

The **Organic Acid Test (OAT)** is a urine-based test that evaluates metabolic markers related to gut health, mitochondrial function, neurotransmitter metabolism, detoxification, oxidative stress, vitamin and amino acid status, and energy production. Below is an overview of the main categories of markers tested and their definitions:

1. Microbial Metabolites (Dysbiosis Markers)

- **Arabinose** – A marker of yeast (e.g., Candida) overgrowth. High levels indicate excessive yeast fermentation.
- **HPHPA (3-Hydroxyphenyl-3-hydroxypropionic acid)** – A metabolite from Clostridia bacteria. Elevated levels can impact dopamine metabolism.
- **DHPPA (Dihydroxyphenylpropionic acid)** – Linked to beneficial gut bacteria; elevated levels may suggest dysbiosis.
- **Tartaric Acid** – A byproduct of Candida metabolism; high levels suggest Candida overgrowth.
- **Citramalic Acid** – Produced by Candida; elevated levels may indicate fungal overgrowth.
- **Benzoic Acid** – Related to gut microbiome balance; high levels may indicate dysbiosis or poor liver detoxification.
- **4-Hydroxybenzoic Acid** – A microbial metabolite linked to bacterial metabolism.

2. Mitochondrial Function & Energy Metabolism

- **Succinic Acid** – A Krebs cycle intermediate; elevated levels may indicate mitochondrial dysfunction.
- **Fumaric Acid** – A key energy cycle marker; high levels suggest metabolic stress.
- **Malic Acid** – A Krebs cycle intermediate; abnormalities may indicate mitochondrial dysfunction.
- **Aconitic Acid** – Related to citric acid cycle efficiency; low levels may indicate poor energy production.
- **Citric Acid** – A key mitochondrial energy marker; low levels may indicate mitochondrial dysfunction.

3. Neurotransmitter Metabolites

- **HVA (Homovanillic Acid)** – A dopamine metabolite; high or low levels may indicate issues with dopamine metabolism.
- **VMA (Vanillylmandelic Acid)** – A norepinephrine and epinephrine metabolite; imbalances may indicate stress or adrenal dysfunction.
- **HVA/VMA Ratio** – A measure of dopamine vs. norepinephrine metabolism; imbalances may indicate neurochemical imbalances.
- **5-HIAA (5-Hydroxyindoleacetic Acid)** – A serotonin metabolite; low levels may indicate serotonin deficiency.
- **Quinolinic Acid** – A neurotoxic metabolite of tryptophan; high levels indicate inflammation or excitotoxicity.
- **Kynurenic Acid** – A neuroprotective metabolite of tryptophan; imbalances can indicate inflammation or cognitive dysfunction.

4. Oxalate Metabolism

- **Oxalic Acid** – High levels can contribute to kidney stones, joint pain, and mitochondrial dysfunction.

5. Vitamin & Nutritional Markers

- **Methylmalonic Acid (MMA)** – A marker for vitamin B12 deficiency.
- **Pyridoxic Acid** – A metabolite of vitamin B6; low levels indicate deficiency.
- **Pantothenic Acid** – A vitamin B5 marker; essential for energy metabolism.
- **Biotin (Vitamin B7) Metabolites** – Deficiencies may impact hair, skin, and gut health.
- **Ascorbic Acid (Vitamin C)** – A critical antioxidant; low levels may indicate oxidative stress.
- **CoQ10 (Ubiquinone)** – Essential for mitochondrial energy; low levels suggest mitochondrial dysfunction.

6. Detoxification & Glutathione Markers

- **Pyroglutamic Acid** – A marker of glutathione metabolism; high or low levels suggest detoxification imbalances.
- **2-Hydroxybutyric Acid** – A marker for oxidative stress and glutathione depletion.

- **Orotate (Orotic Acid)** – Related to ammonia detoxification; high levels may indicate liver stress.

7. Amino Acid Metabolism

- **Phosphoric Acid** – A marker for overall phosphorus status; low levels may indicate deficiencies.
- **Phenylacetic Acid** – Related to phenylalanine metabolism; imbalances can impact neurotransmitters.

8. Fatty Acid Oxidation Markers

- **Adipic Acid & Suberic Acid** – Related to fatty acid metabolism; high levels may suggest inefficient fat utilization.

This test provides a **comprehensive look at metabolic health**, helping identify **nutrient deficiencies, gut dysbiosis, mitochondrial dysfunction, detoxification issues, and neurochemical imbalances.**