The ION Profile® is a comprehensive nutritional evaluation that assesses a patient’s functional need for antioxidants, B-vitamins, minerals, essential fatty acids, amino acids, and other select nutrients. Genova offers the ION Profile with 40 Amino Acids for a more complete assessment of the amino acids. Additionally, the Cardio ION Profile is ideal for patients with risk factors for cardiovascular disease (CVD).

Why Use the ION Profile?
Over time, functional nutritional inadequacies can contribute to a variety of chronic health conditions. The ION Profile measures more than 150 biomarkers that provide insight into a patient’s health. Common clinical indications for ION testing include:

- Mood Disorders
- Cardiovascular Disease
- Fatigue
- Obesity, Diabetes
- Athletes
- Digestive Dysfunction

The ION Results Report:

- **Analyte Pattern Analysis:** Organizes results into related functional categories to understand the patient’s major areas of focus.

- **Supplement Recommendation Summary:** Synthesizes complex biochemistry into actionable treatment options personalized for each patient.

The ION Profile combines the following test profiles:

- **The Amino Acid Profile** assesses essential and non-essential amino acids and intermediates
- **Homocysteine** is an important risk factor for CVD
- **Nutrient & Toxic Element Profiles** identify a patient’s toxic burden and mineral status
- **Coenzyme Q10 Plus Vitamins** measure vitamins involved in antioxidant functions
- **Oxidation Markers** measure oxidative damage to lipid membranes and DNA
- **Fatty Acid Profile** identifies fatty acids that impact inflammation and cardiovascular health
- **Organix® Profile** measures organic acids related to the citric acid cycle and mitochondrial function, neurotransmitter metabolism, vitamin status, detoxification and dysbiosis

A MORE COMPLETE ASSESSMENT OF YOUR PATIENT’S HEALTH
# Amino Acids

## Essential Amino Acids

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lysine</td>
<td>100</td>
<td>%</td>
<td>117 - 203</td>
</tr>
<tr>
<td>Methionine</td>
<td>14</td>
<td>%</td>
<td>16 - 26</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>25 L</td>
<td>%</td>
<td>35 - 59</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>30 L</td>
<td>%</td>
<td>40 - 72</td>
</tr>
<tr>
<td>Leucine</td>
<td>57 L</td>
<td>%</td>
<td>80 - 137</td>
</tr>
<tr>
<td>Valine</td>
<td>159</td>
<td>%</td>
<td>143 - 240</td>
</tr>
</tbody>
</table>

## Branched Chain Amino Acids

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylalanine</td>
<td>42</td>
<td>%</td>
<td>48 - 64</td>
</tr>
<tr>
<td>Histidine</td>
<td>62</td>
<td>%</td>
<td>76 - 151</td>
</tr>
<tr>
<td>Threonine</td>
<td>100</td>
<td>%</td>
<td>63 - 161</td>
</tr>
</tbody>
</table>

## Other Essential Amino Acids

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>69</td>
<td>%</td>
<td>48 - 96</td>
</tr>
<tr>
<td>Taurine</td>
<td>89</td>
<td>%</td>
<td>31 - 73</td>
</tr>
<tr>
<td>Glycine</td>
<td>474 H</td>
<td>%</td>
<td>162 - 348</td>
</tr>
<tr>
<td>Serine</td>
<td>94</td>
<td>%</td>
<td>60 - 115</td>
</tr>
</tbody>
</table>

## Vascular Function

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>69</td>
<td>%</td>
<td>48 - 96</td>
</tr>
<tr>
<td>Taurine</td>
<td>89</td>
<td>%</td>
<td>31 - 73</td>
</tr>
</tbody>
</table>

## Neurotransmitters and Precursors

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylalanine</td>
<td>42</td>
<td>%</td>
<td>43 - 64</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>30</td>
<td>%</td>
<td>38 - 70</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>25 L</td>
<td>%</td>
<td>35 - 59</td>
</tr>
<tr>
<td>Glutamic Acid</td>
<td>180 H</td>
<td>%</td>
<td>29 - 95</td>
</tr>
<tr>
<td>Taurine</td>
<td>89</td>
<td>%</td>
<td>31 - 73</td>
</tr>
</tbody>
</table>

## Sulfur Amino Acids (Glutathione-related)

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methionine</td>
<td>14</td>
<td>%</td>
<td>16 - 26</td>
</tr>
<tr>
<td>Taurine</td>
<td>89</td>
<td>%</td>
<td>31 - 73</td>
</tr>
</tbody>
</table>

## Urea Cycle and Ammonia Detoxification

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>69</td>
<td>%</td>
<td>48 - 96</td>
</tr>
<tr>
<td>Citrulline</td>
<td>48 H</td>
<td>%</td>
<td>20 - 38</td>
</tr>
<tr>
<td>Ornithine</td>
<td>45</td>
<td>%</td>
<td>32 - 61</td>
</tr>
<tr>
<td>Glutamine</td>
<td>339</td>
<td>%</td>
<td>397 - 585</td>
</tr>
<tr>
<td>Asparagine</td>
<td>25 L</td>
<td>%</td>
<td>50 - 45</td>
</tr>
<tr>
<td>Aspartic Acid</td>
<td>13.1 H</td>
<td>%</td>
<td>4.6 - 9.7</td>
</tr>
</tbody>
</table>

## Ratios

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenylalanine/Tyrosine</td>
<td>1.40</td>
<td>%</td>
<td>&lt;= 1.44</td>
</tr>
<tr>
<td>Glutamic Acid/Glutamine</td>
<td>0.53 H</td>
<td>%</td>
<td>0.05 - 0.35</td>
</tr>
<tr>
<td>Tryptophan/LNAA*</td>
<td>0.079 L</td>
<td>%</td>
<td>0.005 - 0.106</td>
</tr>
</tbody>
</table>

*Large neutral amino acids (Lys+Leu+Val+Phe+Tyr)

**NF = Not Reportable**

## Homocysteine Assay - Plasma

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>Value</th>
<th>Unit</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homocysteine</td>
<td>20.7 H</td>
<td>%</td>
<td>4.0 - 10.0</td>
</tr>
</tbody>
</table>

## Nutrient & Toxic Elements Profile - Blood

**Methodology:** Inductively Coupled Plasma/Mass Spectrometry
## Nutrient & Toxic Elements

<table>
<thead>
<tr>
<th>Nutrient Elements</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocytes (packed cells)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Potassium</td>
<td>2,519</td>
<td>2,072 - 2,303 ppm</td>
</tr>
<tr>
<td>2. Magnesium</td>
<td>38</td>
<td>44 - 63 ppm</td>
</tr>
<tr>
<td>3. Calcium</td>
<td>31</td>
<td>24 - 65 ppm</td>
</tr>
<tr>
<td>Plasma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Zinc</td>
<td>782</td>
<td>815 - 643 - 1,594 ppb</td>
</tr>
<tr>
<td>5. Copper</td>
<td>952</td>
<td>929 - 753 - 1,920 ppb</td>
</tr>
<tr>
<td>Whole Blood</td>
<td>0.17</td>
<td>0.16 - 0.13 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Toxic Elements</th>
<th>Value</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole Blood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Aluminum</td>
<td>25</td>
<td>&lt;= 113 ppb</td>
</tr>
<tr>
<td>8. Arsenic</td>
<td>11.5</td>
<td>&lt;= 10.0 ppb</td>
</tr>
<tr>
<td>9. Cadmium</td>
<td>0.21</td>
<td>&lt;= 1.10 ppb</td>
</tr>
<tr>
<td>10. Lead</td>
<td>22</td>
<td>&lt;= 29 ppb</td>
</tr>
<tr>
<td>11. Mercury</td>
<td>3.8</td>
<td>&lt;= 9.8 ppb</td>
</tr>
</tbody>
</table>

## Coenzyme Q10 Plus Vitamins

<table>
<thead>
<tr>
<th>Coenzyme Q10 Plus Vitamins Profile - Serum</th>
<th>Methodology: High Performance Liquid Chromatography</th>
<th>Results</th>
<th>Range: Ages 13 and over.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coenzyme Q10</td>
<td>2.73</td>
<td>0.04</td>
<td>0.48 - 3.04</td>
</tr>
<tr>
<td>alpha-Tocopherol</td>
<td>42.6</td>
<td>9.5</td>
<td>6.8 - 31.7</td>
</tr>
<tr>
<td>gamma-Tocopherol</td>
<td>2.19</td>
<td>0.28</td>
<td>0.06 - 2.99</td>
</tr>
<tr>
<td>Vitamin A (Retinol)</td>
<td>1.39</td>
<td>0.36</td>
<td>0.29 - 1.05</td>
</tr>
<tr>
<td>Vitamin D (Retinol)</td>
<td>0.47</td>
<td>0.15</td>
<td>0.10 - 2.71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lipid Peroxides Assay - Serum</th>
<th>Methodology: High Performance Liquid Chromatography</th>
<th>Results</th>
<th>Range:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid Peroxides</td>
<td>1.47</td>
<td>1.72</td>
<td>&lt;= 2.60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8-Hydroxy-2-deoxyguanosine</td>
<td>4.9</td>
<td>5.3</td>
<td>&lt;= 7.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vitamin D Profile - Serum</th>
<th>Methodology: Chemiluminescent</th>
<th>Results</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-Hydroxyvitamin D</td>
<td>57.1</td>
<td>30.0 - 100.0 ng/mL</td>
<td></td>
</tr>
</tbody>
</table>

Deficiency: <20 ng/mL
Insufficiency: 20-25 ng/mL
Sufficient: 30-100 ng/mL
Recommended: 50-80 ng/mL
Excessive: >100 ng/mL

There is no consensus in the literature regarding optimal levels of 25-Hydroxyvitamin D. Higher levels of 25-Hydroxyvitamin D may be concerning in some patient populations, such as renal failure. Levels below 30 ng/mL are considered insufficient by most medical associations. Treatment is at the discretion of the treating clinician.


Vitamin D Council: [https://www.vitamindcouncil.org](https://www.vitamindcouncil.org)
# Fatty Acids

## Polyunsaturated Omega-3

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha Linolenic (18:3n3)</td>
<td>25</td>
<td>13 - 60</td>
</tr>
<tr>
<td>Eicosapentaenoic (20:5n3)</td>
<td>29</td>
<td>5 - 210</td>
</tr>
<tr>
<td>Docosapentaenoic (22:5n3)</td>
<td>21</td>
<td>11 - 50</td>
</tr>
<tr>
<td>Docosahexaenoic (22:6n3)</td>
<td>110</td>
<td>31 - 213</td>
</tr>
</tbody>
</table>

## Polyunsaturated Omega-6

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linoleic (18:2n6)</td>
<td>1.275</td>
<td>821 - 2,032</td>
</tr>
<tr>
<td>Gamma Linolenic (18:3n6)</td>
<td>5</td>
<td>5 - 46</td>
</tr>
<tr>
<td>Eicosadienoic (20:2n6)</td>
<td>12.3</td>
<td>5.2 - 22.5</td>
</tr>
<tr>
<td>Dihomogamma Linolenic (20:3n6)</td>
<td>39</td>
<td>27 - 140</td>
</tr>
<tr>
<td>Arachidonic (20:4n6)</td>
<td>299</td>
<td>158 - 521</td>
</tr>
<tr>
<td>Docosadienoic (22:2n6)</td>
<td>0.8</td>
<td>&lt;= 2.0</td>
</tr>
<tr>
<td>Docosatetraenoic (22:4n6)</td>
<td>5.3</td>
<td>2.6 - 18.1</td>
</tr>
</tbody>
</table>

## Polyunsaturated Omega-9

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mead (20:3n9)</td>
<td>2.3</td>
<td>5.3</td>
</tr>
</tbody>
</table>

## Monounsaturated

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myristoleic (14:1n5)</td>
<td>1.9</td>
<td>0.8 - 0.7</td>
</tr>
<tr>
<td>Palmitoleic (16:1n7)</td>
<td>52</td>
<td>30 - 256</td>
</tr>
<tr>
<td>Vaccenic (18:1n7)</td>
<td>71</td>
<td>40 - 122</td>
</tr>
<tr>
<td>Oleic (18:1n9)</td>
<td>1,059</td>
<td>486 - 1,470</td>
</tr>
<tr>
<td>11-Eicosanoic (20:1n9)</td>
<td>7.6</td>
<td>3.7 - 18.1</td>
</tr>
<tr>
<td>Nervonic (24:1n9)</td>
<td>1.9</td>
<td>1.1 - 2.7</td>
</tr>
</tbody>
</table>

## Saturated

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capric (10:0)</td>
<td>1.3</td>
<td>0.8 - 6.2</td>
</tr>
<tr>
<td>Lauric (12:0)</td>
<td>4.7</td>
<td>2.2 - 27.3</td>
</tr>
<tr>
<td>Myricic (14:0)</td>
<td>26</td>
<td>15 - 139</td>
</tr>
<tr>
<td>Palmitic (16:0)</td>
<td>1,339</td>
<td>667 - 2,526</td>
</tr>
<tr>
<td>Stearic (18:0)</td>
<td>545</td>
<td>250 - 820</td>
</tr>
<tr>
<td>Arachidic (20:0)</td>
<td>3.0</td>
<td>1.3 - 4.7</td>
</tr>
<tr>
<td>Behenic (22:0)</td>
<td>0.9</td>
<td>0.6 - 2.9</td>
</tr>
<tr>
<td>Lignoceric (24:0)</td>
<td>1.31</td>
<td>0.63 - 2.45</td>
</tr>
<tr>
<td>Hexacosanic (26:0)</td>
<td>0.35</td>
<td>0.36 &lt;= 0.43</td>
</tr>
</tbody>
</table>

## Odd Chain

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentadecanoic (15:0)</td>
<td>9.5</td>
<td>&lt;= 20.6</td>
</tr>
<tr>
<td>Heptadecanoic (17:0)</td>
<td>18.3</td>
<td>&lt;= 24.4</td>
</tr>
<tr>
<td>Nonadecanoic (19:0)</td>
<td>1.83</td>
<td>&lt;= 1.89</td>
</tr>
<tr>
<td>Henicosanic (21:0)</td>
<td>0.38</td>
<td>&lt;= 0.74</td>
</tr>
<tr>
<td>Tricosanoic (23:0)</td>
<td>0.80</td>
<td>&lt;= 0.78</td>
</tr>
</tbody>
</table>

## Trans

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmitelaidic (16:1n7)</td>
<td>1.0</td>
<td>1.8 &lt;= 1.8</td>
</tr>
<tr>
<td>Total C:18 Trans</td>
<td>21</td>
<td>59 &lt;= 59</td>
</tr>
</tbody>
</table>

## Ratios

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Percentage</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA/DGLA</td>
<td>33</td>
<td>11 - 46</td>
</tr>
<tr>
<td>EPA/DGLA</td>
<td>0.74</td>
<td>0.07 - 5.98</td>
</tr>
<tr>
<td>AA/EPA</td>
<td>10</td>
<td>1 - 57</td>
</tr>
<tr>
<td>Triene/Tetraene</td>
<td>0.008</td>
<td>&lt;= 0.023</td>
</tr>
</tbody>
</table>
### Nutrient Markers

**Fatty Acid Metabolism** (Creatine & A2K)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adipate</td>
<td>7.8</td>
<td>&lt;= 11.1</td>
</tr>
<tr>
<td>Suberate</td>
<td>0.9</td>
<td>&lt;= 4.6</td>
</tr>
<tr>
<td>Ethylmalonate</td>
<td>7.9 H</td>
<td>&lt;= 6.3</td>
</tr>
</tbody>
</table>

**Carbohydrate Metabolism** (R, R2, C, Lysine Acid, Glu2Hb)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyruvate</td>
<td>&lt;DL</td>
<td>&lt;= 6.4</td>
</tr>
<tr>
<td>L-Lactate</td>
<td>8.6</td>
<td>0.6 - 16.4</td>
</tr>
<tr>
<td>2-Hydroxybutyrate</td>
<td>2.5</td>
<td>&lt;= 9.9</td>
</tr>
</tbody>
</table>

**Energy Production (Citric Acid Cycle)** (R comp., CoQ10, Amino Acids, Mg)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citrate</td>
<td>570</td>
<td>56 - 987</td>
</tr>
<tr>
<td>Cit-Aconitate</td>
<td>35</td>
<td>18 - 78</td>
</tr>
<tr>
<td>Isocitrate</td>
<td>91</td>
<td>39 - 143</td>
</tr>
<tr>
<td>a-Ketoglutarate</td>
<td>&lt;DL</td>
<td>&lt;= 46.0</td>
</tr>
<tr>
<td>Succinate</td>
<td>21.0</td>
<td>&lt;= 20.9</td>
</tr>
<tr>
<td>Fumarate</td>
<td>&lt;DL</td>
<td>&lt;= 1.35</td>
</tr>
<tr>
<td>Malate</td>
<td>1.1</td>
<td>&lt;= 3.1</td>
</tr>
<tr>
<td>Hydroxymethylglutarate</td>
<td>3.6</td>
<td>&lt;= 5.1</td>
</tr>
</tbody>
</table>

**B-Complex Vitamin Markers** (B1, B2, B3, B6, B9, B12, Folate)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>a-Ketoacetoacetate</td>
<td>&lt;DL</td>
<td>&lt;= 0.49</td>
</tr>
<tr>
<td>a-Ketoisocaproate</td>
<td>&lt;DL</td>
<td>&lt;= 0.52</td>
</tr>
<tr>
<td>a-Keto-β-Methylvalerate</td>
<td>&lt;DL</td>
<td>&lt;= 1.10</td>
</tr>
<tr>
<td>Xanthurenone</td>
<td>&lt;DL</td>
<td>&lt;= 0.63</td>
</tr>
<tr>
<td>β-Hydroxyisovalerate</td>
<td>4.5</td>
<td>&lt;= 11.5</td>
</tr>
</tbody>
</table>

**Methylation Cofactor Markers** (B12, Folate)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylmalonate</td>
<td>0.6</td>
<td>&lt;= 2.3</td>
</tr>
<tr>
<td>Formiminoglutamate</td>
<td>0.5</td>
<td>&lt;= 2.2</td>
</tr>
</tbody>
</table>

### Cell Regulation Markers

**Neurotransmitter Metabolism Markers** (Tyrosine, Tryptophan, B6, Antioxidants)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanilmandeolate</td>
<td>3.8</td>
<td>1.2 - 5.3</td>
</tr>
<tr>
<td>Homovanillate</td>
<td>4.3</td>
<td>1.4 - 7.6</td>
</tr>
<tr>
<td>5-Hydroxyindoleacetic Acid</td>
<td>6.8</td>
<td>1.8 - 9.5</td>
</tr>
<tr>
<td>Kynurenate</td>
<td>1.1</td>
<td>&lt;= 1.5</td>
</tr>
<tr>
<td>Quinolinic Acid</td>
<td>2.8</td>
<td>&lt;= 5.8</td>
</tr>
<tr>
<td>Picolinic Acid</td>
<td>5.6</td>
<td>2.8 - 13.5</td>
</tr>
</tbody>
</table>

**Oxidative Damage and Antioxidant Markers** (Vitamin C and Other Antioxidants)

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Units</th>
<th>% Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-Hydroxyphenylactate</td>
<td>0.47</td>
<td>&lt;= 0.66</td>
</tr>
<tr>
<td>8-Hydroxy-2-deoxyguanosine</td>
<td>4.9</td>
<td>&lt;= 7.6</td>
</tr>
</tbody>
</table>

(Units for 8-Hydroxy-2-deoxyguanosine are ng/mL.)
## Organic Acids Continued

### Toxicants and Detoxification

<table>
<thead>
<tr>
<th>Detoxification Indicator</th>
<th>Value</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methylhippurate</td>
<td>0.111</td>
<td>&lt;= 0.192</td>
<td></td>
</tr>
<tr>
<td>Orotic</td>
<td>0.57</td>
<td>&lt;= 1.01</td>
<td></td>
</tr>
<tr>
<td>Glucarate</td>
<td>9.9</td>
<td>&lt;= 10.7</td>
<td></td>
</tr>
<tr>
<td>α-Hydroxybutyrate</td>
<td>&lt;DL</td>
<td>&lt;= 0.9</td>
<td></td>
</tr>
<tr>
<td>Pyroglutamate</td>
<td>67</td>
<td>28 - 88</td>
<td></td>
</tr>
<tr>
<td>Sulfate</td>
<td>1,531</td>
<td>690 - 2,988</td>
<td></td>
</tr>
</tbody>
</table>

### Compounds of Bacterial or Yeast/Fungal Origin

<table>
<thead>
<tr>
<th>Bacterial - General</th>
<th>Value</th>
<th>Reference</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzoate</td>
<td>&lt;DL</td>
<td>&lt;= 9.3</td>
<td></td>
</tr>
<tr>
<td>Hippurate</td>
<td>709</td>
<td>&lt;= 1,070</td>
<td></td>
</tr>
<tr>
<td>Phenylacetate</td>
<td>0.17</td>
<td>&lt;= 0.18</td>
<td></td>
</tr>
<tr>
<td>Phenylpropionate</td>
<td>&lt;DL</td>
<td>&lt;= 0.06</td>
<td></td>
</tr>
<tr>
<td>p-Hydroxybenzoate</td>
<td>0.5</td>
<td>&lt;= 1.8</td>
<td></td>
</tr>
<tr>
<td>p-Hydroxyphenylacetate</td>
<td>10</td>
<td>&lt;= 34</td>
<td></td>
</tr>
<tr>
<td>Indican</td>
<td>93</td>
<td>&lt;= 90</td>
<td></td>
</tr>
<tr>
<td>Tricarboxylicato</td>
<td>&lt;DL</td>
<td>&lt;= 1.41</td>
<td></td>
</tr>
<tr>
<td>L. acidophilus / General Bacterial</td>
<td>2.0</td>
<td>&lt;= 4.1</td>
<td></td>
</tr>
<tr>
<td>D-Lactate</td>
<td>0.2</td>
<td>&lt;= 4.1</td>
<td></td>
</tr>
<tr>
<td>Clostridial Species</td>
<td>3,4-Dihydroxyphenylpropionate</td>
<td>&lt;DL</td>
<td>&lt;= 0.05</td>
</tr>
<tr>
<td>Yeast / Fungal</td>
<td>D-Arabinol</td>
<td>36</td>
<td>&lt;= 73</td>
</tr>
</tbody>
</table>

Creatinine = 48 mg/dL
## Supplement Recommendation Summaries

### Customized Vitamin, Mineral, Amino Acid Formulations

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Nutrient Need</th>
<th>Clinician Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin C</td>
<td>Low: 250-500 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-1 (Thiamin)</td>
<td>Optional: 0-10 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-2 (Riboflavin)</td>
<td>Low: 10-25 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-3 (Niacin)</td>
<td>Optional: 0-10 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-5 (Pantothenic Acid)</td>
<td>Optional: 0-10 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-6 (Pyridoxine)</td>
<td>Moderate: 25-50 mg</td>
<td></td>
</tr>
<tr>
<td>Vitamin B-12 (Cobalamin)</td>
<td>Moderate: 250-500 mcg</td>
<td></td>
</tr>
<tr>
<td>Folic Acid</td>
<td>Low: 250-500 mcg</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>Moderate: 200-300 mg</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Optional: 0-10 mg</td>
<td></td>
</tr>
<tr>
<td>Black Currant Oil/Evening Primrose Oil</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>Carnitine</td>
<td>Low: 100-250 mg</td>
<td></td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>Moderate: 60-100 mg</td>
<td></td>
</tr>
<tr>
<td>Lipoic Acid</td>
<td>Optional: 0-100 mg</td>
<td></td>
</tr>
<tr>
<td>N-Acetylcyesteine</td>
<td>Optional: 0-200 mg</td>
<td></td>
</tr>
<tr>
<td>Need for other antioxidants</td>
<td>Optional</td>
<td></td>
</tr>
<tr>
<td>L-Glutamine</td>
<td>Low: 500-1000 mg</td>
<td></td>
</tr>
<tr>
<td>L-Isoleucine</td>
<td>Moderate: 500-750 mg</td>
<td></td>
</tr>
<tr>
<td>L-Leucine</td>
<td>Moderate: 1000-2000 mg</td>
<td></td>
</tr>
<tr>
<td>L-Lysine</td>
<td>Low: 500-1000 mg</td>
<td></td>
</tr>
<tr>
<td>L-Methionine</td>
<td>Low: 250-500 mg</td>
<td></td>
</tr>
<tr>
<td>L-Phenylalanine</td>
<td>Low: 250-500 mg</td>
<td></td>
</tr>
<tr>
<td>L-Tryptophan</td>
<td>Moderate: 500-1000 mg</td>
<td></td>
</tr>
<tr>
<td>L-Tyrosine</td>
<td>Low: 250-500 mg</td>
<td></td>
</tr>
</tbody>
</table>

### References


ION Profile – Analytes

Analyte Groups | ION Profile/ION Profile NY | ION w/ Amino Acids 40/ION w/ Amino Acids 40 NY
--- | --- | ---

**#0010 and #0011 AMINO ACIDS – PLASMA**
- Limiting Amino Acids: √ √
- Branched Chain Amino Acids: √ √
- Other Essential Amino Acids: √ √
- Conditionally Essential Amino Acids: √ √
- Vascular Function: √ √
- Neurotransmitters and Precursors: √ √
- Sulfur Amino Acids (Glutathione - related): √ √
- Urea Cycle and Ammonia Detoxification: √ √
- Ratios: √ √
- Vitamin B6 Status Markers: √ √
- Glycine, Serine and Related Amino Acids: √ √
- Collagen - Related Amino Acids: √ √
- DNA (Thymine) Degradation: √ √
- β-Amino Acids and Derivatives: √ √
- Muscle-Specific Amino Acids: √ √
- #0093 HOMOCYSTEINE – SERUM: √ √

**#0091 ORGANIX – URINE†**
- Nutrient Markers: √ √
- Cell Regulation Markers: √ √
- Toxicants And Detoxification: √ √
- Compounds Of Bacterial Or Yeast/Fungal Origin: √ √

**#0040 FATTY ACIDS – PLASMA**
- Polynsaturated Omega-3: √ √
- Polynsaturated Omega-6: √ √
- Polynsaturated Omega-9: √ √
- Monounsaturated: √ √
- Saturated: √ √
- Odd Chain: √ √
- Trans: √ √
- Ratios: √ √

**#0022 NUTRIENT AND TOXIC ELEMENTS – RBC, PLASMA, URINE**
- Nutrient Elements: √ √
- Toxic Elements†: √ √
- #0033 COQ10 PLUS VITAMINS – SERUM†: √ √
- #0032 VITAMIN D – SERUM: √ √
- #0051 LIPID PEROXIDES – SERUM: √ √
- #0087 8-HYDROXY-2 DEOXYGUANOSINE – URINE†: √ √

† D-Arabinitol, Lead, Gamma tocopherol, L-Lactate, D-Lactate, Picolinate and 8OHDG are not available in New York

ION Profile – Blood & Urine
- #0090 ION Profile
- #0190 ION Profile NY
- #0090 ION Pediatric Profile
- #0190 ION Pediatric Profile NY
- #0490 ION Profile with Amino Acids 40
- #0590 ION Profile with Amino Acids 40 NY

Add-on Tests Available for the ION Profile
- #0068 Chemistries
- #0088 Neopterin/Biopterin Profile
- #0031 Vitamin K Assay

ION Pediatric Profile
The ION Profile is also available in a pediatric format with modified specimen collection procedures. For more information on Pediatric Profiles please visit our website at: www.gdx.net

Specimen Requirements
- Serum, ~9 ml total (3 tubes, 3 ml each), frozen
- Plasma, 2.5–3 ml, frozen
- Whole Blood, room temperature
- Overnight Urine, 12 ml, frozen

Value-added Services:
- Medical Education Consultations
- Online Resources
- Educational Webinars
- Convenient Billing Options