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# Health Hunters Newsletter

A service of Riordan Clinic, cofounded in 1975 by Olive W. Garvey and Hugh D. Riordan. The Riordan Clinic is a not-for-profit 501(c)(3) corporation. Go to [www.riordanclinic.org](http://www.riordanclinic.org) to make your tax deductible donation today or visit us at 3100 N. Hillside, Wichita, KS 67219.



## Depressed? Anxious? You are Not Alone



AUTHOR

Anne Zauderer, DC

*The New Research Behind How Methylation Affects Mental Health*

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Riordan Clinic is a not-for-profit 501(c)(3), nutrition-based health facility in Wichita, Kansas. We have integrated lifestyle and nutrition to help you find the underlying causes of your illness. Since our inception in 1975, the mission has been clear and unwavering to "...stimulate an epidemic of health."

I'm about to blow your mind. Quite literally, change the way you think. A bold statement, I know. However, the concepts I'm going to present have the power to change how you approach the emotions you have and help you feel better than you've ever felt before.



Each of us has grown up viewing the world from a particular perspective. We were not always aware that our perspective might be very different from everyone else's. **A fish that swims in blue water doesn't know it's in blue water because that's the way it's always been!** The perspective we have is influenced by all of the relationships and experiences we have in life. However, the other half of that equation, that most people are not aware of, is that our biochemistry

also has a profound impact on our life perspective. This conversation speaks to the old debate in psychology of nature versus nurture. Are we more influenced by how we were raised or by our genetics? The answer, of course, is we are influenced by both. (This is why identical twins, who have the same genetics, can turn out very differently.) In this article I want to help bridge the gap between nature and nurture to help explain a process in the body where the two biochemically intertwine: **methylation**.

Methylation is a biochemical process in the body that happens in every single cell and is therefore happening over a million times every second. It is a process by which the body transfers methyl groups (CH<sub>3</sub>) from one substrate to another. It is the transferring of these methyl groups that, in essence, turns the methylation cycle. You can think about the methylation cycle as a large gear that is turning. There are other gears that fit into the sprockets of the "methylation gear." How fast the methylation gear is turning affects how fast other biochemical gears are turning (such as detoxification gears, neurotransmitter/mood gears, and folate reduction gears). Therefore, **how we methylate affects how we emotionally feel, how we detoxify, and even how our DNA works!** When this system slows down or speeds up, it can have a profound impact on us.

Why would this system go awry?

### Epigenetics

With a basic understanding of genetics, we know that DNA is not easily changed. It takes many, many generations to change the "hard wiring" of our DNA. In the same way, we also know that certain genetic conditions that are built into the DNA cannot be changed, such as having an extra chromosome in Down Syndrome. However, experience teaches us that because of our family history we may be at a much greater

"Depressed? Anxious? You Are Not Alone" continues on page 2...

## Contact the Editor

Please send any comments or suggestions to [newseditor@riordanclinic.org](mailto:newseditor@riordanclinic.org).

Thank you for reading,



**Dr. Anne Zauderer**  
Editor

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*"Depressed? Anxious? You are Not Alone" continued from page 1...*

risk for certain diseases. For example, if you are a woman whose mother had breast cancer, you have a twofold risk of developing breast cancer in your lifetime. This increased risk that you possess is due to **epi-genetic** changes.



The prefix “epi-“ means “above” or “outside of.” When we talk about **epigenetics**, we are referring to the **translation of the DNA code** rather than the DNA itself. If DNA is a code, then epigenetic proteins are responsible for translating that code to build enzymes and proteins in the body. What’s amazing is that these proteins are heavily influenced by our environment. The body can turn on or turn off these proteins based on the needs of the body. This mechanism allows the body to quickly adapt to an ever-changing environment.

One other epigenetic phenomenon to note is that sometimes the proteins responsible for translating our DNA make mistakes. These mistakes are called **single nucleotide polymorphisms (SNPs)**. When these errors occur, there are small changes in the production of enzymes, which affect their function. When our enzymes don’t work optimally, our biochemistry doesn’t work optimally. So, what is one of the biggest biochemical processes that these SNPs affect? You guessed it .... Methylation!

To review in basic terms – because of our environment, our DNA is not getting translated correctly and we have developed errors in the enzymes that regulate methylation. When methylation goes awry, we can develop:

- Depression
- Anxiety
- Diabetes
- Fibromyalgia/Chronic Fatigue Syndrome
- Cancer
- Addictive Behavior (such as alcoholism)
- Insomnia
- Autism or Down Syndrome
- Frequent miscarriages
- Bipolar or manic depression
- Allergies and/or chemical sensitivities
- Atherosclerosis
- Spina Bifida, cleft palate, and/or neural tube defects
- Autoimmune Disorders
- Hashimoto’s or Hypothyroidism
- ADD or ADHD
- Dementia/Alzheimer’s
- Schizophrenia
- Neuropathy
- Anorexia
- Chronic viral infections
- .... and more!

This is the connection between how we feel and our biochemistry. If we are not methylating correctly, our body will not be able to produce our neurotransmitters in adequate amounts and we will feel depressed or anxious.

Have you ever had the experience of feeling depressed or anxious, but when you try to think of a reason you feel that way, you can’t come up with one? Or another scenario: if we feel anxious, our brain looks for a reason why we are feeling that way. We assume it must be our job, our kids, our spouse ... etc. Or maybe we have felt that way our whole life and we just assume that is the way we are supposed to feel? In reality, it’s our neurochemistry that is altered and has influenced how we perceive the world.

*"Depressed? Anxious? You are Not Alone" continues on page 3...*

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Dr. William Walsh, one of the foremost experts in methylation, has reported some interesting statistics based on his 30 years of experience.

98% of people with autism are under-methylated  
95% of people with anti-social personality disorder ("sociopaths") are under-methylated  
90% of people with schizoaffective disorder are under-methylated  
85% of people with oppositional defiance disorder (ODD) are under-methylated  
82% of people with anorexia are under-methylated  
38% of people with depression are under-methylated

64% of people with panic attacks are over-methylated  
52% of people with paranoid schizophrenia are over-methylated  
28% of people with ADHD are over-methylated  
23% of people with behavior disorders are over-methylated  
18% of people with depression are over-methylated



Up to this point, I've painted a pretty bleak picture. If it is epigenetic changes that make us the way we are, do we have the ability to ever get well? YES!! This is the punch line of the whole article .... Remember when I said that when we have SNPs (small errors) in our enzymes it decreases the function of those enzymes and that is

what changes our biochemistry (i.e. under-methylated or over-methylated)? Well, those enzymes have co-factors that help them work more efficiently. Those co-factors can, essentially, help make up for the weaknesses in those enzymes. What are co-factors, you ask? **NUTRIENTS!!** All of the vitamins and minerals we take act as co-factors for our enzymes and make them work better!

Therefore, depression is not a Prozac deficiency, but rather a lack of key nutrients. Taking drugs does not address the root cause of the issue. By taking the right nutrients, in the right doses, you can affect your biochemistry and help prevent or lessen the symptoms of all of the conditions listed above. The key is: knowing which nutrients you need and taking them in the right doses to balance your methylation.

Some of the most important nutrients to do this are: magnesium, B12, B6, zinc, B9, selenium, glutathione, phosphatylserine, phosphatylcholine, taurine and methionine. However, as I mentioned, the key is balance. Not everyone needs all of these nutrients, and, if taken incorrectly, they can actually do more harm than good.

To be able to properly balance your methylation, it is recommended that you test for your individual SNPs through a screening test (such as a 23andMe genetic test) as well as test your individual nutrient levels (such as the Methylation Panel through the BioCenter Laboratory) and then consult with a doctor who can help walk you through the process of replenishing the correct nutrients.



There is hope for feeling better without drugs! It just takes the right nutrients in the right doses to make it happen.

If you are interested in how methylation affects your mood, **join Dr. Ron Hunninghake and Dr. Anne Zauderer for a FREE lunch and lecture on November 16 at noon.**

Please email [reservations@riordanclinic.org](mailto:reservations@riordanclinic.org) or call 316.682.3100 to reserve your spot today!

## Kale Salad With Apples and Cheddar

Leafy greens are an excellent source of natural folate, which supports methylation in the body. Add two hard-boiled eggs to this salad to provide half of your daily source of choline, which is also a great methyl support!

### INGREDIENTS

4 cups very finely chopped or slivered curly kale or Russian kale (about 6 ounces on the stem, or half of a 3/4-pound bunch, stemmed and washed in two rinses of water)

2 tablespoons coarsely chopped toasted almonds

1 apple, sweet, like a Fuji, or a sweet-tart, like a Gala, Braeburn or Pink Lady, cored and cut in 1/4-inch dice

1 ounce sharp Cheddar cheese, cut in 1/4-inch dice

2 tablespoons fresh lemon juice

Salt to taste

1 very small garlic clove, puréed

5 tablespoons extra virgin olive oil

2 tablespoons freshly grated Parmesan

### PREPARATION

1. Combine the kale, almonds, apple and Cheddar in a large bowl.
2. Whisk together the lemon juice, salt, garlic and olive oil. Add to the salad, and toss well. Sprinkle the Parmesan over the top, and serve.

Source: <http://cooking.nytimes.com/recipes/1013732-kale-salad-with-apples-and-cheddar>



Photo: Andrew Scrivani for The New York Times

# Upcoming Events

November 11th  
12pm – 1pm

## Yoga in the Pyramid

Susan LeVine, certified Yoga Therapist, will be teaching a yoga class in the pyramid at the Riordan Clinic, Wichita campus. Susan has a gift of leading yoga that is tailored toward the individual and that can be done by all experience levels. Come over your lunch break and enjoy an invigorating session! Cost is \$10. Reservations can be made by calling 316-682-3100 or emailing: [reservations@riordanclinic.org](mailto:reservations@riordanclinic.org).

November 16th  
12pm - 1pm

## FREE\* Lunch and Lecture – Correcting the Molecular Basis of Depression and Anxiety

Join us at the Riordan Clinic, Wichita campus to discuss with Dr. Ron and Dr. Anne how your mood and emotions are influenced by a process in the body called methylation. They will discuss how the power of the right nutrients in the right doses can have a profound impact on this process and improve how you feel.

\*Complimentary light refreshments will be served

December 1st  
7pm – 8pm

## Evening Lecture – Give Thanks for Your Gut

Hosted by GreenAcres Market (Kansas City), Dr. Nia will be speaking about the importance of gut health and how that affects the progression of many chronic diseases.

Please see [www.riordanclinic.org](http://www.riordanclinic.org) for more information

# 7 Facts About Depression That Will Blow You Away



AUTHOR

Kelly Brogan, MD



*Adapted from A Mind of Your Own  
by Kelly Brogan, MD*

and take a fresh look at where science is leading us. The human body interacts in its environment with deep intelligence. Your body creates symptoms for a reason. Depression is a meaningful symptom of a mismatch, biologically, with lifestyle—we eat a poor diet, harbor too much stress, lack sufficient physical movement, deprive ourselves of natural sunlight, expose ourselves to environmental toxicants, and take too many drugs. Inflammation is the language that the body speaks, expressing imbalance, inviting change. We usually suppress these symptoms with medication but that is like turning off the smoke alarm when you have a fire going on. Let's get the facts straight:

## 1. Depression is often an inflammatory condition

Depression is often a manifestation of irregularities in the body that often starts far away from the brain and is not associated with so-called “chemical imbalances.” The medical literature has emphasized the role of inflammation in mental illness for more than twenty years (unfortunately, it takes an average of 17 years for the data that exposes inefficacy and/or a signal of harm, to trickle down into your doctor's daily routine; a time lag problem that makes medicine's standard of care “evidence-based” only in theory and not practice). Not a single study has proven that depression is caused by a chemical imbalance in the brain. That's right: there has never been a human study that successfully links low serotonin levels and depression. Imaging studies, blood and urine tests, post-mortem suicide assessments, and even animal research have never validated the link between neurotransmitter levels and depression. In other words, the serotonin theory of depression is a total myth that has been unjustly supported by the manipulation of data. Much to the contrary, high serotonin levels have been linked to a range of problems, including schizophrenia and autism. So if you think a chemical pill can save, cure, or “correct” you, you're dead wrong. That is about as misguided as putting a bandage over a nail stuck in your foot and taking aspirin. It's absolutely missing an opportunity to “remove the splinter” and resolve the problem from the source.

## 2. Antidepressants have the potential to irreversibly disable the body's natural healing mechanisms

Despite what you've been led to believe, antidepressants have repeatedly been shown

A silent tragedy in the history of modern health care is happening right now in America, but no one is talking about it. We have been told a story of depression: that it is caused by a chemical imbalance and cured by a chemical fix—a prescription. More than 30 million of us take antidepressants, including one in seven women (one in four women of reproductive age). Millions more are tempted to try them to end chronic, unyielding distress, irritability, and emotional “offness”—trapped by an exhausting inner agitation they can't shake.

It is time, even according to leaders in the field, to let go of this false narrative

*“7 Facts About Depression That Will Blow You Away” continues on page 5...*

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in long-term scientific studies to worsen the course of mental illness—to say nothing of the risks of liver damage, bleeding, weight gain, sexual dysfunction, and reduced cognitive function they entail. The dirtiest little secret of all is the fact that antidepressants are among the most difficult drugs to taper from, more so than alcohol and opiates. While you might call it “going through withdrawal,” we medical professionals have been instructed to call it “discontinuation syndrome,” which can be characterized by fiercely debilitating physical and psychological reactions. Moreover, antidepressants have a well-established history of causing violent side effects, including suicide and homicide. In fact, five of the top 10 most violence-inducing drugs have been found to be antidepressants.

### 3. The effect of antidepressants is not a cure

Even if we accepted the proposition that these drugs are helpful for some people (82% of which is due to the placebo effect according to Dr. Irving Kirsch), extrapolating a medical cause from this observation would be akin to saying that shyness is caused by a deficiency of alcohol, or that headaches are caused by a lack of codeine. And what about a genetic vulnerability? Is there such thing as a depression gene? In 2003, a study published in *Science* suggested that those with genetic variation in their serotonin transporter were three times more likely to be depressed. But six years later this idea was wiped out by a meta-analysis of 14,000 patients published in the *Journal of the American Medical Association* that denied such an association.

### 4. Most prescriptions for antidepressants are doled out by family doctors—not psychiatrists

Seven percent of all visits to a primary care doctor end with an antidepressant and almost three-quarters of the prescriptions are written without a specific diagnosis. What’s more, when the Department of Mental Health at Johns Hopkins Bloomberg School of Public Health did its own examination into the prevalence of mental disorders, it found that most people who take antidepressants never meet the medical criteria for a bona fide diagnosis of major depression, and many who are given antidepressants for things like OCD, panic disorder, social phobia, and anxiety also don’t qualify as actually having these conditions.

### 5. Many physical conditions mimic psychiatric symptoms

Many different physical conditions create psychiatric symptoms but aren’t themselves “psychiatric.” Two prime examples: dysfunctioning thyroid and blood sugar chaos. We think (because our doctors think) that we need to “cure” the brain, but in reality we need to look at the whole body’s ecosystem: intestinal health, hormonal interactions, the immune system and autoimmune disorders, blood sugar balance, and toxicant exposure.

### 6. Basic lifestyle interventions can facilitate the body’s powerful self-healing mechanisms to end depression

Dietary modifications (more healthy fats and less sugar, dairy, and gluten); natural supplements like B vitamins and probiotics that don’t require a prescription and can even be delivered through certain foods; minimizing exposures to biology-disrupting toxicants like fluoride in tap water, chemicals in common drugs like Tylenol and statins, and fragrances in cosmetics; harnessing the power of sufficient sleep and physical movement; and behavioral techniques aimed at promoting the relaxation response.

### 7. Depression is a message and an opportunity

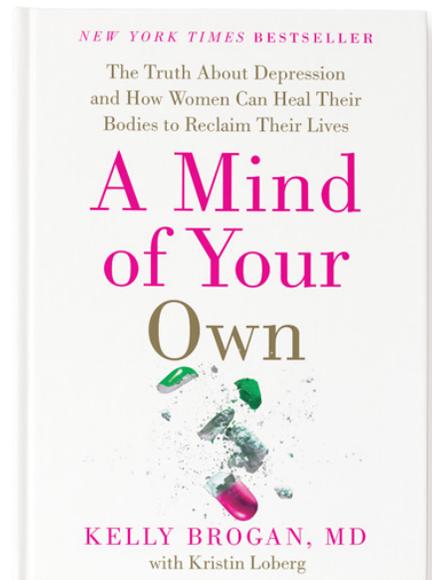
It’s a sign for us to stop and figure out what’s causing our imbalance rather than just masking, suppressing, or rerouting the symptoms. It’s a chance to choose a new story, to engage in radical transformation, to say yes to a different life experience.

Join the revolution. Find out more in ***A Mind of Your Own: How Women Can Heal Their Bodies to Reclaim Their Lives.***

*Kelly Brogan, MD, is a Manhattan-based holistic women’s health psychiatrist, author of the book, A Mind of Your Own, and co-editor of the landmark textbook, Integrative Therapies for Depression. She completed her psychiatric training and fellowship at NYU Medical Center after graduating from Cornell University Medical College, and has a B.S. from MIT in Systems Neuroscience. She is board certified in psychiatry, psychosomatic medicine, and integrative holistic medicine, and is specialized in a root-cause resolution approach to psychiatric syndromes and symptoms. She is a mother of two.*

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# Yoga Therapy and Pain Management



**AUTHOR**

Susan LeVine,  
*Certified Yoga Therapist*

Yoga therapy is a wonderful modality for pain management that uses a wide range of mind/body practices, from postural and breathing exercises to deep relaxation and meditation. These practices are tailored to the needs of the individual. Yoga is not a “one size fits all” approach to optimum wellness.

Yoga therapy has recently emerged as a valuable profession. It is extremely useful in situations where medical treatment alone is not working such as: back pain, insomnia, anxiety and high blood pressure. It has become especially popular for musculoskeletal issues like back pain, sciatica, and shoulder, neck and hip pain. It can reduce pain by strengthening weak muscles and stretching tight ones. The mindful practice of yoga can increase body awareness and reduce postural maladaptive patterns.

“Back pain is more likely to be persistent when comorbid psychosocial distress is present. Research on yoga for psychological health is growing, with promising evidence of benefit for depression. Neuroanatomical studies have linked longitudinal yoga practice to increased thickness of cortical gray matter in brain areas associated with enhanced pain tolerance....Yoga has even demonstrated to increase levels of neurotransmitters in the brain such as GABA.”(1)

Sometimes people get stuck in a “pain cycle” where they think and talk of nothing else. This becomes a thought groove in their minds and a meditation on pain. The brain responds to these thought patterns by creating more pain receptors. The pain can become worse, and the person becomes more anxious and depressed.

By teaching the mind to focus on something other than the pain, new thought grooves are established in the mind. The person can cope better in the moment, and also “change their mind” in the long term. This change in thinking is possible for people of any

*"Yoga Therapy and Pain Management" continues on page 7...*

# Using Real Health to Alleviate Anxiety: A Co-Learner's Journey



**AUTHOR**

Erin Manning,  
*Riordan Clinic Co-Learner*

What I have discovered as a patient of the Riordan Clinic has literally changed my life and the dynamic of my whole family.



Although I have never struggled with chronic illness or physical health, I battled crippling depression and anxiety for more than a decade. As a young mom I was miserable. I was torn between being in love with my tiny little miracles and at the same time feeling bitter, sad and overwhelmed. It was so much more than just postpartum depression.

My husband was confused and felt helpless as he watched me cycle through emotions. I went to see a wonderful doctor who put me on a medication for anxiety. It helped. For a long time, it helped. It never quite resolved it but I felt like I was more able to control myself. But for years it was a battle. It was a battle to force my behavior. It was a battle to make myself take medication that I didn't want to because I just wanted to be myself. It was a battle to know that my kids were growing up with an unpredictable mom that sometimes yelled so much that everyone in the house was crying – even me! My life was inconsistent and I still felt like I had very little control. Even with medication my anxiety and mood changes were better but definitely still rocky.

I worked hard to keep these emotions out of my professional life and away from my coworkers. Which made it that much harder when I got home. It was like the vault I had been storing it all up in was opened up every night. My husband dealt with the worst of it. He saw me crying, rocking on the floor, scratching at my own skin trying to get some of the anxiousness out. He saw me yo-yo between happy-go-lucky and stark raving mad. It was really hard and I felt like such a failure. And the whole time, I was on anti-anxiety meds.

Then in 2013 I had my first lab testing at the Riordan Clinic. Our goal was just to check it out and see if I needed to modify my diet and/or supplement my general nutrition. I had no idea that what we would discover would soon set me free of prescription meds, and more importantly the anxiety, indefinitely.



We discovered that my Vitamin D and Vitamin B12 levels were barely registering on the graph. Dr. Mead immediately started me on high doses of both, including weekly injections of B12 and daily oral supplementation. I also focused on making sure I added Vitamin C every day.

A couple of weeks went by and I was feeling calmer. I wasn't so sleepy in the afternoons and my overall mood was more consistent. A few more months and I felt like a whole new person. Not a different person because for the first time in my adult life I felt like ME. Like the heavy, wet blanket of anxiety that was causing me to work through a fog of hurt

*"Using Real Health to Alleviate Anxiety: A Co-Learner's Journey" continues on page 7...*

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and confusion was lifted off of me and what was left was just plain ol' me. And plain ol' me was able to handle the daily ups and downs of life without panicking. And soon I would realize the connection between balancing my nutrient levels and balancing my mood.

Three years later and I have never refilled my anti-anxiety prescription. I take my vitamins regularly and know that when I'm going to be in an increased situation (i.e. traveling or in a busy, new environment) I need to be even more diligent in not missing a day or maybe even take a little more. I still feel anxious but now it's at appropriate times and I'm able to stop and breathe and work my way through it.

If someone would have told me that I could be completely rid of the anxiety attacks, depression and erratic behavior I probably wouldn't have believed them. But now when I'm filling out forms and they ask about medical history I don't even check that little "anxiety" box because that's not who I am anymore. Now I'm just... me. Happy, whole, healthy. Not a forced version of it but... REAL HEALTH.

I am so thankful that what started as a curious desire to check my nutrient levels turned into a life changing realization. The take away is that something is causing your anxiety. Instead of trying to mask what it is, find it and correct it! For me, It was Vitamin D and B12. For you it could be something different. Dr Ron asked me once what the most important vitamin was. The answer? The one that you are deficient in!! Call. Get tested. Let yourself hope. There is a better way... find it.

## Nutrient Spotlight

### Zinc 30

Zinc is a very important trace mineral that functions in over 100 different enzymes systems in the brain alone. Zinc picolinate is a highly absorbable form of this mineral. It is a co-factor in biochemical reactions and is necessary for the synthesis of DNA and RNA. Zinc protects the cellular membrane and is important in cellular growth. It commonly affects the hair, skin and gastrointestinal system. It is one of the most commonly deficient minerals in the body.



Highly Absorbable

### B Complex

Containing Vitamins B6 and B12, B Complex provides a full-complement of essential nutrients in high potency amounts. Inclusion of L-5-methyltetrahydrofolate (L-5-MTHF, a bioactive form of folate), ensures more immediate effects on metabolism than folic acid, the form of folate commonly used in fortified foods and supplements. As the only form of folate that crosses the blood-brain barrier, L-5-MTHF is especially useful for supporting methylation pathways. Activated vitamin B12 as methylcobalamin enhances B12 absorption and bioavailability.



Easy to Swallow Capsules

age if there is willingness to try and to practice. Recent research on the brain supports the hopeful possibilities of the neuroplasticity of the brain. In plain English, it's never too late to teach an old dog new tricks.

Yoga therapy is tailored to the individual. The therapist is trained to evaluate and assess what will be just right for the situation, and to provide empowering support to the client. He or she does not diagnose or treat conditions, but rather assesses the whole person, and provides education on yogic techniques that will optimize health. In yoga therapy, the client is the expert, and the therapist helps them connect with the wisdom of their own bodies and minds.

It is crucial to work with a qualified yoga therapist, because you are entrusting them with your body, mind and spirit. For more information, and to find a qualified therapist, go to The International Association of Yoga Therapists website ([iayt.org](http://iayt.org)).

1. *The Principles and Practices of Yoga in Health Care*, by Sat Bir Sing Khalsa, Lorenzo Cohen, Timothy McCall and Shirley Telles, Handspring Publishing, LTD, 2016.

Susan LeVine has been teaching Yoga for over 22 years and is a Certified Yoga Therapist. She is also certified to teach Shambhava Yoga™ Asana and Shambhava Yoga™ Meditation.

She is director of Yoga for You, a Yoga and Meditation Center where she teaches Yoga Movement Therapy Classes, which are held by appointment, or on the public class schedule. She cares deeply about her clients, and hopes to help each one to find the joy of their own Yoga. Contact Susan for more information or to schedule an appointment! 316.644.3944 or go to [www.creativeyogasolutions.com](http://www.creativeyogasolutions.com)

**Susan LeVine will be teaching a yoga class in the pyramid at the Riordan Clinic, Wichita campus on November 11th from noon – 1pm. Come over your lunch break and enjoy an invigorating session! Cost is \$10. Reservations can be made by calling 316-682-3100 or emailing: [reservations@riordanclinic.org](mailto:reservations@riordanclinic.org).**

# Methylation for Beginners



**AUTHOR**

Charles Hinshaw, MD  
Director of Bio-Center  
Laboratory

## Why Nutrient Levels Need to Be Tested

Methylation describes the addition of a methyl group to a substrate with the purpose of making another substance. This begs the question, what is a methyl group? A methyl group consists of a carbon atom (C) to which three hydrogen atoms (H) are attached: thus CH<sub>3</sub>, the chemical expression of methyl. The process of adding to or taking away a methyl group is critical in cellular metabolism, and in fact, occurs in every cell in human beings, billions of times every second.

Methylation is needed to keep all cells in good working condition. There are many examples that illustrate the importance of methylation, such as:

1. If the “feel good,” antidepressant brain chemical serotonin is not methylated, it will become inactive, which in turn leads to depression.
2. When the essential amino acid methionine is used to methylate proteins and DNA, a secondary amino acid is produced, homocysteine. Homocysteine is an amino acid that is a well-recognized independent cardiovascular risk factor, and must be methylated itself to convert back to methionine.
3. Methylation of certain parts of your DNA can switch off unnecessary genes and prevent abnormal DNA division and cancer development.

Fortunately, rather than worrying about complex biochemical pathways, the status of methylation can be evaluated by testing the levels of key, essential nutrients necessary for normal methylation. Patterns of specific deficiencies are indicative of impaired methylation and can be used for initial diagnosis, confirmation and follow-up. When deficiencies are recognized, supplementation with the appropriate nutrients can correct the impaired methylation pathways and thereby relieve symptoms. As medical knowledge continues to improve and grow, correction of impaired methylation related to DNA defects, either hereditary or acquired (SNPs), will also be added to the armamentarium of treatment methodologies.

The BioCenter Laboratory at the Riordan Clinic offers a comprehensive Methylation Panel that evaluates key nutrients that are needed for optimal methylation. Included in the panel are:

Coenzyme Q10	Vitamin B2
Glutathione-RBC	Vitamin B6
Histamine	Magnesium
Homocysteine	Copper
B12	Zinc
Folate	Urinary Pyrroles

**SALE!**

**On special for the month of November!**  
**~~\$1079~~ \$701**

## Research at the Riordan Clinic

### High-Dose Intravenous Vitamin C Treatment of a Child with Neurofibromatosis Type 1 and Optic Pathway Glioma: A Case Report

Nina Mikirova, Ronald  
Hunnunghake, Ruth C. Scimeca,  
Charles C. Hinshaw, Faryal Ali,  
Chris Brannon, Neil Riordan

**Objective:** Unusual clinical course

**Background:** In neurofibromatosis type 1 (NF1) disease, the loss of the tumor suppressor function of the neurofibromin gene leads to proliferation of neural tumors. In children, the most frequently identified tumor is the optic pathway glioma.

**Case Report:** We describe the case of a 5-year-old child who was diagnosed with NF1 and optic pathway tumor onset at the age of 14 months. Because of the tumor progression, chemotherapy with carboplatin and vincristine was prescribed at this early age and continued for one year. As the progression of disease continued after chemotherapy, the child, at the age of 2.8 years, was started on high-dose intravenous vitamin C (IVC) treatment (7–15 grams per week) for 30 months. After 30 months, the results of IVC treatments demonstrated reduction and stabilization of the tumors in the optic chiasm, hypothalamus, and left optic nerve according to radiographic imaging. The right-sided optic nerve mass seen before IVC treatment disappeared by the end of the treatment.

**Conclusions:** This case highlights the positive effects of treating NF1 glioma with IVC. Additional studies are necessary to evaluate the role of high-dose IVC in glioma treatment.

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