

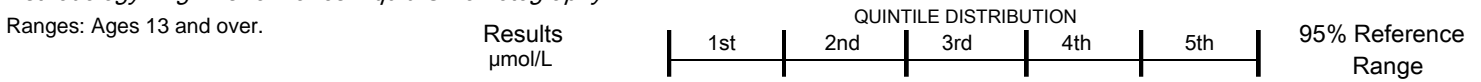


3102 ION® Profile with Amino Acids 40 - Blood/Urine

Amino Acids 40 Profile - Plasma

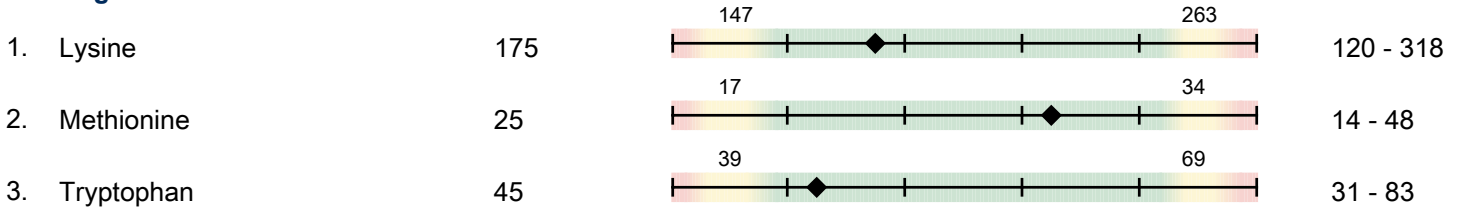
Methodology: High Performance Liquid Chromatography

Ranges: Ages 13 and over.

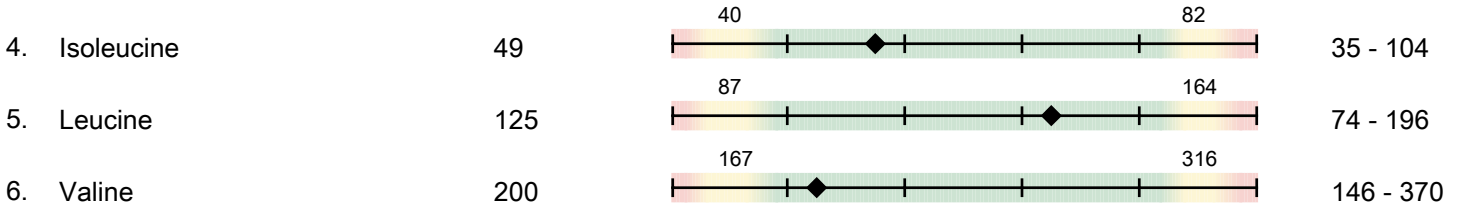


Essential Amino Acids

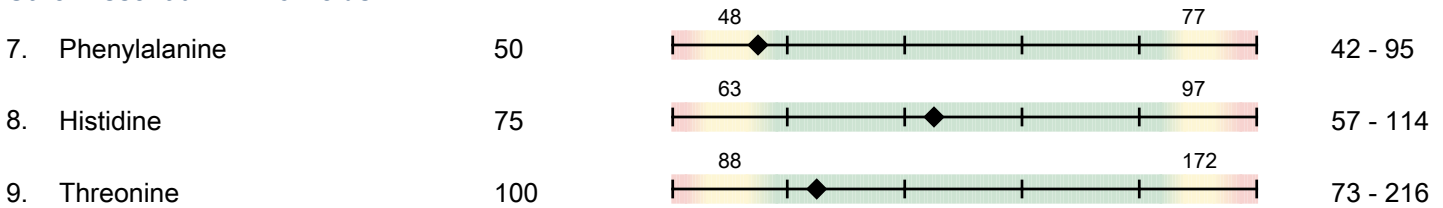
Limiting Amino Acids



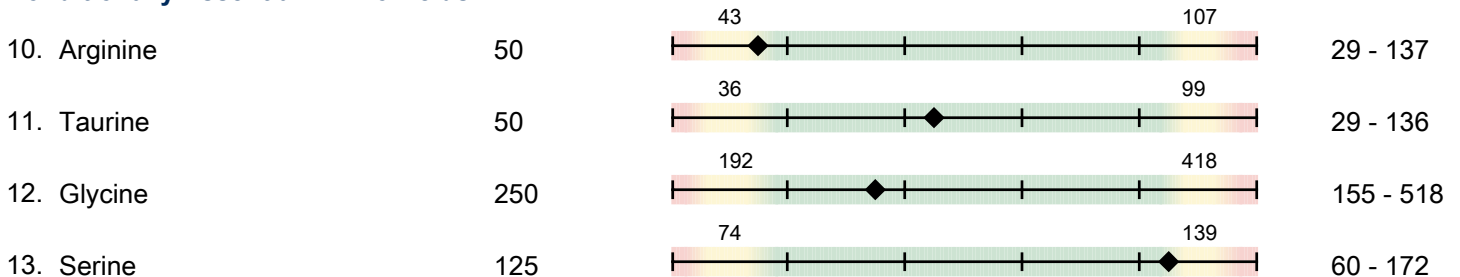
Branched Chain Amino Acids



Other Essential Amino Acids



Conditionally Essential Amino Acids

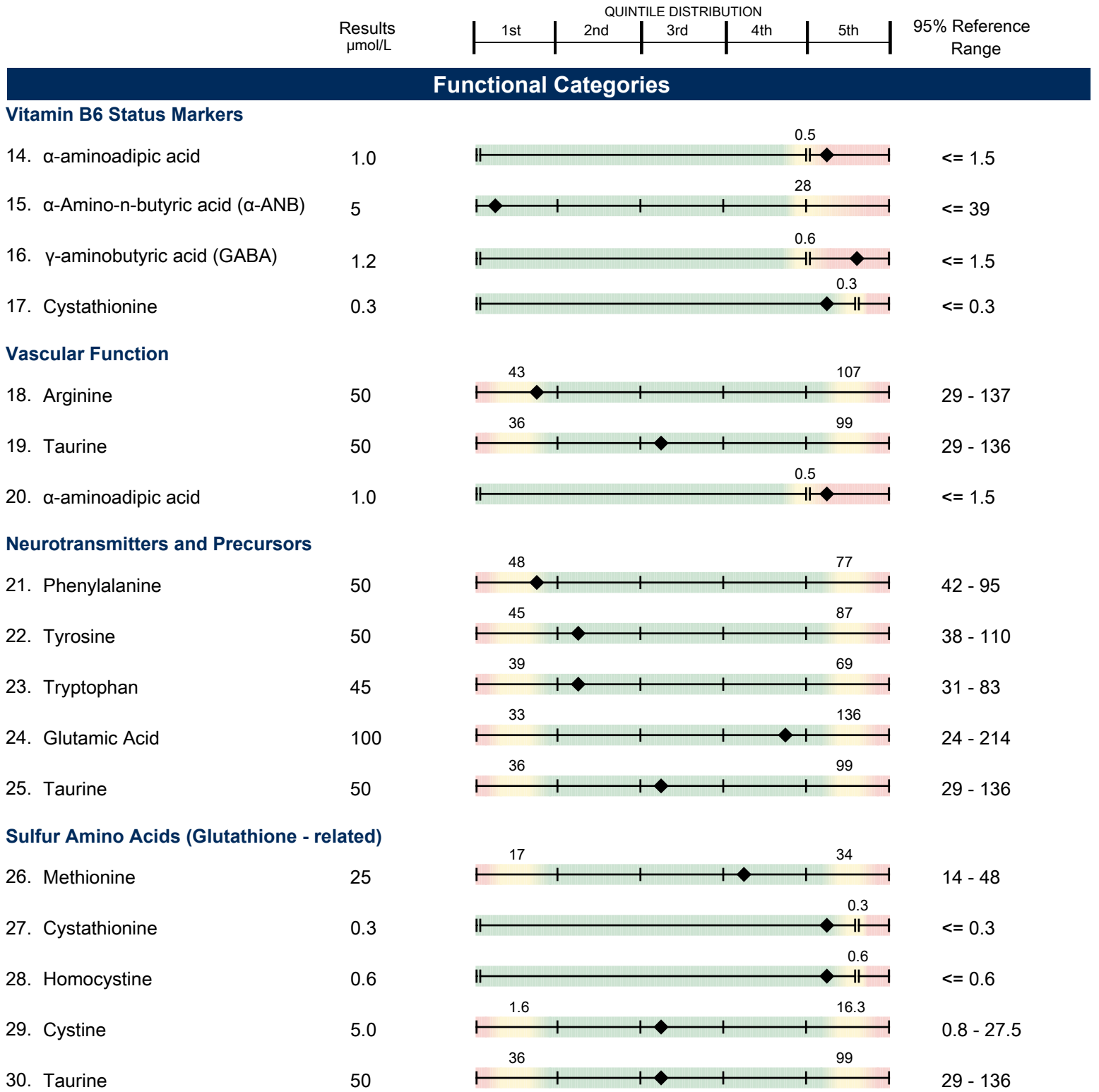




Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromatography

Ranges: Ages 13 and over.

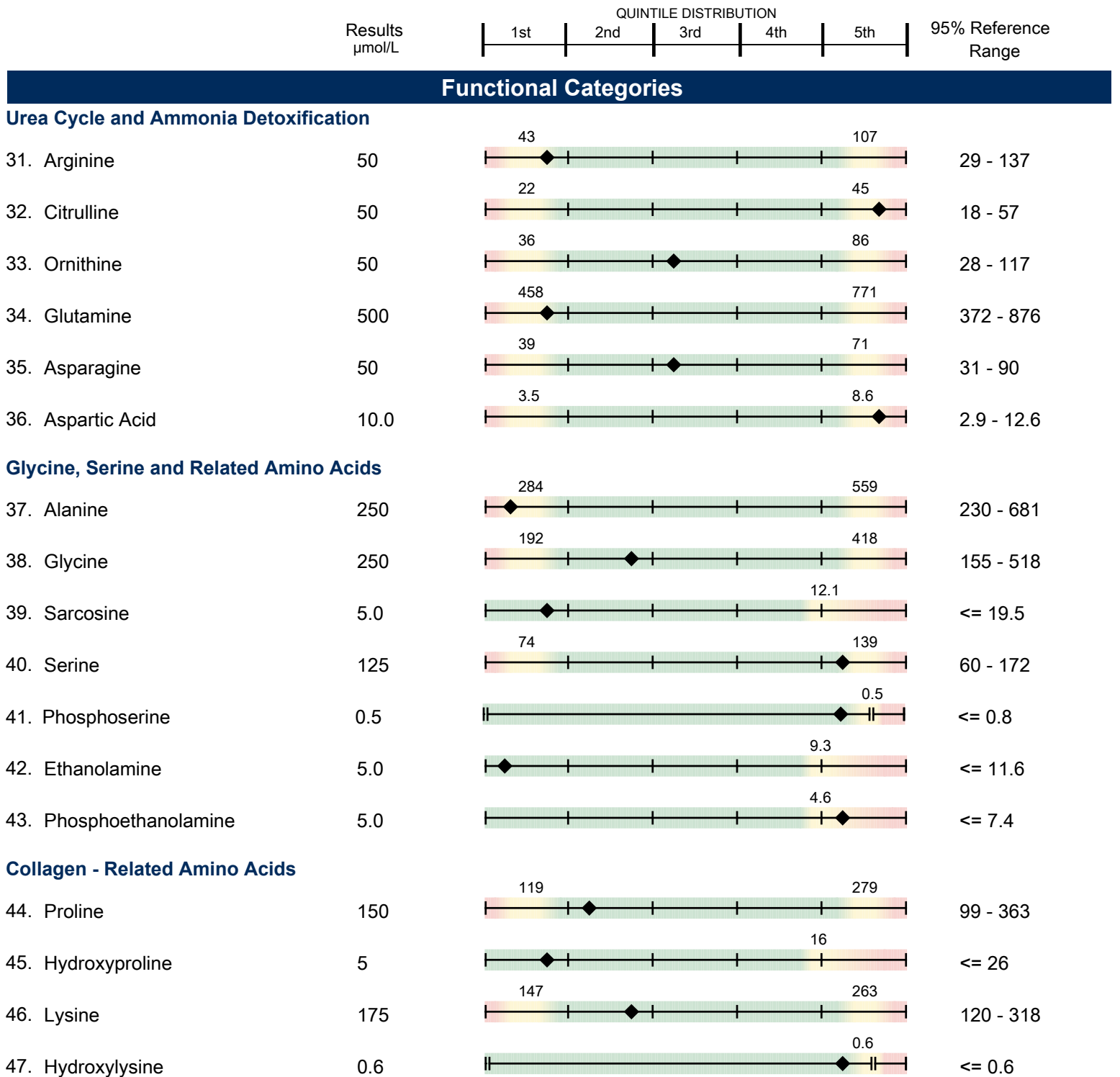




Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromatography

Ranges: Ages 13 and over.





Amino Acids 40 Profile - Plasma

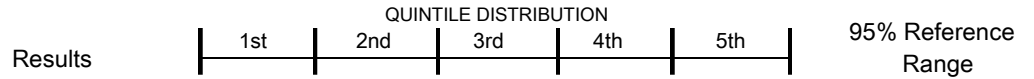
Methodology: High Performance Liquid Chromatography

Ranges: Ages 13 and over.



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

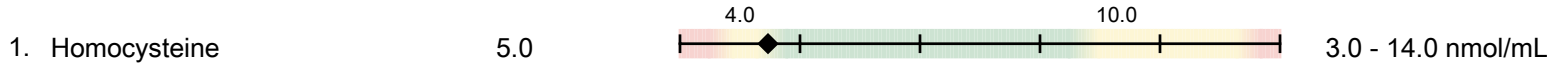
NR = Not Reportable



Homocysteine Assay - Plasma

Methodology: Enzymatic Assay

Ranges: Ages 13 and over.

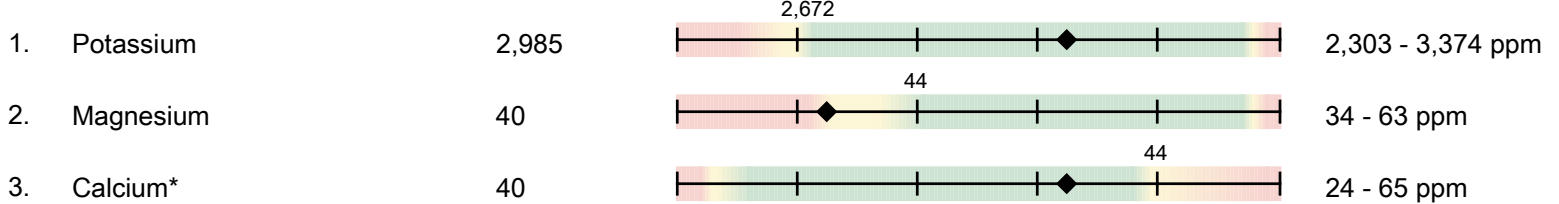


Nutrient & Toxic Elements Profile - Blood

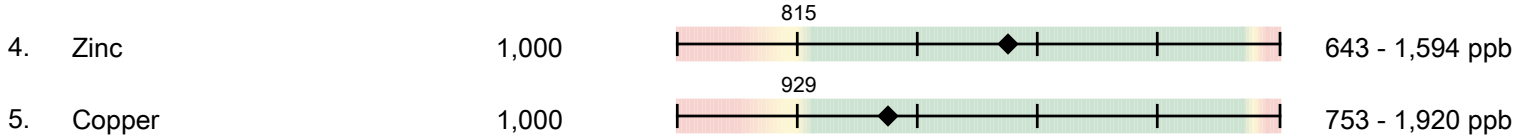
Methodology: Inductively Coupled Plasma/Mass Spectrometry

Nutrient Elements

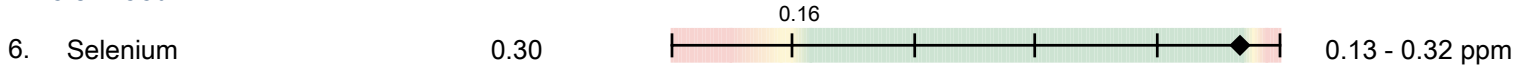
Erythrocytes (packed cells)



Plasma

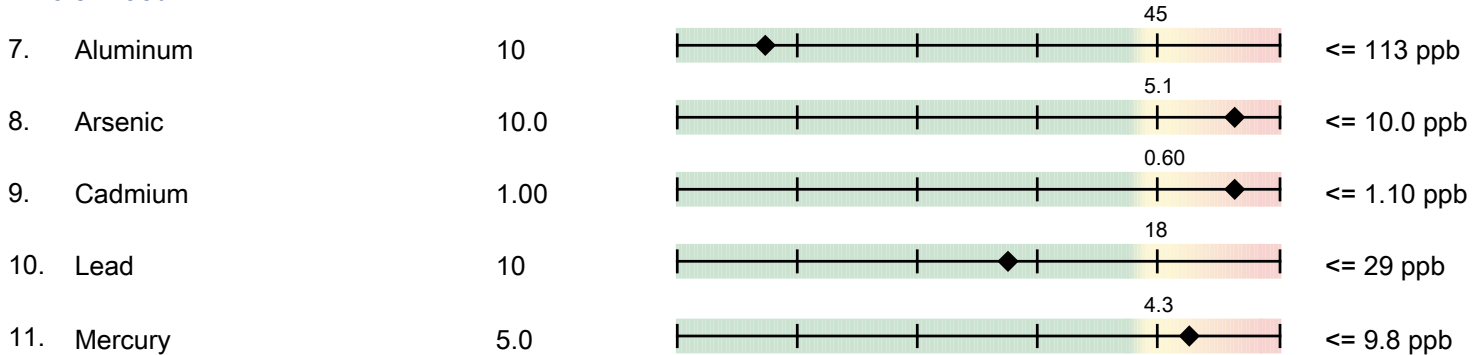


Whole Blood



Toxic Elements

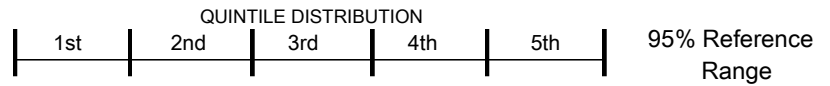
Whole Blood



*Relevant to membrane permeability, not nutritional status.

Results for whole blood toxic elements that are within normal limits do not rule out metal accumulation in other tissues.

NR = Not Reportable



Coenzyme Q10 Plus Vitamins Profile - Serum

Methodology: High Performance Liquid Chromatography

Ranges: Ages 13 and over.

	Results mg/L		95% Reference Range
1. Coenzyme Q10	2.00	0.64 — 2.16	0.48 - 3.04
2. alpha-Tocopherol	15.0	9.8 — 25.1	6.8 - 31.7
3. gamma-Tocopherol	2.00	0.26 — 2.06	0.06 - 2.99
4. Vitamin A (Retinol)	1.00	0.36 — 0.74	0.29 - 1.05
5. β-Carotene	2.00	0.15 — 1.70	0.10 - 2.71

Lipid Peroxides Assay - Serum

Methodology: High Performance Liquid Chromatography

	Results nmol/mL		95% Reference Range
6. Lipid Peroxides	1.00	1.72	<= 2.60

DNA/Oxidative Stress Marker (8-OHdG) Assay - Urine

Methodology: LC/Tandem Mass Spectrometry, Colorimetric

Ranges: Ages 13 and over.

	Results ng/mg creatinine		95% Reference Range
7. 8-Hydroxy-2-deoxyguanosine	1.4	5.3	<= 7.6

Vitamin D Profile - Serum

Methodology: Chemiluminescent

	Results ng/mL	Reference Range
8. 25-Hydroxyvitamin D ♦	50	30 - 100 ng/mL

- Deficiency: <20 ng/mL
- Insufficiency: 20-29 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.

Holick MF, et al. *J Clin Endocrinol Metab.* 2011;96(7):1911-1930.
 Vitamin D Council: <https://www.vitaminDcouncil.org/>

<DL = less than detection limit
 NR = Not Reportable

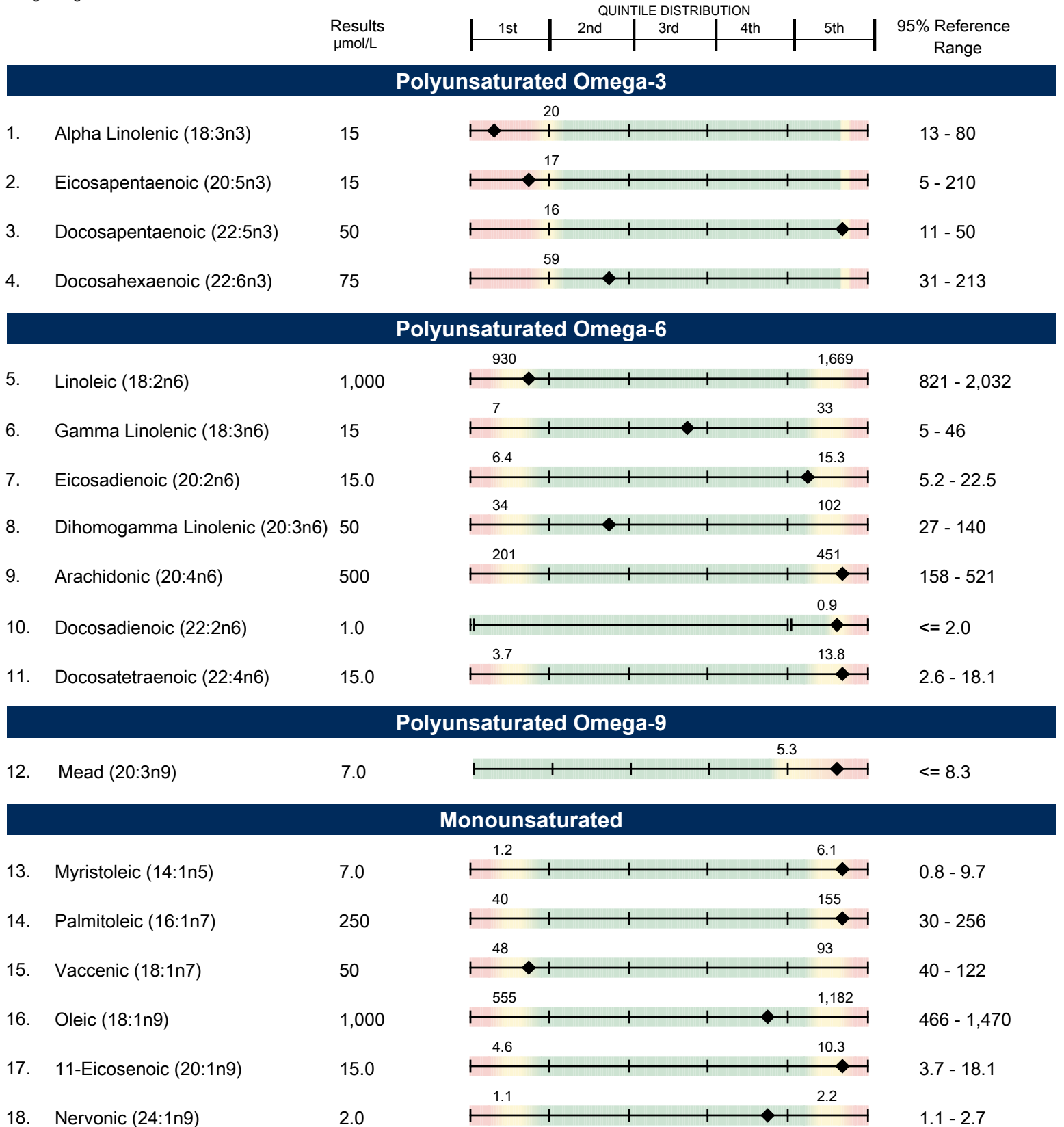
25-Hydroxyvitamin D testing performed by Genova Diagnostics, Inc. 63 Zillicoa St., Asheville, NC 28801-0174. A. L. Peace-Brewer, PhD, D(ABMLI), Lab Director - CLIA Lic. #34D0655571 - Medicare Lic. #34-8475.



Fatty Acids Profile - Plasma

Methodology: Capillary Gas Chromatography/Mass Spectrometry

Ranges: Ages 13 and over





Fatty Acids Profile - Plasma

Methodology: Capillary Gas Chromatography/Mass Spectrometry

Ranges: Ages 13 and over

		Results μmol/L	QUINTILE DISTRIBUTION					95% Reference Range
			1st	2nd	3rd	4th	5th	
Saturated								
19.	Capric (10:0)	2.0	1.4				4.0	0.8 - 6.2
20.	Lauric (12:0)	20.0	3.3				14.5	2.2 - 27.3
21.	Myristic (14:0)	50	20				87	15 - 139
22.	Palmitic (16:0)	800	792				1,794	667 - 2,526
23.	Stearic (18:0)	300	294				511	250 - 629
24.	Arachidic (20:0)	4.0	1.5				3.2	1.3 - 4.7
25.	Behenic (22:0)	2.5	0.8				2.0	0.6 - 2.9
26.	Lignoceric (24:0)	2.00	0.84				1.66	0.63 - 2.45
27.	Hexacosanoic (26:0)	0.30					0.36	<= 0.43
Odd Chain								
28.	Pentadecanoic (15:0)	15.0					14.5	<= 20.6
29.	Heptadecanoic (17:0)	20.0					19.3	<= 24.4
30.	Nonadecanoic (19:0)	1.00					1.51	<= 1.89
31.	Heneicosanoic (21:0)	0.50					0.50	<= 0.74
32.	Tricosanoic (23:0)	0.50					0.62	<= 0.78
Trans								
33.	Palmitelaidic (16:1n7t)	1.0					0.4	<= 1.8
34.	Total C:18 Trans	50					42	<= 59
Ratios								
35.	LA/DGLA	20					30	11 - 46
36.	EPA/DGLA	0.30	0.24					0.07 - 5.98
37.	AA/EPA	33					20	1 - 57
38.	Triene/Tetraene	0.014					0.016	<= 0.023

NR = Not Reportable

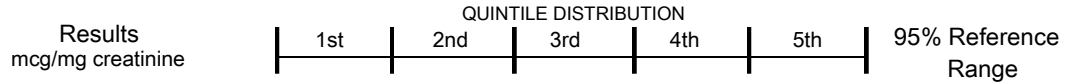


Organix® Comprehensive Profile - Urine

Methodology: LC/Tandem Mass Spectrometry, Colorimetric

This report is not intended for the diagnosis of neonatal inborn errors of metabolism.

Ranges: Ages 13 and over



Nutrient Markers

Fatty Acid Metabolism

(Carnitine & B2)

Item	Results	mcg/mg creatinine	Quintile Distribution	95% Reference Range
1. Adipate	2.9		6.2	<= 11.1
2. Suberate	0.6		2.1	<= 4.6
3. Ethylmalonate	2.9		3.6	<= 6.3

Carbohydrate Metabolism

(B1, B3, Cr, Lipoic Acid, CoQ10)

4. Pyruvate	2.9		3.9	<= 6.4
5. L-Lactate	<DL	L	8.5	0.6 - 16.4
6. β-Hydroxybutyrate	0.6		2.1	<= 9.9

Energy Production (Citric Acid Cycle)

(B comp., CoQ10, Amino Acids, Mg)

7. Citrate	57		601	56 - 987
8. Cis-Aconitate	10	L	51	18 - 78
9. Isocitrate	29	L	98	39 - 143
10. α-Ketoglutarate	0.3		19.0	<= 35.0
11. Succinate	2.9		11.6	<= 20.9
12. Fumarate	0.57		0.59	<= 1.35
13. Malate	0.6		1.4	<= 3.1
14. Hydroxymethylglutarate	0.6		3.6	<= 5.1

B-Complex Vitamin Markers

(B1, B2, B3, B5, B6, Biotin)

15. α-Ketoisovalerate	0.23		0.25	<= 0.49
16. α-Ketoisocaproate	0.29		0.34	<= 0.52
17. α-Keto-β-Methylvalerate	0.29		0.38	<= 1.10
18. Xanthurenate	0.23		0.34	<= 0.46
19. β-Hydroxyisovalerate	0.2		7.6	<= 11.5

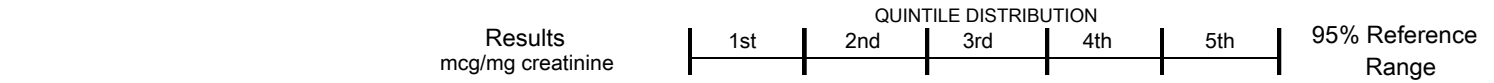


Organix® Comprehensive Profile - Urine

Methodology: LC/Tandem Mass Spectrometry, Colorimetric

This report is not intended for the diagnosis of neonatal inborn errors of metabolism.

Ranges: Ages 13 and over



Nutrient Markers

Methylation Cofactor Markers

(B12, Folate)

20. Methylmalonate	0.6	1.7	<= 2.3
21. Formiminoglutamate	0.1	1.2	<= 2.2

Cell Regulation Markers

Neurotransmitter Metabolism Markers

(Tyrosine, Tryptophan, B6, Antioxidants)

22. Vanilmandelate	1.4	1.6 - 3.9	1.2 - 5.3
23. Homovanillate	2.9	1.9 - 5.7	1.4 - 7.6
24. 5-Hydroxyindoleacetate	2.2	2.1 - 5.6	1.6 - 9.8
25. Kynurenate	0.6	1.0	<= 1.5
26. Quinolinate	2.9	4.0	<= 5.8
27. Picolinate	5.7	8.0	2.8 - 13.5

Oxidative Damage and Antioxidant Markers

(Vitamin C and Other Antioxidants)

28. p-Hydroxyphenyllactate	0.04	0.39	<= 0.66
29. 8-Hydroxy-2-deoxyguanosine	1.4	5.3	<= 7.6

(Units for 8-hydroxy-2-dexoyguanosine are ng/mg creatinine)

Toxicants and Detoxification

Detoxification Indicators

(Arg, NAC, Met, Mg, Antioxidants)

30. 2-Methylhippurate	0.105	0.084	<= 0.192
31. Orotate	0.57	0.69	<= 1.01
32. Glucarate	0.6	6.3	<= 10.7
33. α-Hydroxybutyrate	0.3	0.3	<= 0.9
34. Pyroglutamate	21	59	28 - 88
35. Sulfate	10	958 - 2,347	690 - 2,988

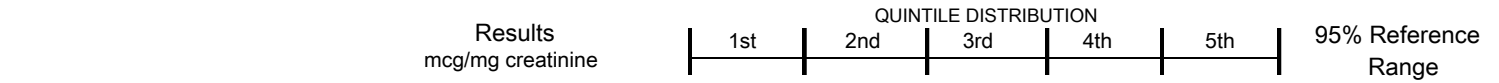


Organix® Comprehensive Profile - Urine

Methodology: LC/Tandem Mass Spectrometry, Colorimetric

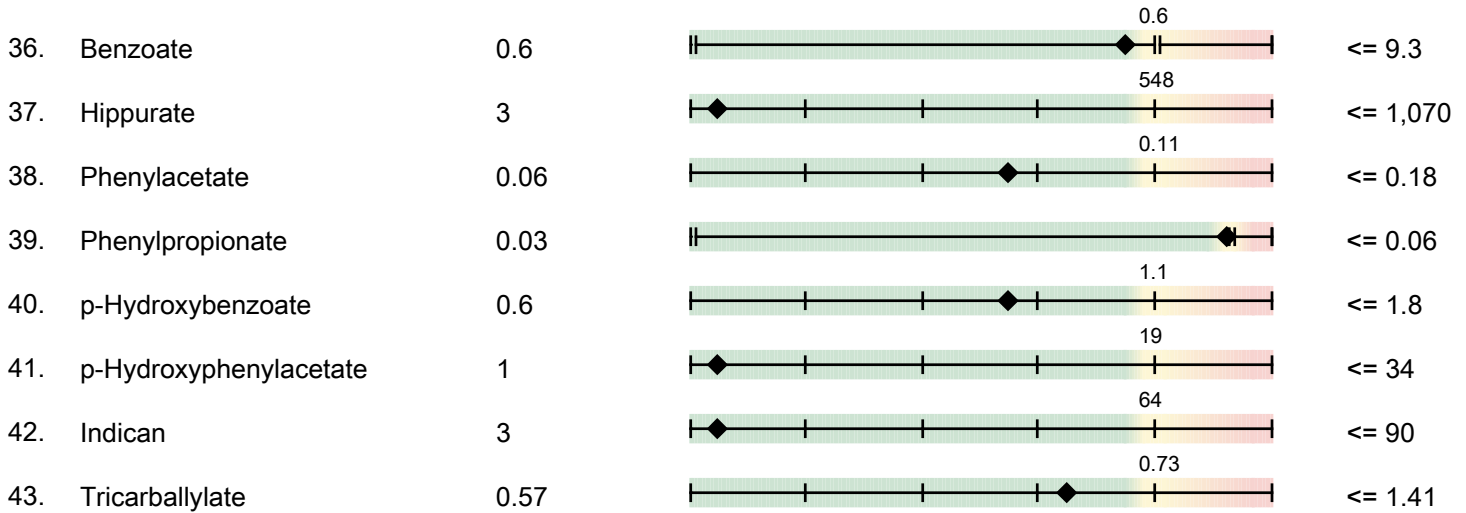
This report is not intended for the diagnosis of neonatal inborn errors of metabolism.

Ranges: Ages 13 and over

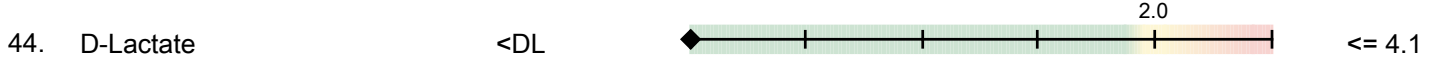


Compounds of Bacterial or Yeast/Fungal Origin

Bacterial - General



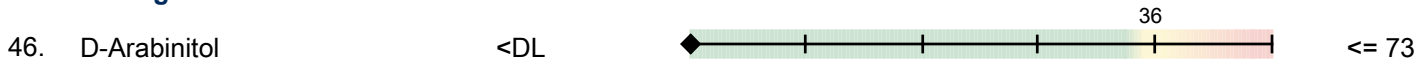
L. acidophilus / General Bacterial



Clostridial Species



Yeast / Fungal



Creatinine = 175 mg/dL

<DL = less than detection limit
 >UL = greater than upper linearity limit
 NR = Not Reportable



Commentary

The Diasorin Liaison 25-Hydroxyvitamin D Total Assay is certified by the CDC Vitamin D Standardization-Certification Program (CDC VDSCP).

The performance characteristics of all assays have been verified by Genova Diagnostics, Inc. Unless otherwise noted with ♦, the assay has not been cleared by the U.S. Food and Drug Administration.



3102 ION® Profile with Amino Acids 40 - Blood/Urine

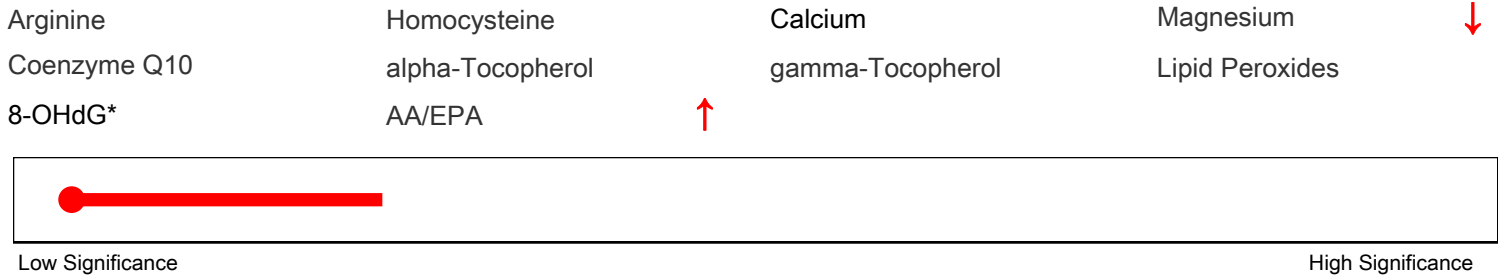
ION Analyte Pattern Analysis

A multi-analyte report can provide greater insight about health risks and special nutrient needs. Patterns of abnormalities can reinforce the degree of significance indicated by a single measurement. Analytes from the various profiles in the ION report are combined below into categories associated with clinical/metabolic conditions.

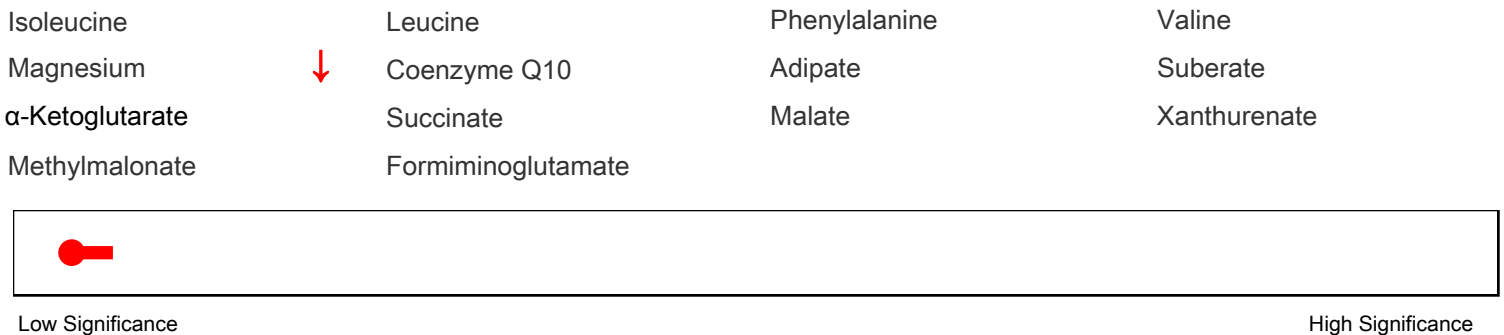
The categories included cover the most common areas of concern relevant to these profiles. Above each thermometer are listed the analytes used to calculate the degree of significance. An **↑** or **↓** appears when the patient result is outside the fourth quintile of the population.

The thermometer advances to the right as the number and severity of relevant abnormalities increases. The longer the filled bar, the greater the degree of significance or likelihood that a health threat may exist in that category. The preceding laboratory results provide the detail upon which these thermometers are based.

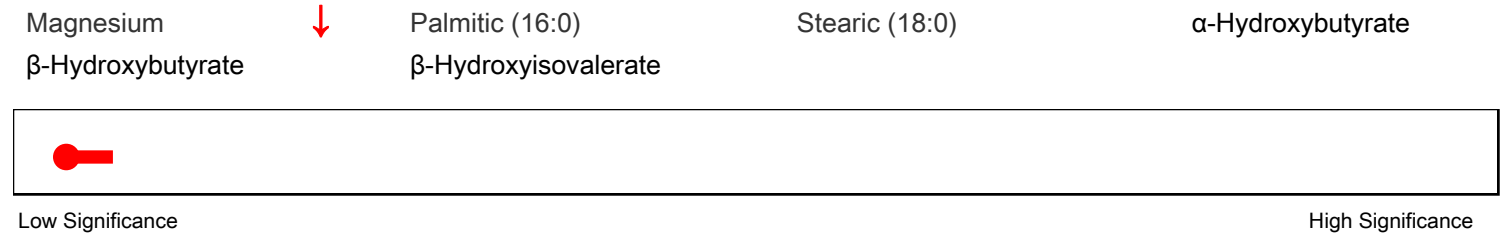
Cardiovascular System



Fatigue



Metabolic Syndrome (Syndrome X)



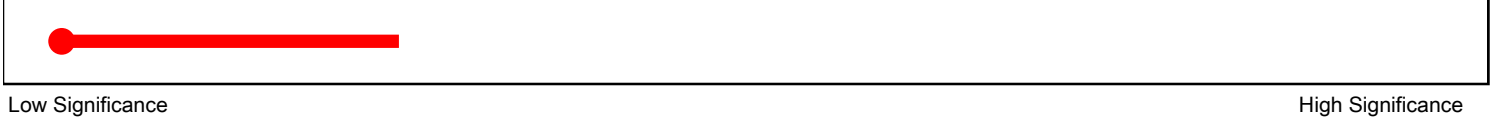
*8-OHdG = 8-Hydroxy-2-deoxyguanosine



3102 ION® Profile with Amino Acids 40 - Blood/Urine

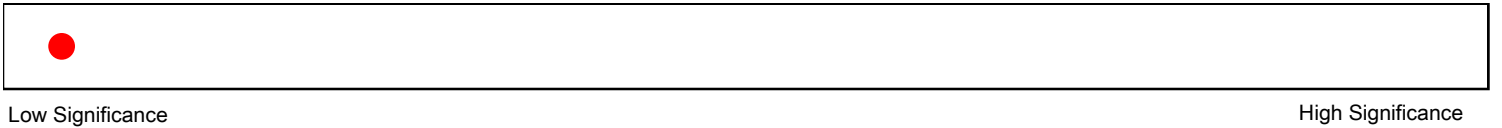
Mental/Emotional

Tryptophan	Tyrosine	Magnesium	↓	Eicosapentanoic	↓
Docosahexaenoic	Xanthurenate	Methylmalonate		Formiminoglutamate	
Vanilmandelate	↓	5-Hydroxyindoleacetate			



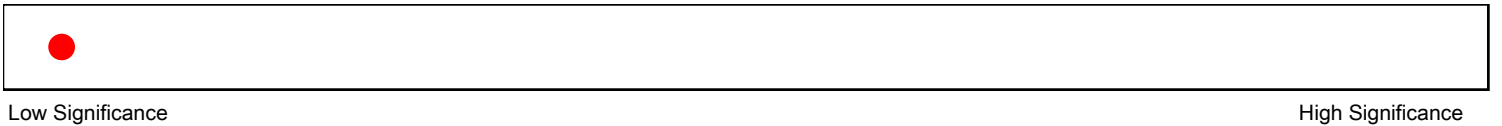
Intestinal/Bacterial Metabolites

Phenylacetate	Phenylpropionate	p-Hydroxybenzoate	p-Hydroxyphenylacetate
Indican	Tricarballylate	D-Lactate	3,4-DHPP*



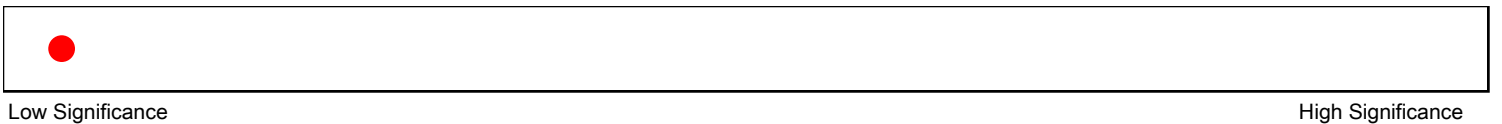
Intestinal Yeasts/Fungal Metabolites

D-Arabinitol



Digestion/Absorption

Arginine	Histidine	Isoleucine	Leucine
Lysine	Methionine	Phenylalanine	Threonine
Tryptophan	Valine	Selenium	



*3,4-DHPP = 3,4-Dihydroxyphenylpropionate



3102 ION® Profile with Amino Acids 40 - Blood/Urine

Toxic Exposure

Aluminum	Arsenic	Cadmium	Lead
Mercury	Palmitelaidic (16:1n7t) ↑	Total C:18 Trans ↑	Citrate
Cis-Aconitate	Isocitrate	Quinolinate	2-Methylhippurate ↑
Orotate	Glucarate		



Low Significance

High Significance

Detoxification Impairment

Methionine	Glycine	Serine	Taurine
Glutamine	Pyroglutamate ↓	Sulfate ↓	Benzoate



Low Significance

High Significance

Oxidative Stress/Antioxidant Insufficiency

Taurine	Selenium	Lead	Mercury
alpha-Tocopherol	gamma-Tocopherol	Vitamin A (Retinol)	β-Carotene
Lipid Peroxides	8-OHdG*	p-Hydroxyphenyllactate	Sulfate ↓

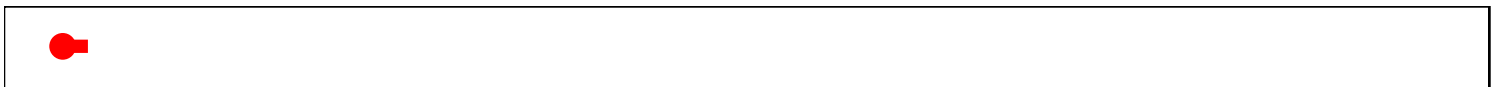


Low Significance

High Significance

Mitochondrial Functional Impairment

Magnesium ↓	Coenzyme Q10	Adipate	Suberate
Ethylmalonate	Pyruvate	L-Lactate	α-Hydroxybutyrate
β-Hydroxybutyrate	Succinate	Fumarate	Malate



Low Significance

High Significance

*8-OHdG = 8-Hydroxy-2-deoxyguanosine



3102 ION® Profile with Amino Acids 40 - Blood/Urine

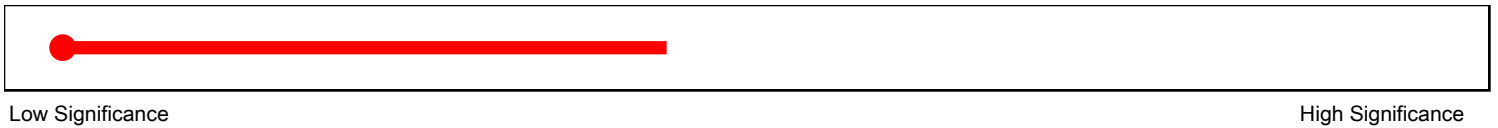
Amino Acid Insufficiency

Arginine	Histidine	Isoleucine	Leucine
Lysine	Methionine	Phenylalanine	Threonine
Tryptophan	Valine	Sulfate	↓



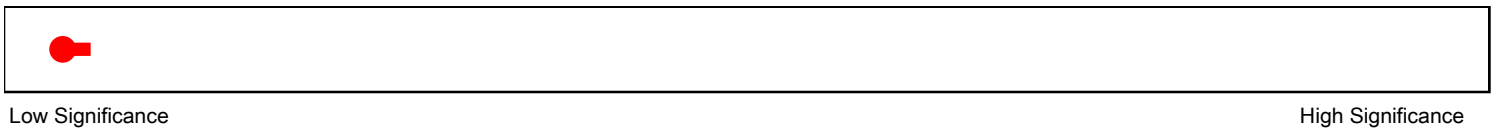
Essential Fatty Acid Insufficiency

Arachidonic	Alpha Linoleic	↓	Eicosapentaenoic	↓	Docosahexaenoic
Linoleic	Gamma Linolenic		Dihomogamma Linolenic		Palmitoleic
Triene/Tetraene					↑



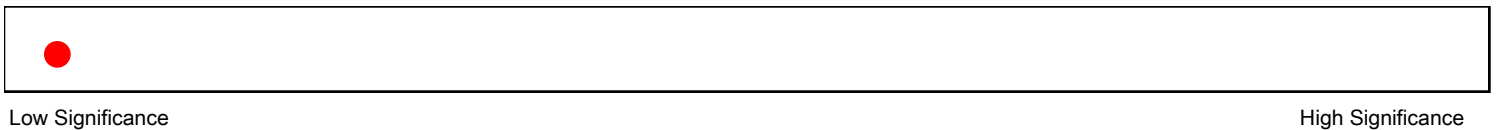
Disordered Methyl Group (Single Carbon) Transfer

Homocysteine	Pentadecanoic	↑	Heptadecanoic	↑	Nonadecanoic
Tricosanoic	Xanthurenate		Methylmalonate		Formiminoglutamate
Kynurenate					



Disordered Tryptophan Metabolism

Tryptophan	Xanthurenate	5-Hydroxyindoleacetate	Kynurenate
Quinolinic acid	Indican		



**3102 ION® Profile with Amino Acids 40 - Blood/Urine****Additional Considerations**

This page is provided as a starting point that may guide decisions about medical treatment based on the test results. It is derived only from the laboratory results included in this report. Final recommendations should be based on consideration of the patient's medical history and current clinical condition.

Nutrient	Nutrient Need
Vitamin D	Moderate
N-Acetylcysteine	Low

Various conditionally essential nutrients and other potentially beneficial interventions appear in this section only if relevant abnormalities are present.


3102 ION® Profile with Amino Acids 40 - Blood/Urine
General Supplement Ranges

These supplement ranges are not adjusted for age, sex, or gender.

Nutrient supplementation is at the discretion of the treating clinician. The supplement dose ranges provided below are meant for educational purposes only. These dosage ranges relate to findings commonly found on Genova's nutritional panels and do not apply to specific disease conditions where different dosages may be warranted.

Nutrient	Adult Dosage Range*
Vitamin A	0-5000 IU
Vitamin C	0-1000 mg
Vitamin D	0-2000 IU
Vitamin E (mixed tocopherols)	0-400 IU
Vitamin B-1 (Thiamin)	0-50 mg
Vitamin B-2 (Riboflavin)	0-50 mg
Vitamin B-3 (Niacin)	0-50 mg
Vitamin B-5 (Pantothenic Acid)	0-100 mg
Vitamin B-6 (Pyridoxine)	0-50 mg
Vitamin B-12 (Cobalamin)	0-1000 mcg
Folic Acid	0-1000 mcg
Biotin	0-400 mcg
Magnesium	0-400 mg
Zinc	0-25 mg
Selenium	0-200 mcg
Omega-3	0-3 gms
Carnitine	0-1000 mg
Coenzyme Q10	0-200 mg
Lipoic Acid	0-200 mg
N-Acetylcysteine	0-1000 mg
L-Arginine	0-1000 mg
Glycine	0-3000 mg
L-Glutamine	0-3000 mg
L-Isoleucine	0-500 mg
L-Leucine	0-1000 mg
L-Lysine	0-1000 mg
L-Methionine	0-500 mg
L-Phenylalanine	0-500 mg
Taurine	0-1000 mg
L-Tyrosine	0-1000 mg
L-Threonine	0-500 mg
L-Tryptophan	0-200 mg
L-Valine	0-500 mg

*Dosage ranges are adapted from the textbook *Nutritional Medicine* by Alan Gaby, M.D.¹

1. Gaby AR. *Nutritional Medicine*. Vol 265: Fritz Perlberg Publishing; 2011.