

For children with **autism (ASD) or neurodevelopmental disorders**, certain **organic acid markers** are particularly important because they provide insight into **gut health, neurotransmitter imbalances, mitochondrial dysfunction, oxidative stress, and detoxification issues**—all of which are commonly disrupted in ASD.

Key Markers to Focus On:

1. Gut Dysbiosis & Microbial Overgrowth (Strongly Associated with ASD)

- **Arabinose** → High levels suggest **Candida overgrowth**, which is common in ASD and can contribute to hyperactivity, brain fog, and immune dysregulation.
- **HPPHA (3-Hydroxyphenyl-3-hydroxypropionic Acid)** → Elevated in **Clostridia overgrowth**, which affects **dopamine metabolism**, leading to irritability, aggression, and behavior problems.
- **DHPPA (Dihydroxyphenylpropionic Acid)** → A marker for beneficial gut bacteria; imbalances indicate dysbiosis.
- **Tartaric Acid** → Elevated in **fungal overgrowth** (Candida), which can cause mood swings and gut issues.
- **Citramalic Acid** → A **yeast byproduct** that can indicate Candida overgrowth.
- **Benzoic Acid & 4-Hydroxybenzoic Acid** → Bacterial metabolites; abnormal levels suggest **gut dysbiosis**.

2. Neurotransmitter Metabolism (Brain Function & Mood Regulation)

- **HVA (Homovanillic Acid)** → A dopamine metabolite; imbalances may indicate **dopamine dysfunction**, leading to focus and attention issues.
- **VMA (Vanillylmandelic Acid)** → A norepinephrine and epinephrine metabolite; imbalances can affect **fight-or-flight response and anxiety levels**.
- **HVA/VMA Ratio** → High ratios may suggest **dopamine dominance** (aggression, irritability), while low ratios may indicate **low dopamine** (lack of motivation, fatigue, focus issues).
- **5-HIAA (5-Hydroxyindoleacetic Acid)** → A **serotonin metabolite**; low levels are linked to **depression, anxiety, and sleep disturbances** in ASD.
- **Quinolinic Acid** → A neurotoxic **inflammatory metabolite**; high levels are linked to **neuroinflammation and excitotoxicity** (a problem in ASD).

- **Kynurenic Acid** → A protective metabolite; imbalances can indicate **neuroinflammation and glutamate excitotoxicity**.

3. Mitochondrial Function & Energy Production (Commonly Impaired in ASD)

- **Succinic Acid, Fumaric Acid, Malic Acid** → Indicators of **Krebs cycle dysfunction**. Mitochondrial dysfunction is common in ASD and can cause **fatigue, low muscle tone, and brain fog**.
- **Aconitic Acid** → A marker for energy production; low levels suggest **poor mitochondrial efficiency**.
- **Citric Acid** → Essential for mitochondrial function; **low levels indicate metabolic dysfunction**.

4. Oxalate Metabolism (Pain & Gut Health)

- **Oxalic Acid** → High levels can lead to **pain, inflammation, and gut issues** (commonly found in ASD children). Oxalates can interfere with mitochondrial function and cause **calcium-binding issues**.

5. Detoxification & Oxidative Stress (Poor Detox is Common in ASD)

- **Pyroglutamic Acid** → A marker for **glutathione metabolism**. Low levels indicate **poor detoxification and high oxidative stress**, which is common in ASD.
- **2-Hydroxybutyric Acid** → An **early indicator of oxidative stress** and glutathione depletion.
- **Orotic Acid** → Linked to **ammonia detoxification**; high levels suggest liver stress, which is **common in ASD due to impaired detox pathways**.

6. Vitamin & Nutritional Markers (Critical for Brain & Gut Health)


- **Methylmalonic Acid (MMA)** → A marker for **vitamin B12 deficiency**, which is essential for **methylation and brain function**.
- **Pyridoxic Acid (Vitamin B6)** → Low levels affect **neurotransmitter production** (dopamine, serotonin).
- **Pantothenic Acid (Vitamin B5)** → Required for **energy metabolism and stress response**.
- **Biotin (Vitamin B7)** → Important for **gut and neurological health**.


- **Ascorbic Acid (Vitamin C)** → A critical antioxidant; **low levels contribute to oxidative stress.**
- **CoQ10 (Ubiquinone)** → Essential for mitochondrial function and energy; **deficiency is common in ASD.**


7. Fatty Acid Oxidation (Energy Production)


- **Adipic Acid & Suberic Acid** → Indicators of **fatty acid metabolism**; high levels suggest **inefficient fat utilization**, which is often seen in ASD.


Summary:

For **children with autism or neurodevelopmental disorders**, the most critical markers on the OAT are:  **Gut markers** (Arabinose, HPHPA, Tartaric Acid) → Identify yeast and Clostridia overgrowth.

 **Neurotransmitter metabolites** (HVA, VMA, 5-HIAA, Quinolinic Acid) → Evaluate dopamine, serotonin, and neuroinflammation.

 **Mitochondrial markers** (Succinic, Fumaric, Malic Acids) → Assess energy production.

 **Oxalates (Oxalic Acid)** → High levels may contribute to pain, poor mitochondrial function, and gut issues.

 **Detox markers** (Pyroglutamic Acid, 2-Hydroxybutyric Acid) → Determine oxidative stress and glutathione function.

 **Vitamin markers** (MMA, Pyridoxic Acid, Biotin, CoQ10) → Identify essential nutrient deficiencies.

This test helps guide **targeted interventions** using **gut support (probiotics, antifungals)**, **mitochondrial support (CoQ10, B vitamins)**, **neurotransmitter balancing (5-HTP, GABA)**, and **detox strategies (glutathione, N-acetylcysteine)**.