VibrantWellness

Organic Acids

Key Clinical Messages

What is the Organic Acids Test?

Vibrant's Organic Acids Test is a urine-based test that measures organic acid excretion in a single urine collection sample first thing in the morning. Vibrant's Organic Acids test includes 78 metabolic markers that can accurately identify conditions associated with genetic disorders, nutrient deficiencies, intestinal dysbiosis, and toxicity from the diet, environment, and certain medications.

What are Organic Acids?

Organic acids are byproducts of cellular metabolism. Based on known metabolic pathways and enzyme-cofactor requirements, these organic acid markers can provide great insights in discovering underlying causes of chronic symptoms.

Why Order Organic Acids?

The Organic Acids test provides a snapshot in time of an individuals' biochemistry. It provides data on multiple different systems in the body in one test. Some of the important categories assessed on the test include:

- Energy metabolism
- Mitochondrial function
- Fat metabolism
- Nutrient deficiencies
- Glutathione status
- Toxic exposure
- Oxidative stress
- Methylation status
- Salicylate metabolism
- Oxalate levels
- Neurotransmitter end products
- Microbial overgrowth: bacteria, clostridia, yeast/fungus and mold exposure
- Inborn errors of metabolism

Organic acids testing can aid advanced providers in the detection of many underlying imbalances in chronically or acutely ill patients with complex illnesses. It can serve as a great first assessment test for individuals who have multi-system symptoms, complicated presentations or prefer urine collection instead of phlebotomy. Alongside other diagnostic testing, organic acids profiles complete the clinical picture of root causes and guide practitioners in developing the most individual and effective interventions.

Which Patients Benefit From This Test?

Conditions and symptoms which may benefit from organic acids testing Include:

- ADD/ADHD
- Autism spectrum disorder
- Mental and/or developmental delays
- Difficulty concentrating
- Hyperactivity
- Chronic fatigue syndrome
- Fibromyalgia
- Fatigue and weakness
- Depression and/or anxiety
- Confusion or dizziness
- Mood disorders or mood swings
- Insomnia or other sleep problems
- Slowed reaction time
- Poor memory
- Headaches or migraines
- Digestive dysfunction
- Nausea or vomiting
- Poor appetite
- Abdominal pain, diarrhea, bloating
- Hypo- or hyperglycemia
- Unexplained weight gain/loss
- Muscle weakness
- Hypotonia
- Chronic pain
- Eczema or dermatitis
- Immune deficiency or frequent infections
- Anemia
- Hearing, speech, or visual impairment
- Tachycardia
- Rapid or abnormal breathing
- Kidney stones
- Seizure disorders
- Other neurological disorders

Test Prep

Collection: One (1) urine specimen tube. First morning urine sample collection.

Hydration: Do not drink more than 8 oz water 1 hour prior to each urine collection. Samples may be rejected if the urine is too dilute.

Fasting: Not required.

Diet: Avoid apples, grapes, pears, and cranberries (as well as their juices), mushrooms, and ribose supplements 48 hours before collection.

Reference Ranges and Interpretation of Results

Reference ranges are established using urine samples from 1000 apparently healthy individuals. The level of the organic acid has a green (normal) or red (high/low) highlight around the cell indicating the corresponding result based on the reference range of each organic acid. Additionally, the previous value (if available) is also indicated to help check for improvements every time the test is ordered.

The results are presented as a complete list of organic acids and their absolute levels normalized to creatinine in a quantile format along with the reference ranges. Reference ranges have not been validated in the pediatric population. Vibrant has a comprehensive interpretive guide for the Organic Acids Test to aid providers in the interpretation of their patient's results.

Sample Results

Fungal Metabolites	Current	Previous	Result	Reference
3-Oxoglutaric acid (mmol/mol)	0.21		0 — 0.31	≤0.31
Arabinose (mmol/mol)	112.99		0 — 30	≤30.0

Methodology

- The Organic Acids test uses gas chromatography with tandem mass spectrometry (GC-MS/MS).
  - Catecholamine metabolites and serotonin & kynurenine metabolites are measured using liquid chromatography tandem mass spectrometry methodology (LC-MS/MS).
- The analyte results are expressed by normalizing to the quantity of creatinine measured to account for urine dilution variations.
- Vibrant is a CLIA-certified and CAP-accredited lab.

Which Tests Pair Well With Organic Acids?

- **Micronutrients** – to gain a comprehensive understanding of the patient's whole nutrition foundation; if there are hints of nutrient deficiencies/insufficiencies on the Organic Acids test, it may be important to assess a patient's overall nutrient outlook.
- **Gut Zoomer** – to take a deeper look at digestive capacity and the health of the microbiome to determine the extent of yeast and bacterial overgrowth; this is particularly helpful when other markers in the microbial metabolites panel are elevated.
- **Environmental Toxins** – to investigate the total toxic burden that can impact many enzymatic reactions affecting energy metabolism and mitochondrial function.
- **Heavy Metals** – to investigate the total toxic burden that can impact many enzymatic reactions affecting energy metabolism and mitochondrial function.
- **Mycotoxin** – to investigate the total toxic burden that can impact many enzymatic reactions affecting energy metabolism and mitochondrial function; this may be particularly important when other mold metabolites are also elevated.
- **Candida & IBS Profile** – to assess for fungal antibodies to gain a comprehensive understanding of the patient's fungal burden, particularly if other fungal markers are elevated.
- **Neurotransmitters** – to get a comprehensive understanding of neurotransmitter imbalances, particularly if neurotransmitter metabolites are out of range.

What Markers Are Included on Vibrant's Organic Acids Test?

Microbial Markers

Yeast and Fungal Markers

- Citramalic Acid
- 5-Hydroxymethyl-furoic Acid
- 3-Oxoglutaric Acid
- Furan-2,5-dicarboxylic Acid
- Furancarbonylglycine
- Tartaric Acid
- Arabinose
- Carboxycitric Acid
- Tricarballylic Acid

Bacterial Markers

- Hippuric Acid
- 2-Hydroxyphenylacetic Acid
- 4-Hydroxybenzoic Acid
- 4-Hydroxyhippuric Acid
- DHPPA

Clostridia Bacterial Markers

- 4-Hydroxyphenylacetic Acid
- HPHPA
- 4-Cresol
- Indoleacetic Acid

Detoxification & Oxidative Stress Markers

Glutathione

- Pyroglutamic Acid
- 2-Hydroxybutyric Acid
- N-acetylcysteine Acid

Ammonia Excess

- Orotic Acid

Toxins

- Mandelic Acid

Energy Metabolism & Mitochondrial Function Markers

Krebs Cycle Metabolites

- Succinic Acid
- Fumaric Acid
- Malic Acid
- 2-Oxoglutaric Acid
- Cis-aconitic Acid
- Citric Acid

Glycolysis Markers

- Lactic Acid
- Pyruvic Acid

Ketone and Fatty Acid Oxidation

- 3-Hydroxybutyric Acid
- Acetoacetic Acid
- 4-Hydroxybutyric Acid
- Adipic Acid
- Suberic Acid
- Sebacic Acid
- Ethylmalonic Acid
- Methylsuccinic Acid

Mitochondrial Markers

- 3-Methylglutaric Acid
- 3-Methylglutaconic Acid
- 3-Hydroxyglutaric Acid

Amino Acid Metabolites

- 2-Hydroxyisovaleric Acid
- 3-Methyl-2-oxovaleric Acid
- 2-Hydroxyisocaproic Acid
- 2-Oxoisocaproic Acid
- 2-Oxo-4-methiolbutyric Acid
- Phenyllactic Acid
- Phenylpyruvic Acid
- Homogentisic Acid
- 4-Hydroxyphenyllactic Acid
- N-Acetylaspartic Acid
- Malonic Acid
- 2-Oxoisovaleric Acid

Neutrotransmitter Markers

Catecholamine Metabolites & Ratios

- DOPAC
- HVA
- VMA
- HVA/VMA Ratio
- HVA/DOPAC Ratio

Serotonin Metabolites & Ratios

- 5-HIAA
- Kynurenic Acid
- Quinolinic Acid
- Quinolinic Acid/ 5-HIAA Ratio

Nutrition & Oxalate Markers

- 3-Hydroxybutyric Acid
- Acetoacetic Acid
- 4-Hydroxybutyric Acid
- Adipic Acid
- Suberic Acid
- Sebacic Acid
- Ethylmalonic Acid
- Methylsuccinic Acid
- 3-Hydroxy-3-methylglutaric Acid

Pyramidine Metabolites

- Uracil
- Thymine

Aspartame, Salicylates, or GI bacteria

- 2-Hydroxyhippuric Acid

Mineral Metabolites

- Phosphoric Acid

Kreb's Cycle At-A-Glance

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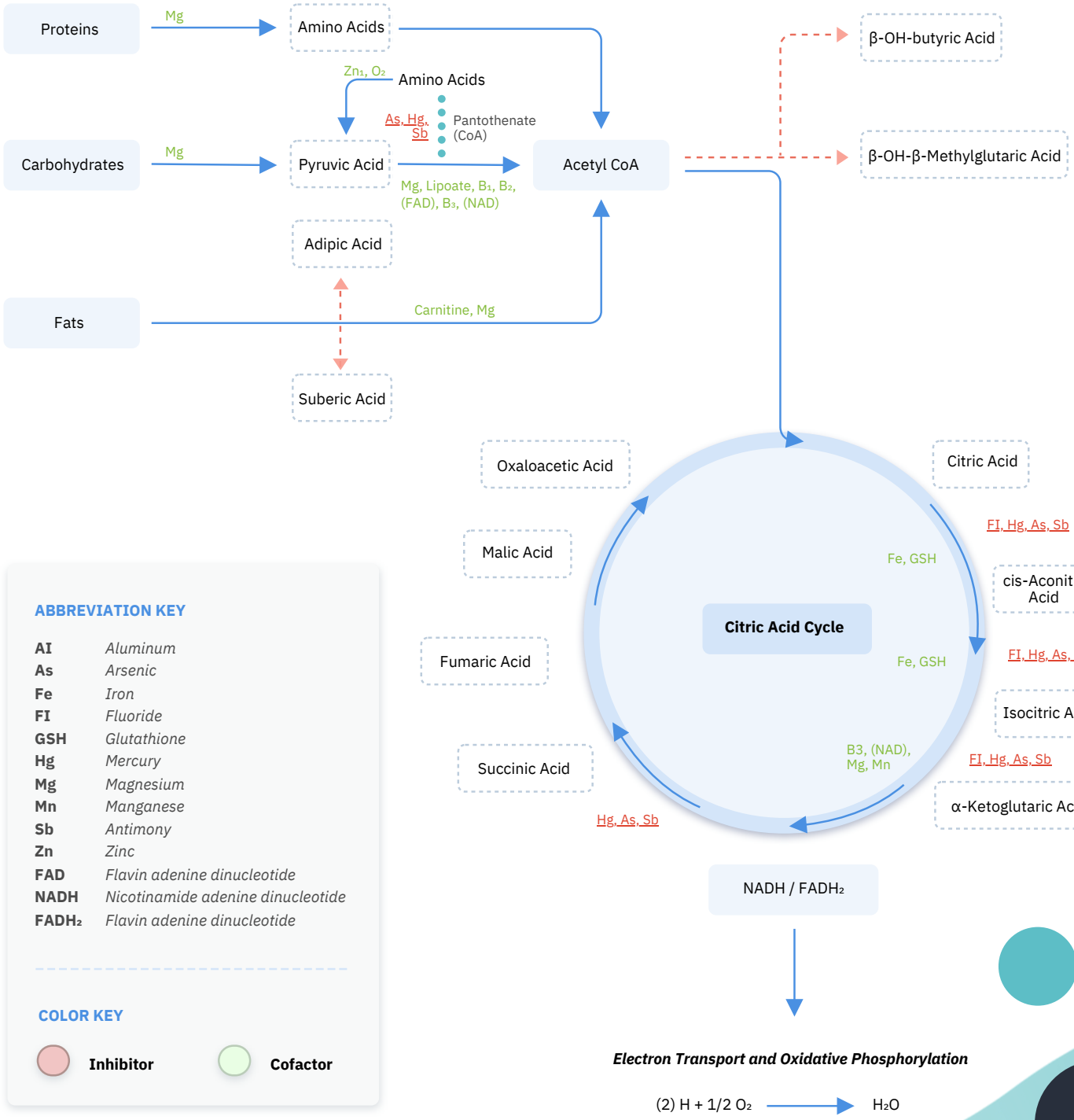

ABBREVIATION KEY

AI	*Aluminum*
As	*Arsenic*
Fe	*Iron*
FI	*Fluoride*
GSH	*Glutathione*
Hg	*Mercury*
Mg	*Magnesium*
Mn	*Manganese*
Sb	*Antimony*
Zn	*Zinc*
FAD	*Flavin adenine dinucleotide*
NADH	*Nicotinamide adenine dinucleotide*
$FADH_2$	*Flavin adenine dinucleotide*

COLOR KEY

Inhibitor **Cofactor**

Regulatory Statement:
This test has been laboratory developed and their performance characteristics determined by Vibrant America LLC, a CLIA-certified laboratory performing the test CLIA#:05D2078809. The test has not been cleared or approved by the U.S. Food and Drug Administration (FDA). Although FDA does not currently clear or approve laboratory-developed tests in the U.S., certification of the laboratory is required under CLIA to ensure the quality and validity of the tests.

Revised 6/27/2024