Modism

VA-098 / VA-949

VitaAiD Professional Therapeutics

Supports Neurological Development Via Methylation Cycle & The Collateral Pathways

Key Features:

- With **key cofactors of multiple metabolic pathways** implicated in the clinical presentations of ASD & ADHD.
- **Supports the collateral metabolic pathways** of the methylation cycle and **reduce the symptoms of metabolic overload** from methylation enhancement.
- The inclusion of ***S. boulardii* helps to support the gut flora** in cases of opportunistic bacteria overgrowth, particularly ***Clostridium spp.*** and ***Candida albicans.***

Indication:

Support the neurological development of patients with attention deficit hyperactivity disorder (ADHD), autism spectrum disorders (ASD), and other neurological disorders.

Description:

Modism is a comprehensive formula designed to **support multiple biochemical pathways of neurotransmitters and metabolic intermediates, enhance antioxidant capacity** and **help restore healthy microbiota;** all of which have been implicated in the clinical presentations of autism spectrum disorders (ASD) and ADHD.

1) Methylation Pathway (MTHFR)

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.

MTHFR polymorphisms (A1298C or/and C677T) are one of the most common causes of insufficient methylation. Conditions involving MTHFR dysfunction may include cardiovascular diseases, ASD, ADHD, cancers (eg. breast, prostate, colon, and brain), anxiety, depression, and schizophrenia. Both **C677T and A1298C, in particular, have been shown closely associated with ASD**[1] and **ADHD** [9]**.**

Active 5-MTHF with other methyl-donors (ie. methyl-cobalamin, betaine) can be used to feed into and drive the methylation cycle.

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. With already compromised metabolism of several neurotransmitters, **unsupported collateral pathways may further amplify the symptoms of ASD and ADHD.**

Serving Size: 1 scoop (4.2 g)
42 servings per container

Ingredients (per scoop):

Vitamin B1 (from thiamine HCl)	10 mg
Vitamin B2 (from riboflavin-5'-phosphate)	10 mg
Vitamin B3 (Niacinamide)	25 mg
Vitamin B6 (from calcium pyridoxal-5'-phosphate)	25 mg
5-MTHF (from calcium 5-methylfolate)	250 mcg
Vitamin B12 (methylcobalamin)	250 mcg
Vitamin D3 (cholecalciferol) (12.5 mcg)	500 IU
Magnesium (from magnesium citrate)	125 mg
Molybdenum (from molybdenum glycinate)	200 mcg
Copper (from copper bisglycinate)	200 mcg
Zinc (from zinc gluconate)	6 mg
Taurine	200 mg
Betaine Anhydrous	400 mg
Saccharomyces boulardii	5 billion cfu

Other Ingredients: Silicon dioxide, erythritol, citric acid, stevia, natural passion fruit flavor

Suggested Use: Take 1 scoop, 1-2 times daily, away from other medications, or as directed by your health care practitioner.

2) Catecholamine Metabolism (COMT, MAO)

Cofactors Required: B2, B6, Vit C, Mg

Catechol-O-Methyltransferase (COMT) and Monoamine Oxidase (MAO) work together to metabolize neurotransmitters such as histamine, dopamine, norepinephrine, and serotonin.

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 COMT and MAO, could **worsen anxiety, agitation, and aggression in ASD & ADHD patients.**

3) Histamine Reduction (HNMT, DAO, MAO)

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

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

Histaminergic system is implicated in many neurological disorders including Tourette syndrome and

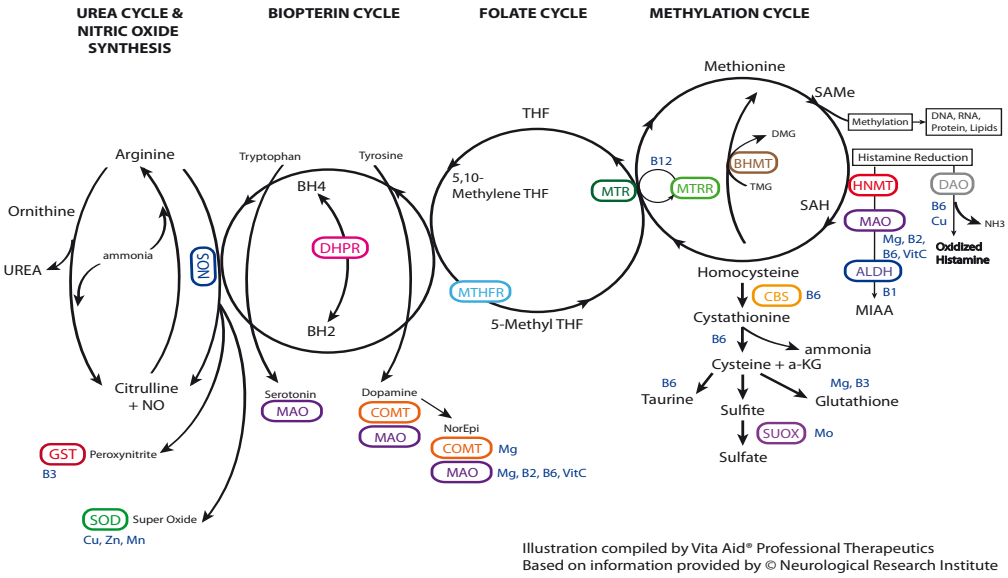

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Figure 1. Methylation cycle and its collateral pathways.

ASD. Therefore, it is important to supply cofactors for all 3 histamine reduction pathways, especially when the methylation cycle is enhanced.

4) Sulfite Metabolism via Sulfite Oxidase (SUOX)

Cofactor 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).

5) Dysbiosis & Autism Spectrum Disorders (ASD)

A growing body of studies has demonstrated a positive correlation between gut dysbiosis, particularly Clostridium and Candida overgrowth [2,3], and ASD. The proposed mechanism is Clostridia's continuous secretions of neurotoxins into the system damaging the neurons and halting normal development. [6] There is also evidence showing the Clostridium overgrowth as the result of environmental glyphosate toxicity, as well as long-term antibiotic use, in autistic toddlers.

Saccharomyces boulardii - a yeast probiotic - is clinically used in treating antibiotic-associated diarrhea caused by Clostridium overgrowth, as well as restoring the gut microbiota from chronic dysbiosis.[8] It is able to neutralize multiple toxins produced by *Clostridium difficile* and *Candida albicans*, as well as inhibit their growth, [7,12] and hence, it may prove to be useful in improving the clinical outcomes of ASD.

6) Anti-Oxidative Capacity & Mitochondrial Support

Cofactors Required: Cu, Mn, Zn, Vitamin B3, Taurine

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. Moreover, ASD patients have been found to have low levels of glutathione and SOD rendering them susceptible to inflammation and toxins. [10,11]

Glutathione-S-Transferase (GST) is the enzyme that, with the help of niacinamide, 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 O_2 to the less active H_2O_2.

Taurine is a potent mitochondrial antioxidant. Mitochondrial dysfunction is commonly implicated in ASD and many other neurological conditions.

The rates of ADHD and ASD have been rising exponentially in the past decade. Both environment and the genetics seem to be at the center of the disease development. Therefore, it is important to address the multi-faceted mechanisms of the ASD and ADHD pathogenesis.

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