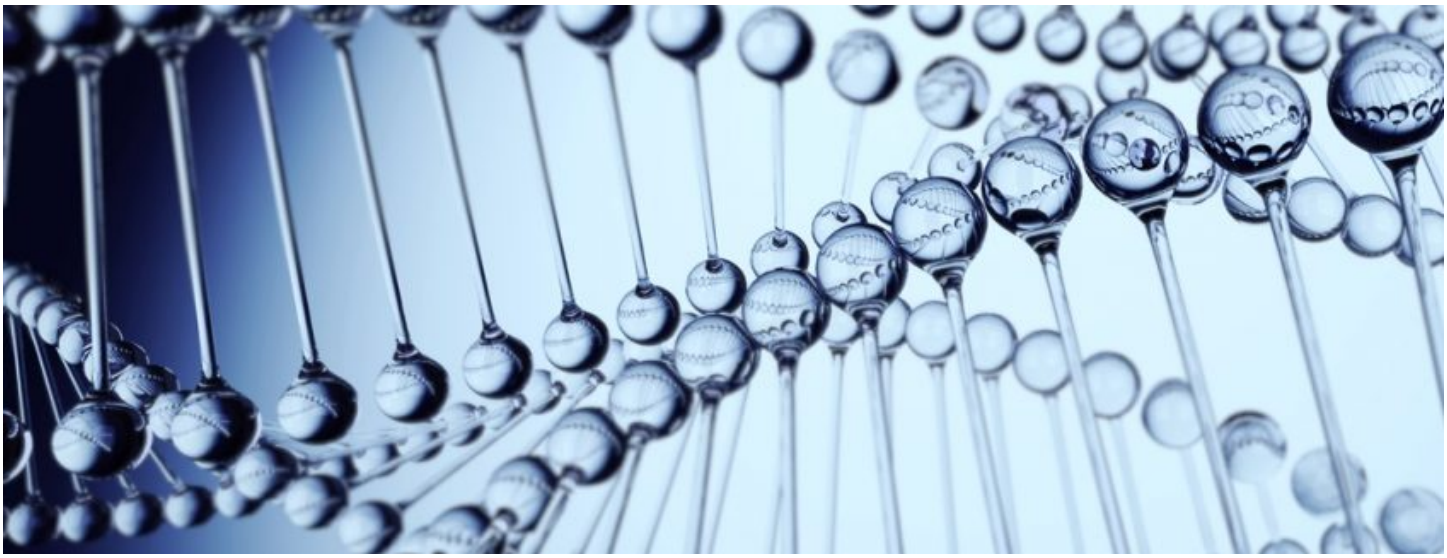
How Genetics Affects Detoxification

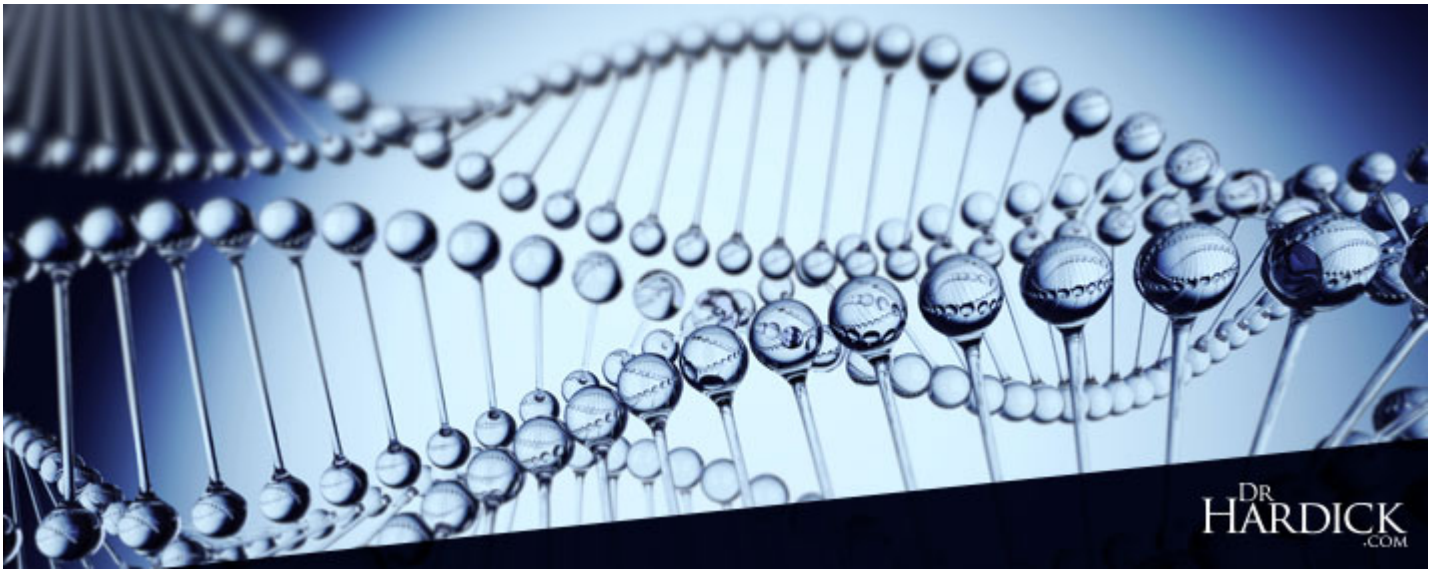
Methylation by Dr. Hardick

Dr. B.J. Hardick — Read time: 11 minutes



The Relationship Between Genetics and Detox (Its's all about Methylation!)

November 16, 2016/2 Comments/in Detox and Cleansing /by Dr. B.J. Hardick



As you probably know, I believe that regular detoxification is one of the most important health practices any North American should consider. Our increased need to detox is an unfortunate sign of the times. More than 100,000 chemicals are now found in our foods, drugs, personal products and everyday items, with about 1,000 new ones introduced every year. (1) The latest *Centers for Disease Control and Prevention* (CDC) National Report on Human Exposure to Environmental Chemicals (2015) tested for 265 different industrial chemicals and found increasingly worrisome levels in our blood and urine. (2, 3, 4) The role these chemicals play in multiple forms of cancer is well documented.

As we've said many times, "genes load the gun — environment pulls the trigger." But, is it possible that we sometimes place unbalanced attention on the environment, and not the genes? We **do** know that genetics plays a role in one's ability to detoxify, specifically, through methylation.

What is Methylation?

Even if we eat well, exercise, and try to manage our stress, our detoxification systems are very challenged to keep up, if not completely overwhelmed. One of the body's main detoxification pathways is methylation, and this can be affected by a genetic mutation called MTHFR.

Perhaps you have heard of methylation or MTHFR, but it's very likely that, if you've studied this in any depth, your brain may have collapsed under the weight of highly technical biochemical explanations. Let's simplify.

MTHFR is short for **methylenetetrahydrofolate reductase**, an enzyme that plays key roles in your body's processing of amino acids and folate (vitamin B9), as well as other biochemical pathways. **Methylation is critical for gene expression.** Although your genes never change, they can become active or inactive, flipped on or flipped off (through epigenetics), and this is achieved via **methyl groups**. Methyl groups (a carbon atom attached to three hydrogens) are the body's messengers, jumpstarting reactions such as turning on a gene or activating an enzyme.

Methyl groups attach to DNA like charms on a charm bracelet. Dysfunctional methylation may result in the silencing of beneficial genes or the expression of detrimental ones, wreaking all sorts of havoc on the body.

Impaired methylation is a factor in cardiovascular disease (5), cancer (6, 7), diabetes, asthma, chronic miscarriage (8), neurological disorders including Alzheimer's and multiple sclerosis (9), and autism. (10) The science is still in its infancy, but evidence suggests these mutations play roles in a staggering number of diseases—MTHFR.net lists 64 thus far. (11)

Methylation is required for effective detoxification. Our bodies, especially our livers, use methylation to convert toxins into water-soluble compounds so they can be excreted. When these toxins build up in our tissues—heavy metals for example—our risk for cancer and other serious health problems ramps up. ***Therefore, you can see how any mutation in the MTHFR gene could create a serious weakness in one's body when it comes to detoxification–and many other vital health functions.***

12 Facts about MTHFR

1. MTHFR is an enzyme used in an important biochemical process called methylation. The MTHFR gene produces the MTHFR enzyme, but genetic mutations can inhibit this

gene's function. Estimates vary, but it's believed that **40 to 60 percent of the general population has one or more MTHFR mutations**.

2. Methylation converts folate and folic acid into the active or "methylated" form your body can use: methylfolate or 5-MTHF.
3. Methylation requires adequate vitamin B12 in its methylated form, methylcobalamin. *This is one more reason why Vitamin B12 is so vital to your health–specifically detox.*
4. Methylation is involved in more than 200 enzymatic reactions and occurs billions of times per second in our cells, contributing to detoxification, DNA repair, energy production, mood balancing, glutathione production, and control of inflammation.
5. In addition to folate and other deficiencies, **MTHFR mutations may contribute to elevated homocysteine** levels because methylation is required for converting homocysteine into methionine.
6. ***Elevated homocysteine can damage your blood vessels*** *and increase your risk for coronary artery disease.*
7. Individuals with MTHFR mutations may have problems detoxifying, therefore may benefit from increased detoxification support.
8. Not everyone with MTHFR mutations is compromised. Other factors come into play such as diet and lifestyle, toxic exposures, stress management, and other genetic and epigenetic factors. The good news is, MTHFR testing is now available (read further).
9. MTHFR plays a critical role in folate metabolism, which has implications for every process in your body that relies on folate (vitamin B9)–of which there are many.
10. ***Folic acid is a widely used synthetic version of folate and should be avoided.*** Many people are unable to convert folic acid into folate—particularly those with MTHFR mutations. Recent studies link folic acid in processed foods and supplements to various forms of cancer. (12, 13, 14)
11. Whether or not you have MTHFR mutations, the best dietary approach is to consume plenty of naturally folate-rich foods. Folate comes from the word foliage (think "leafy greens").
12. If your diet is good but your folate level remains low, you might benefit from supplementing with the methylated form of folate, and possibly methylated B12 as well.

Sorting Out Folic Acid, Folate and Folinic Acid

In order to appreciate the importance of the roles folate and methylation play in your health, you must first understand the basic differences between folate, folic acid and folinic acid.

Folate:

Folate is the natural form of vitamin B9 found in foods, especially vegetables and legumes. Folate is required by your body during rapid cell division and is essential for normal growth and development and proper nerve and brain function.

Folinic Acid:

Folinic acid is another form of vitamin B9 occurring naturally in foods, which is stable, metabolically active, and does not require enzymatic conversion in your body. Folinic acid is especially supportive of DNA base production, so it's beneficial when cell turnover and DNA production demands are high, such as when repairing gut lining or regenerating skin and hair. There are some reports that folinic acid supplementation helps mitigate hair loss during chemotherapy.

Folic Acid:

Unlike folate and folinic acid, folic acid is a synthetic compound used in low quality supplements and fortified foods such as breads, cereals, pasta and "enriched" flour. Recent studies suggest folic acid may be harmful in the high levels people are consuming today, *particularly in people with MTHFR mutations who lack the ability to convert it to folate*. Unconverted folic acid attaches itself to the same receptors the body uses to absorb folate, effectively blocking folate absorption.

MTHFR in Plain English

Genetics is a profound science, but it need not be complicated, for the sake of this article.

Genomic mapping has revealed there are about 25,000 genes in the human organism, all interacting in complicated and often mysterious ways. We have a variety of genetic mutations that influence our health, also termed polymorphisms, defects or variations. It's still a matter of debate as to how these genetic variations can be "managed" to optimize health on a day to day basis. We now know that our DNA is continuously changing, in terms of genes being flipped on and off.

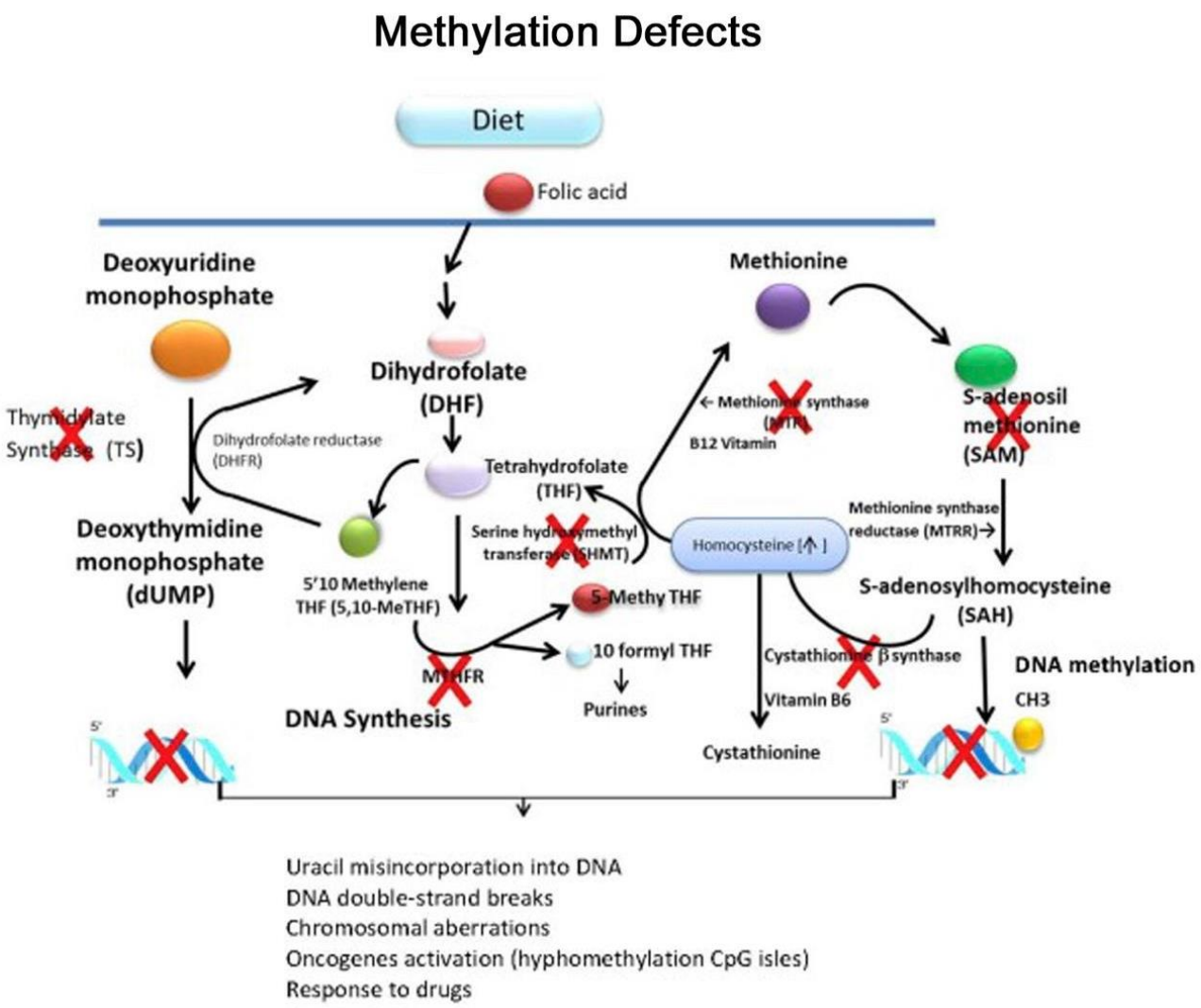
When it comes to the MTHFR gene, there are about 30 known mutations, but two are particularly well-studied: C677T and A1298C. These number-letter designations are known as SNPs (snips). (15, 16) You can think of SNPs as sort of a genetic "latitude and longitude"—in other words, they are codes pinpointing the location of an abnormality in your genetic sequence. This is important because the MTHFR gene is made up of 20,373 base pairs. The numbers represent the base pair position and the letters represent the allele, or the place on the chromosome where the gene occurs.

MTHFR mutations are classified as heterozygous or homozygous. In genetics, hetero- and homo- refer to the two alleles on the gene. If you have just one mutant allele on the MTHFR gene, you're said to have a heterozygous mutation. If you have two copies of the same mutant allele, you have a homozygous mutation. Some people even have a "compound heterozygous," which consists of one mutant allele on two base positions.

The number and types of mutations help determine how strongly you will be affected. Heterozygous MTHFR mutations seem to have only minor influences on health, whereas homozygous mutations are more significant, for example:

- Individuals with homozygous C677T mutations tend to have significantly lower folate levels than those with heterozygous C677T.
- Those with homozygous or compound heterozygous mutations are more likely to have elevated homocysteine levels (and therefore have higher cardiovascular risk).
- Homozygous MTHFR mutations are thought to inhibit MTHFR enzyme function by as much as 70 percent. (17)

It's important to reiterate that having a mutation does not necessarily mean you will develop a disease. There are mitigating factors such as diet, lifestyle, stress, and other factors that enter into the mix. We DO know that if you have a MTHFR mutation **and** your diet is low in folate, you are more likely to develop folate deficiency than someone with the same mutation who gets plenty of folate in their diet.



Source: http://doccarnahan.blogspot.ca/2013/05/mthfr-gene-mutation-whats-big-deal.html

How would I summarize this chart? Fundamentally, any methylation defect (due to an MTHFR mutation, or lack of Vitamin B12, or anything marked by an "X") can lead to chromosomal aberrations, DNA damage, oncogene activation and other problems that can interfere with normal physiological function.

Methylation Keeps Your Homocysteine in Check

One of the more serious consequences of having compromised methylation is elevated homocysteine levels. **The amount of homocysteine in your blood is one of the best overall predictors of your health and longevity**, and methylation is critical for keeping those levels low–which is what you want. When methylation underperforms, homocysteine levels rise, and this increases your risk for just about every chronic health condition, including cancer.

Homocysteine is a key amino acid because, through methylation, it gets converted into health-promoting compounds such as glutathione and methionine. Glutathione is your master antioxidant, and methionine is used to make proteins, utilize antioxidants, and process fats. When homocysteine conversion is compromised, rising blood levels can lead to accelerated aging, arterial damage, pain and inflammation, weakened immune defenses and cognitive decline.

Normal homocysteine levels are between 5.0 and 15.0 micromoles per liter of blood (μmol/L). However, studies show that even within that range, each increase of 5.0 μmol/L raises your heart attack risk by 20 percent. (18, 19, 20)

MTHFR Genetic Testing and B Vitamin Supplementation

If you suspect you might have a methylation problem, you may want to consider genetic testing. Genetic testing is a personal choice. Perhaps you have low folate levels in spite of a good diet, or your homocysteine levels are mysteriously rising. Genetic testing is not the end-all, be-all, but it may provide one more piece of the puzzle.

MTHFR testing can be done using blood, saliva or an oral swab. Dr. Lynch of MTHFR.net recommends genetic testing through 23andme with StrateGene, which not only tells you about your MTHFR gene but also identifies many additional genetic markers that may be helpful toward gaining a more complete picture of your health. (21)

Alternately, you can try supplementation with the methylated forms of folate and possibly B12 (methylfolate and methylcobalamin). Start slowly so your body will begin detoxifying *gradually*. If your eyes glaze over when you see all the different forms of folate—methylfolate, 5-methyltetrahydrofolate, 5-MTHF, L-5-MTHF and the like—you might want to watch Dr. Lynch's video on the subject (below), as well as his article about managing side effects. (22)

Simple Strategies to Outsmart MTHFR Defects

The following suggestions apply regardless of whether or not you have a methylation defect. The body is a complex biochemical machine, so the more strategies you can implement, the better. *For more information about MTHFR protocols, refer to MTHFR.net.* (23)

- Consume a whole foods diet, preferably organic and non-GMO, that incorporates naturally folate-rich foods. Some of the best sources of folate are asparagus, spinach, turnip greens, broccoli, beets, bok choy, cauliflower, parsley, liver, and legumes, especially lentils, garbanzos and pinto beans. (24)
- Read labels carefully to make sure your food products and supplements contain only folate and folinic acid, *not folic acid*. Avoid "enriched" or "fortified" foods which almost universally have folic acid added.
- Minimize consumption of processed foods, sugar, and health-damaging fats such as vegetable oils. Excess dietary sugar is known to raise homocysteine levels.
- Avoid alcohol, caffeine, and smoking.
- Avoid as many toxic exposures as possible. Use natural, eco friendly personal care, cleaning, and gardening products.
- Make a comprehensive detoxification plan. Implement a variety of detox therapies such as sweating and infrared saunas, Epsom salt baths, dry skin brushing, regular exercise, and juice fasts. For more detox suggestions, review my ebook *Real Detox*.
- Avoid medications that interfere with methylation pathways. Examples include oral contraceptives, proton pump inhibitors, certain antibiotics, ibuprofen, and ACE inhibitors. (25)
- Manage your stress.

- Optimize your sleep.

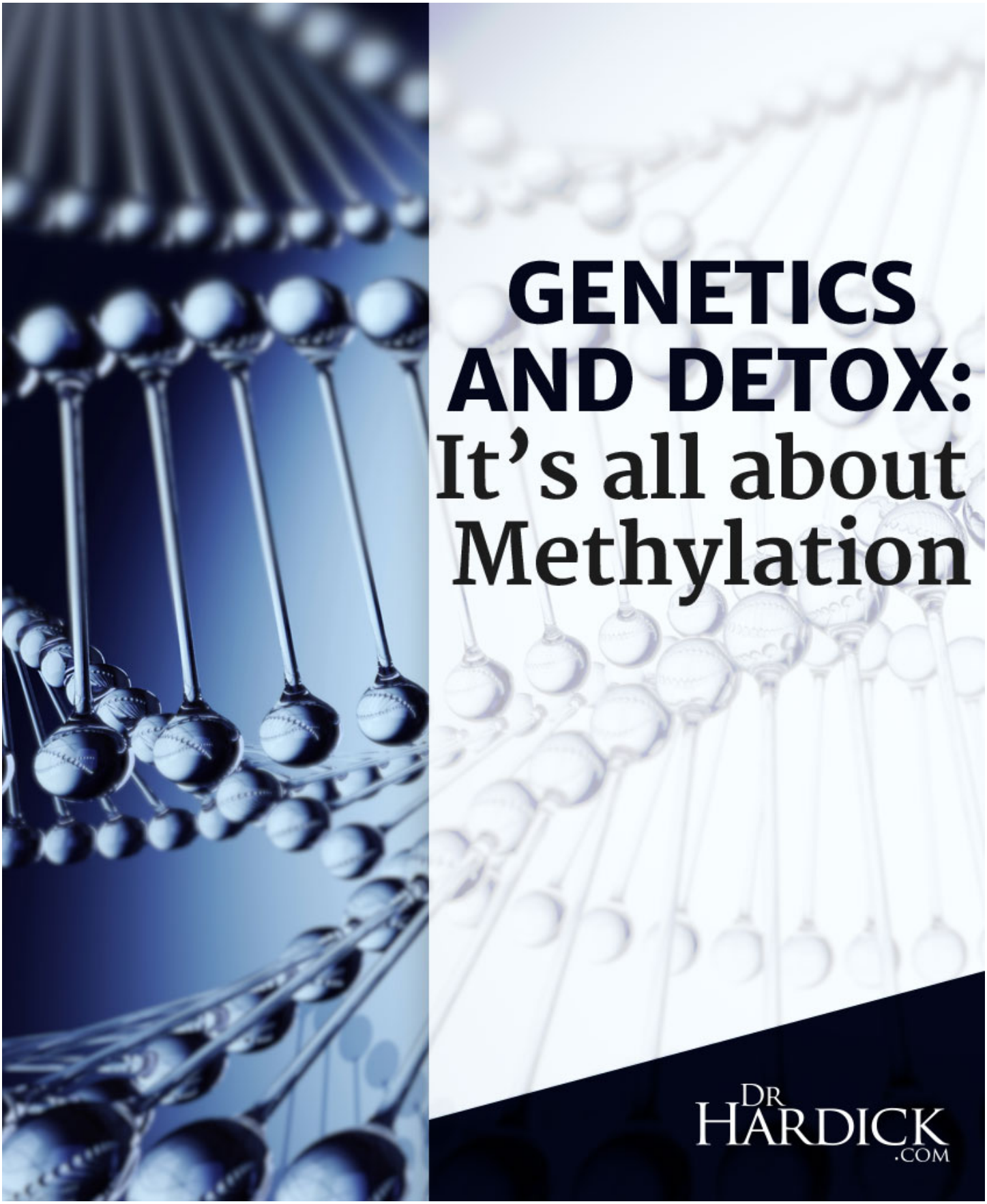
Several More MTHFR Resources

As modern science shines new light on how our health is influenced by our genetics, it may seem like human physiology just keeps getting more and more complicated, and to a degree this is true. However, this new understanding of MTHFR helps us fill in few more pieces of the puzzle, such as why some individuals struggle with detox more than others–and this gives us something to work with. Rest assured, the holistic health community is more committed than ever before to working on that Big Puzzle–and figure it out–for our collective good.

For more information on MTHFR, the following resources are worth a look:

- net Website devoted to current research on MTHFR, Dr. Ben Lynch
- Interview with Dr. Lynch on Wellness Mama, “Methylation Problems & Gene Mutations”
- Guide to Understanding the MTHFR Gene, NIH Genetics Home Reference
- Autism: Pathways to Recovery, Dr. Amy Yasko, downloadable book that includes comprehensive discussion of methylation and how MTHFR mutations and other genetics influence health; excellent resource for autism, but goes far beyond that disorder.

Do not use the information on this website or in Dr. Hardick’s seminars to diagnose or treat a health problem or disease, or to determine your need for medication or treatment. Always consult your healthcare professional before adjusting any diet, exercise or medical regimens. Nothing contained in this website should be considered complete or instructional for medical diagnosis or treatment. Click here to read the complete disclaimer.


GENETICS
AND DETOX:
It's all about
Methylation
DR
HARDICK
.COM

I do not like the fact they suggest 23andme for genetic testing in this article, and I don't know enough about StratGene to comment on it either.

Another thing I would have liked to have seen in this article; they got it right that 40-60% of the US population has at least one of these mutations, but they neglected to state that it's prevalent in 80-90% of the autism community.

Also, it's the C677T variant that's especially critical in women, it's known as a blood clotting disorder (and this gene is responsible for so many miscarriages in women, especially those who take folic acid and not Folate during pregnancy).

(Comments from a person who has a MTHFR genetic mutation.)

About Dr. B.J. Hardick

Dr. B.J. Hardick is a Doctor of Chiropractic and internationally-recognized natural health author and speaker. His health journey began as a child — alternative medicine is the only medicine he has ever known. In 2009, he authored his first book, Maximized Living Nutrition Plans. In 2018, he authored his second book, Align Your Health. An energizing and passionate speaker, Dr. Hardick shares his lifestyle methods to numerous professional and public audiences every year in the United States and Canada. His teachings encompass the principles of ancestral nutrition, detoxification, functional fitness, mindfulness, and green living. Learn More

https://www.drhardick.com/wp-content/uploads/2016/11/FeatIMG_Genetics-Detox-and-Methylation-e1479322937916.jpg 873 1031 Dr. B.J. Hardick https://www.drhardick.com/wp-content/uploads/2018/07/ximg_DrHardick_logo.png.pagespeed.ic_.oNZjRcGWRC.png Dr. B.J. Hardick2016-11-16 22:02:072018-05-02 15:43:56The Relationship Between Genetics and Detox (Its's all about Methylation!)

You might also like

Grain-Free Chocolate Cupcakes   Almond Flour Lemon Bars

Scroll to top