



METHYLATION ADAPTOGENS

How to balance your methylation support program to avoid excessive methylation and optimize long-term health outcomes

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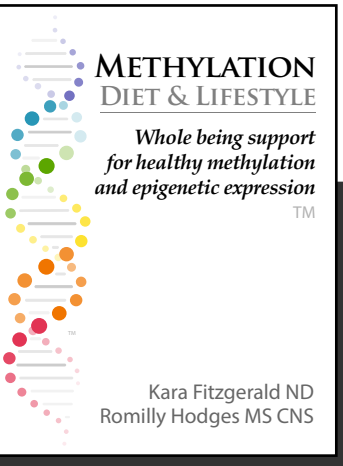

Methylation 101 (A Recap for Those Already in the Know)

Methylation is one of those foundational biochemical processes that occurs in every human cell ALL the time. It's very fundamental and very wide-reaching. Awareness of the importance of methylation has increased for a number of reasons, including:

1. The well-established effects of methylation deficiency on birth defects. That's why many foods are fortified with folic acid, a synthetic nutrient that increases methylation activity.

2. The established link between elevated homocysteine levels, an indicator of methylation insufficiency, and heart disease risk.

3. The increased use of MTHFR gene testing. The MTHFR gene codes for an enzyme that activates folate and folic acid so that it can be used to support methylation activity. Specific MTHFR gene variations are associated with increased risk for many diseases including autism, depression, fertility issues, insomnia, thyroid disease and much more.

At a basic level, methylation involves the formation of methyl (CH_3) groups on proteins in the body. There are two kinds of methylation activity we need to think about:

1. **Metabolic methylation:** Methylation that helps either form or degrade biologically active proteins. Those that are formed through methylation include neurotransmitters, DNA bases, immune cells, Coenzyme Q10, and phospholipids. Those that are degraded using methylation include stress hormones, toxins, estrogens and histamine.

2. **DNA methylation:** Methylation that is attached to specific sections of DNA that then *regulates* the expression of genes. This is what epigenetics is—that layer that sits 'on top' of our genes and determines how they are used. For the most part, more DNA methylation turns genes OFF, and less methylation turns genes ON. Yes—your genes are NOT your destiny; diet and environment alter epigenetic programming which in turn alters gene expression!

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When we "push" methylation activity in the body with high-dose supplemental folate and B12, key nutrients in the formation of methyl-donating compounds, we are doing a lot to prevent methylation deficiency. But (and this is a big BUT), we are not yet taking care to ensure that methylation activity is BALANCED. That is—that we don't enter a state of excess methylation.

Understanding the Risks of Excess Methylation

This is where our understanding of epigenetics and DNA methylation becomes critical. Sometimes it is helpful to limit the expression of certain genes through methylation, such as genes that over-activate immune cells in autoimmunity (e.g. CD70) or genes that inhibit proper bone formation and density (e.g. SOST). But extra methylation is not uniformly beneficial: increased methylation on tumor suppressor and DNA repair genes can turn those genes OFF, increasing the risk for cancers. In fact, DNA demethylating agents are an important part of our cancer-fighting pharmaceutical toolkit. The need for balance makes methylation adaptogens essential in any methylation-support program.

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What is a Methylation Adaptogen?

The term adaptogen, most often used in botanical medicine, refers to a plant-based compound that promotes 'balance' within a biochemical pathway. Adrenal adaptogens, for example, are commonly used for stress balance and can support both underactive as well as overactive adrenal activity. It's a little bit like using a thermostat in your home: when temperature rises above the desired level, the thermostat turns off the heat to bring the temperature down. When temperatures fall too low, the thermostat signals the heating to kick in and raise the temperature. Adaptogens are both gentle and powerfully effective!

Certain natural compounds act as adaptogens for DNA methylation, both promoting appropriate methylation and reducing inappropriate methylation. In short, these epigenetic remodelers act to reduce the risk of entering a state of excess or inappropriate DNA methylation that can have negative health outcomes. Pushing methylation activity *without* this kind of balance is potentially risky and irresponsible.

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Here are some examples of methylation adaptogens: anthocyanins, apigenin, betanin, biochaninA, caffeic acid, chlorogenic acid, coumaric acid, curcumin, daidzein, ellagic acid, EGCG, genistein, lycopene, myricetin, naringenin, quercetin, rosmarinic acid, and sulforaphane. If you haven't heard of all of these, don't worry. These are bioactive phytonutrients (plant compounds) that are found directly in the foods we eat (or should eat!). Actually, eating a diet that is high in varied and colorful plant foods goes a LONG way towards supplying your body with these amazing molecules.

Eat Your Methylation Adaptogens!

Real foods are some of the best sources of methylation adaptogens. Here are some of our favorites:

Cruciferous Vegetables: Cruciferous veggies are rich in sulforaphane as well as folates. To increase cruciferous vegetables in your diet, choose from arugula, broccoli, bok choy, Brussels sprouts, cabbage, cauliflower, horseradish, kale, kohlrabi, radish, rutabaga, wasabi and watercress.

Berries: Berries are high in many methylation adaptogens including anthocyanins, cholorogenic acid, ellagic acid and quercetin. Choose a variety of different berries, including blackberries, blackcurrants, blueberries, raspberries, and strawberries. We love berries by themselves (have you ever closed your eyes, popped a berry in your mouth and mindfully enjoyed the taste sensation that berries truly are?), in smoothies, and also in a home-made (low sugar) chia jam.

Turmeric: Turmeric's active methylation adaptogen is curcumin, which is widely-known for its many beneficial health effects and shown to be an effective methylation adaptogen. Curcumin is a common ingredient in curry spices and is also available on its own. Combine turmeric with black pepper in your cooking for increased absorption. You can

also try our recipe for Turmeric-Pickled Daikon, which includes both curcumin and sulforaphane, as well as beneficial probiotics that also help regulate DNA expression.

Shiitake mushrooms: You may already know of the anti-cancer benefits of *Lentinus edodes*, otherwise known as the shiitake mushroom. Shiitake mushrooms are demonstrated DNA methylation adaptogens and can also reduce serum homocysteine levels. Win-win!

Rosemary: One of the main active constituents of rosemary is the methylation adaptogen, rosmarinic acid. Fresh or dried rosemary makes a delicious addition to your cooking—we love it to flavor roasted vegetables, in stews and casseroles, and even as a tea. We've included a bonus Rosemary-Lemon Tea recipe (adding naringenin from lemon) for you below!

Can you get your other essential methylation-related nutrients from food?

Yes, it's easy to pop a supplement and think you're covered, but you can get so much more from taking those nutrients in through food. For example, if you choose 1 cup of lightly-cooked broccoli you are not only getting around 170 mcg of folate (nearly half of the daily recommended intake), you are also getting a boost of complementary sulforaphane to ensure that the methylation activity you just supported stays in balance.

Bonus Recipe! Rosemary-Lemon Tea

Ingredients:

- 2 sprigs of fresh organic rosemary
- 1-2 pieces of organic lemon rind (use your peeler for this)
- 1 tsp honey, coconut palm sugar or stevia (optional)
- 1 cup boiling water

Remove the rosemary needles from their stem. You can easily do this by gripping the end that they are pointing towards and slowing pulling back along the stem in the opposite direction. Crush the rosemary needles in a mortar and pestle. Place the rosemary, lemon rind and sweetener in a large mug. Cover with boiling water and let steep for 5-10 minutes. Enjoy!

For a comprehensive resource on optimal methylation support, see the eBook Methylation Diet & Lifestyle.