

## Cellular Zoomer

The Cellular Zoomer evaluates a broad range of urine- and saliva-based markers spanning mitochondrial energy production, oxidative and nitrative stress, detoxification pathways, microbial metabolites, neurotransmitter activity, nutrient utilization, and redox-related genetics. Together, these markers provide a structured view of cellular performance and stress response, helping clarify how biochemical systems interact to influence energy, resilience, metabolism, and recovery.

| Oxidative Damage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Microbial Overgrowth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
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| <ul style="list-style-type: none"><li>Malondialdehyde (MDA)</li><li>4-Hydroxynonenal (GS-HNE)</li><li>8-iso-Prostaglandin F2α</li><li>11-β-Prostaglandin F2α</li><li>15(R)-Prostaglandin F2α</li><li>8-Hydroxy-2-deoxyguanosine (8-OHdG)</li><li>8-Hydroxyguanine</li><li>8-Hydroxyguanosine</li><li>Dityrosine</li><li>3-Chlorotyrosine</li><li>3-Bromotyrosine</li><li>8-Nitroguanosine</li><li>8-Nitroguanine</li><li>Nitrotyrosine</li><li>CML (Nε-Carboxymethyllysine)</li><li>CEL (Nε-Carboxyethyllysine)</li></ul>                                                                                                                                                                                | <p><b>Yeast &amp; Fungal</b></p> <ul style="list-style-type: none"><li>Citramalic Acid</li><li>5-Hydroxymethyl-furoic Acid</li><li>3-Oxoglutaric Acid</li><li>Furan-2,5-dicarboxylic Acid</li><li>Furancarboxylglycine</li><li>Tartaric Acid</li><li>Arabinose</li><li>Carboxycitric Acid</li><li>Tricarballic Acid</li></ul> <p><b>Bacterial</b></p> <ul style="list-style-type: none"><li>Hippuric Acid</li><li>2-Hydroxyphenylacetic Acid</li><li>4-Hydroxybenzoic Acid</li><li>4-Hydroxyhippuric Acid</li><li>DHPPA</li></ul> <p><b>Clostridia &amp; Dysbiosis</b></p> <ul style="list-style-type: none"><li>4-Hydroxyphenylacetic Acid</li><li>HPHPA</li><li>4-Cresol</li><li>Indoleacetic Acid</li></ul> | <ul style="list-style-type: none"><li>DOPAC</li><li>HVA</li><li>VMA</li><li>HVA/VMA Ratio</li><li>HVA/DOPAC Ratio</li></ul> <ul style="list-style-type: none"><li>5-HIAA</li><li>Kynurenic Acid</li><li>Quinolinic Acid</li><li>Quinolinic Acid / 5-HIAA Ratio</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Mitochondrial & Energy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Vitamin, Mineral & Nutrient Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Functional Metabolism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <ul style="list-style-type: none"><li>Succinic Acid</li><li>Fumaric Acid</li><li>Malic Acid</li><li>2-Oxoglutaric Acid</li><li>Cis-aconitic Acid</li><li>Citric Acid</li><li>3-Hydroxybutyric Acid</li><li>Acetoacetic Acid</li><li>4-Hydroxybutyric Acid</li><li>Adipic Acid</li><li>Suberic Acid</li><li>Sebacic Acid</li><li>Ethylmalonic Acid</li><li>Methylsuccinic Acid</li><li>Lactic Acid</li><li>Pyruvic Acid</li><li>3-Methylglutaric Acid</li><li>3-Methylglutaconic Acid</li><li>3-Hydroxyglutaric Acid</li><li>2-Hydroxybutyric Acid</li><li>3-Hydroxy-3-methylglutaric Acid</li><li>2-Hydroxyisovaleric Acid</li><li>3-Methyl-2-oxovaleric Acid</li><li>2-Hydroxyisocaproic Acid</li></ul> | <ul style="list-style-type: none"><li>Ascorbic Acid (Vitamin C)</li><li>Glutaric Acid (Vitamin B2)</li><li>Methylcitric Acid (Biotin)</li><li>Methylmalonic Acid (Vitamin B12)</li><li>Pantothenic Acid (Vitamin B5)</li><li>Pyridoxic Acid (Vitamin B6)</li><li>Phosphoric Acid</li><li>Glyceric Acid</li><li>Glycolic Acid</li><li>Oxalic Acid</li><li>3-Hydroxy-3-methylglutaric Acid</li><li>Malonic Acid</li><li>N-Acetylaspartic Acid</li><li>Thymine &amp; Uracil (Pyrimidine Metabolites)</li></ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>2-Hydroxyisocaproic Acid</li><li>2-Oxoisocaproic Acid</li><li>2-Oxoisovaleric Acid</li><li>2-Oxo-4-methiolbutyric Acid</li><li>Phenylpyruvic Acid</li><li>Phenyllactic Acid</li><li>Homogentisic Acid</li><li>4-Hydroxyphenyllactic Acid</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Antioxidant Genetics (Add-On Markers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"><li>PRKAA2 (rs2796498, rs10789038)</li><li>CAT (rs1001179, rs7943316, rs4756146)</li><li>COX-2 (rs20417)</li><li>CYB5R3 (rs916321)</li><li>CYP1A1 (rs1048943)</li><li>GLUL (rs10911021)</li><li>GPX1 (rs1050450, rs1987628)</li><li>GPX2 (rs4902346, rs2071566)</li><li>GPX4 (rs713041)</li><li>GSTM1 (rs366631)</li><li>GSTM5 (rs3754446)</li><li>GSTP1 (rs1695)</li><li>GSS (rs121909307)</li><li>GSR (rs8190955)</li><li>HMOX1 (rs2071746)</li><li>CYBA (rs4673, rs9932581)</li><li>SELENOP (rs3877899)</li><li>SOD1 (rs2234694)</li><li>SOD2 (rs4880)</li><li>SOD3 (rs1799895, rs8192287)</li><li>TXNRD1 (rs7310505)</li><li>TXNRD2 (rs1548357)</li><li>TRXR2 (rs4485648)</li><li>XDH (rs206812, rs2073316)</li></ul> |  |

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