Methyl-Aide

VitaAid® Professional Therapeutics

Comprehensive Support for Methylation Cycle & Collateral Pathways | VA-132

Key Features:

- Active P5P, 5-MTHF, methylcobalamin & betaine to **enhance methylation with MTHFR insufficiency**
- Essential minerals, vitamins & taurine to **support the collateral metabolic pathways** of the methylation cycle and **reduce the symptoms caused by the metabolic overload** from methylation enhancement, such as anxiety, sulfite sensitivity, histamine intolerance & allergic reactions, insomnia & fatigue, GI Upset, and memory decline.

Description:

Methylation is one of the most important biochemical reactions in the human body. It is involved in **DNA turnover, neurotransmitter synthesis and reduction, detoxification, and tissue regeneration.** Therefore, dysfunction in methylation can result in a collection of symptoms or conditions, such as mental/mood disorders, neurological disorders, cardiovascular disease, and cancers.

However, when we enhance solely the methylation cycle, all of the collateral pathways *[Figure 1]* will be upregulated and require more supplementation of cofactors. Failure to address the whole picture can overload the collateral pathways and worsen the symptoms.

Methyl-Aide is a comprehensive formula developed from this concept, by providing the active methyl-donors (ie. 5-MTHF, methylcobalamin, betaine) and essential cofactors of the collateral pathways (ie. Cu, Mg, Mo, Zn, and vitamins B1-6).

Quantity: 84 Vegetarian Capsules

Ingredients (per 2 capsules):

Vitamin B1 (from thiamine HCl)	50 mg
Vitamin B2 (from riboflavin-5'-phosphate)	30 mg
Niacinamide	100 mg
Vitamin B5 (from calcium d-pantothenate)	150 mg
Vitamin B6 (from calcium pyridoxal-5'-phosphate)	40 mg
5-MTHF (from calcium 5-methylfolate)	1000 mcg
Vitamin B12 (methylcobalamin)	1000 mcg
Copper (from copper bisglycinate)	500 mcg
Magnesium (from magnesium bisglycinate)	90 mg
Molybdenum (from molybdenum glycinate)	150 mcg
Zinc (from zinc bisglycinate)	10 mg
*Taurine	200 mg
*Betaine Anhydrous	200 mg

***Other Ingredients:** Silicon dioxide, L-Leucine, pullulan/hypromellose (capsule)

Suggested Use: Adults - Take 1-2 capsules with food, 2-3 times a day, or as directed by your health care practitioner. Take a few hours before or after taking other medications.

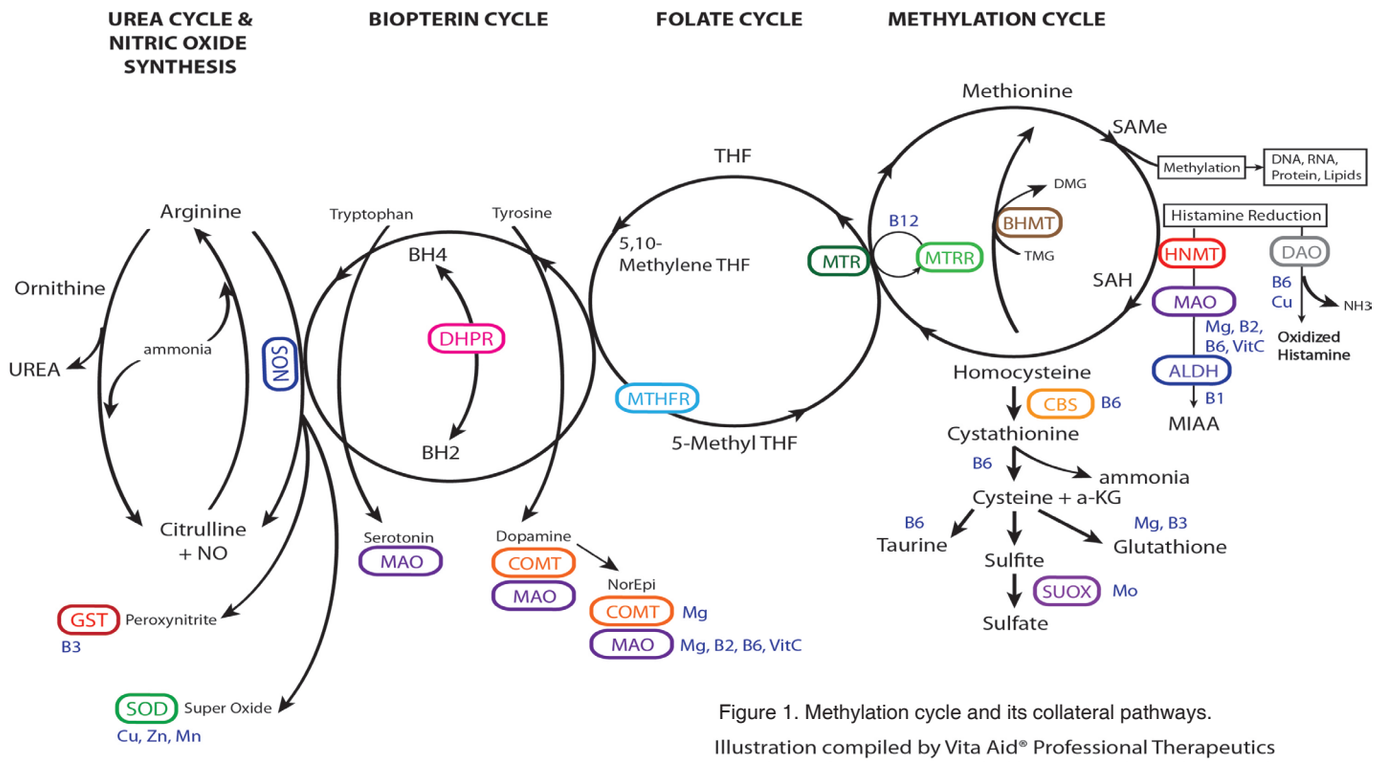

Figure 1. Methylation cycle and its collateral pathways.

Illustration compiled by Vita Aid® Professional Therapeutics
Based on information provided by © Neurological Research Institute

MTHFR Dysfunction

MTHFR (5,10-methylenetetrahydrofolate reductase) is **the rate-limiting enzyme in the folate cycle that catalyzes reduction of 5,10-methylene tetrahydrofolate to 5-methyl tetrahydrofolate (5-MTHF),** the major active form of folate in the plasma. **Active 5-MTHF with other methyl-donors (ie. methylcobalamin, betaine) feeds into and drives the methylation cycle.**

MTHFR mutations (A1298C or/and C677T) are one of the most common causes of insufficient methylation. The most direct outcome of MTHFR dysfunction is hyperhomocysteinemia, which is an independent risk factor for cardiovascular diseases.[1] Other conditions involved are ADHD, cancers (eg. breast, prostate, colon, and brain), anxiety, depression, schizophrenia, etc.

Collateral Metabolic Pathways

The folate and methylation cycles are closely related to other important collateral metabolic pathways ***[Figure 1]*** that include **sulfite, histamine, COMT, MAO, GST (glutathione S-transferase), and SOD (superoxide dismutase).**

When these 2 cycles are enhanced by the methyl-donors (ie. 5-MTHF, methylcobalamin, betaine), it creates additional metabolites for the collateral pathways and potentially depletes the vitamins and minerals involved. The most common negative reactions from unsupported collateral pathways may include agitation & anxiety, sulfite sensitivity, histamine intolerance & allergic reactions, insomnia & fatigue, GI Upset, and memory decline.

Sulfite Metabolism via Sulfite Oxidase (SUOX)

Cofactors Required: Mo

Enhanced methylation can increase homocysteine production. Homocysteine is either metabolized into cysteine to make glutathione and taurine (involving Mg, B3, B6) or **converted into "sulfite", the toxic form of sulfur**. Sulfite requires **molybdenum (Mo) as a cofactor in SUOX** to be converted into **sulfate** – the beneficial form of sulfur.

Patients with unsupported sulfite metabolism may experience symptoms of sulfite sensitivities, such as asthma attack, allergic rhinitis, hives and swollen eyes, and anaphylaxis (rarely).

Sulfite is widely used as a food preservative and commonly found in dried fruits & vegetables, canned fruits & vegetables, beer/cider/wine, fruit and vegetable juices, cereal, and sugar syrups.

Neurostransmitter Metabolism (COMT, MAO)

Cofactors Required: B2, B6, Vit C, Mg

Enhanced methylation would increase activity of the biopterin cycle and consequently increase the output of catecholamines (ie. epinephrine and norepinephrine), and, without nutrient support in Catechol-O-Methyltransferase (COMT) and Monoamine Oxidase (MAO), could **cause anxiety and agitation.**

COMT and MAO work together to metabolize neurotransmitters such as histamine, dopamine, norepinephrine, and serotonin.

Histamine Reduction

Cofactors Required: B1, B6, Cu, Mg, Vit C

Histamine plays 3 major roles in the body: immune response (via IgE antibodies), neurotransmitter (increase wakefulness[2]), and promoting stomach acid secretion.[3]

Histamine is metabolized by 3 major enzymatic pathways:

1. **histamine-N-methyltransferase (HNMT)** – responsible for histamine metabolism in the central nervous system (CNS); requires SAMe.
2. **diamine oxidase (DAO)** – requires Vitamin B6 and Copper; works outside the CNS.
3. **monoamine oxidase (MAO)** – requires vitamin B6, magnesium, and vitamin C; works inside the CNS.

Enhanced methylation increases methyl-histamine via HNMT, and can consequently **overload the MAO, especially when MAO also needs to process the increased catecholamines and serotonin from biopterin cycle.** Therefore, it is important to supply cofactors for all 3 histamine reduction pathways.

Anti-Oxidative Capacity

Cofactors Required: Cu, Mn, Zn, B3

Nitric oxide (NO) synthesis is upregulated via the **biopterin cycle** as the methylation cycle is enhanced. The superoxide radicals from NO synthesis then can increase the nutrient demand in SOD and GST pathways.

Glutathione-S-Transferase (GST) is the enzyme that catalyzes the reduction of oxidized glutathione (GS-SG ==> 2x GSH) – restoring glutathione to its active form.

Superoxide Dismutase (SOD) utilizes copper, zinc, or manganese as its cofactors depending on its types (ie. 1 to 3) and locations (ie. cytoplasm, mitochondria, and extracellular). It converts radicalized O2 to the less active H2O2.

Taurine

Taurine supports patients intolerant to magnesium via its actions on membrane stabilization and calcium signaling modulation.[4,5] Magnesium, in sensitive individuals, can disrupt the membrane potential and cellular signaling and cause symptoms such as syncope, dysrhythmia, mania, and agitation. Taurine is also a mitochondrial antioxidant to neutralize increased reactive oxygen species from enhanced methylation.

Reference:

1. Brosnan JT, Jacobs RL, Stead LM, Brosnan ME. Methylation demand: a key determinant of homocysteine metabolism. Acta Biochim Pol. (2004); 51(2): 405-13.
2. Alvarez EO. The role of histamine on cognition. Behavioural Brain Research (2009). 199(2): 183-9.
3. Schubert ML. Gastric secretion. Curr Opin Gastroenterol (2014); 30(6): 578-82.
4. Murakami S. Role of taurine in the pathogenesis of obesity. Mol Nutr Food Res. (2015); 59(7): 1353-63.
5. Stout C, Charles A. Modulation of intercellular calcium signaling in astrocytes by extracellular calcium and magnesium. Glia. (2003); 43(3): 265-73.

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