

Patient: **SAMPLE
PATIENT**

DOB:

Sex:

3102 ION ® Profile - Blood/Urine

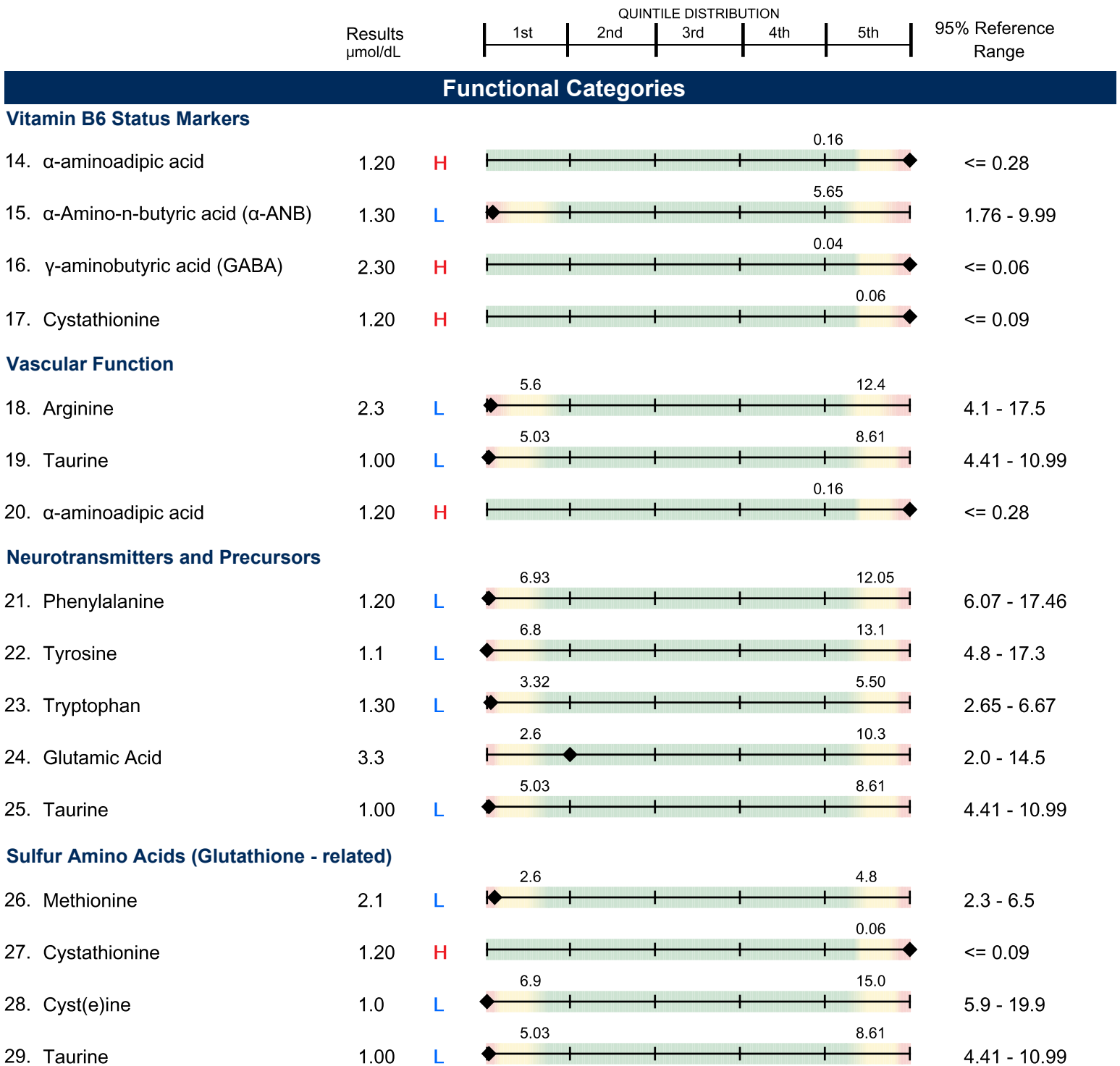
Amino Acids 40 Profile - Plasma

Methodology: LC/MS/MS



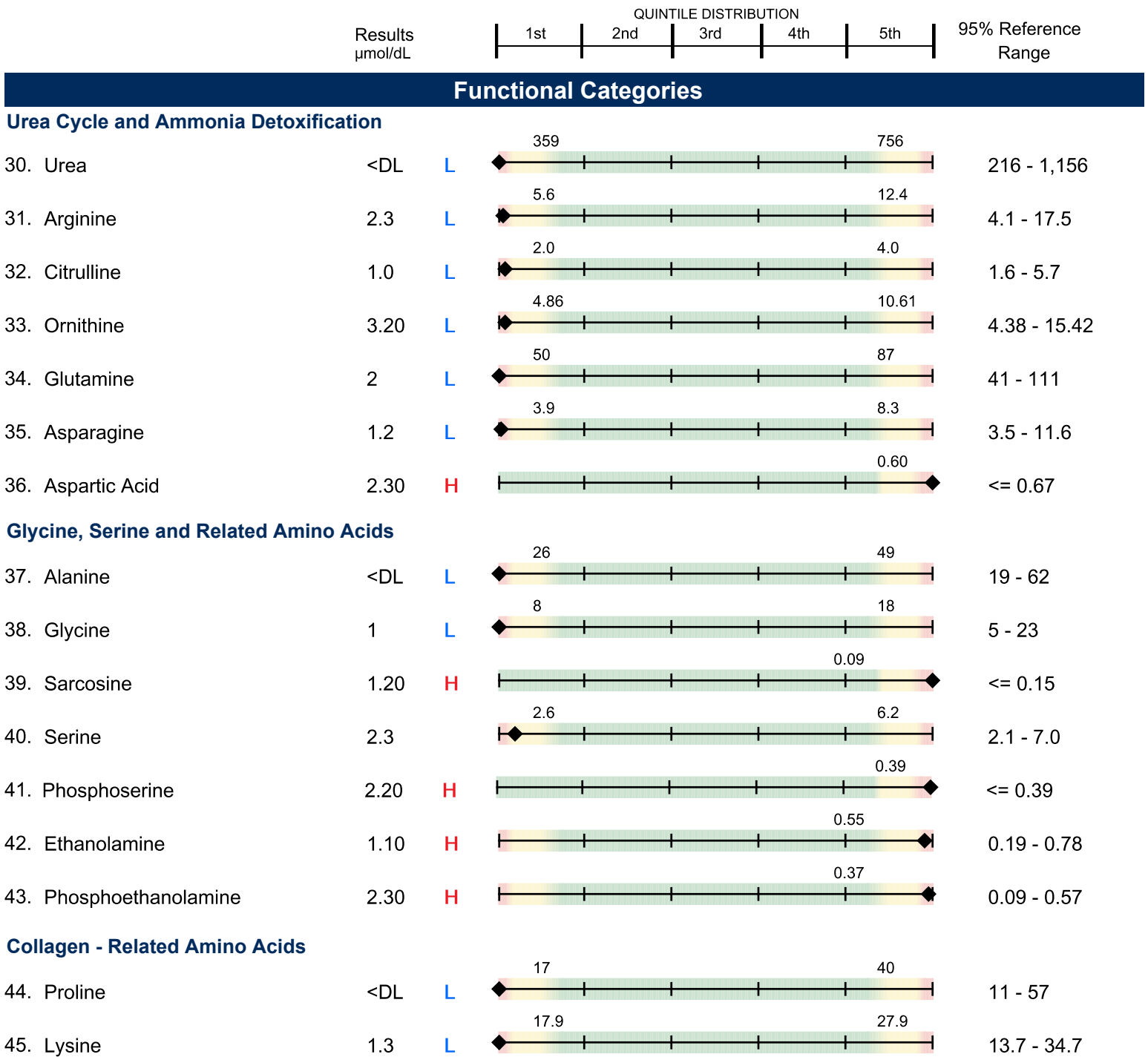
Amino Acids 40 Profile - Plasma

Methodology: LC/MS/MS



Amino Acids 40 Profile - Plasma

Methodology: LC/MS/MS



Amino Acids 40 Profile - Plasma

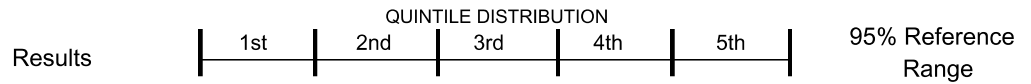
Methodology: LC/MS/MS



		QUINTILE DISTRIBUTION					95% Reference Range	
Results μmol/dL		1st	2nd	3rd	4th	5th		
Functional Categories								
β-Amino Acids and Derivatives								
46. β-Alanine	1.2	H	0.4					≤ 0.7
47. Histidine	1.2	L	7.011.7					6.5 - 13.3
48. 1-Methylhistidine	1.20		2.17					≤ 3.85
DNA (Thymine) Degradation								
49. β-Aminoisobutyric Acid	1.10	H	0.41					≤ 0.72
Muscle-Specific Amino Acids								
50. 3-Methylhistidine	1.30	H	0.56					≤ 0.78
Ratios								
51. Phenylalanine/Tyrosine	1.09		0.701.14					0.53 - 1.46
52. Glutamic Acid/Glutamine	1.65	H	0.14					≤ 0.31
53. α-ANB/Leucine	NR		0.170.41					0.07 - 0.54
54. Tryptophan/LNAA	NR		0.0500.075					0.041 - 0.091

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

NR = Not Reportable



Homocysteine Assay - Plasma

Methodology: Enzymatic Assay

1. Homocysteine	22.0	H		3.7 - 10.4 umol/L
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Nutrient & Toxic Elements Profile - Blood

Methodology: Inductively Coupled Plasma/Mass Spectrometry

Nutrient Elements

Erythrocytes (packed cells)

1. Potassium	125	L		2,220 - 3,626 mcg/g
2. Magnesium	0.5	L		30.1 - 56.5 mcg/g

Plasma

3. Zinc	5.0	L		64.3 - 159.4 mcg/dL
4. Copper	15.0	L		75.3 - 192.0 mcg/dL

Whole Blood

5. Selenium	50	L		109 - 330 mcg/L
6. Manganese	10.0			3.0 - 16.5 mcg/L

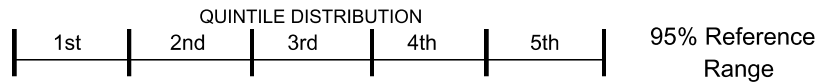
Toxic Elements

Whole Blood

7. Arsenic	0.2			<= 13.7 mcg/L
8. Cadmium	0.20			<= 1.22 mcg/L
9. Lead	<DL			<= 2.81 mcg/dL
10. Mercury	<DL			<= 4.35 mcg/L

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-pressure liquid chromatography (HPLC), LC/MS/MS

Results					
1.	Coenzyme Q10	15.00	H		0.43 - 1.49 mcg/mL
2.	alpha-Tocopherol **	3.0	L		9.0 - 29.0 mg/L
3.	gamma-Tocopherol **	4.0			0.5 - 4.9 mg/L
4.	Vitamin A (Retinol) **	12.0	L		22.0 - 69.5 mcg/dL
5.	β-Carotene **	2	L		3 - 91 mcg/dL

**Indicates testing performed at Labcorp Burlington 1447 York Court, Burlington, NC 27215-3361 Lab Director = Sanjai Nagendra, MD CLIA # 34D0655059

Glutathione Assay - Whole Blood

Methodology: Colorimetric

Results					
6.	Glutathione	109	L		>= 669 umol/L

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

Methodology: LC/MS/MS, TBARS (thiobarbituric acid reactive substances), Hexokinase/G-6-PDH

Results					
7.	Lipid Peroxides	14.9	H		<= 10.0 umol/g creatinine
8.	8-Hydroxy-2-deoxyguanosine	15			<= 15 mcg/g creatinine

Vitamin D Profile - Serum

Methodology: Chemiluminescent

	Results	Reference Range
9.	25 - Hydroxyvitamin D ♦	45
		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

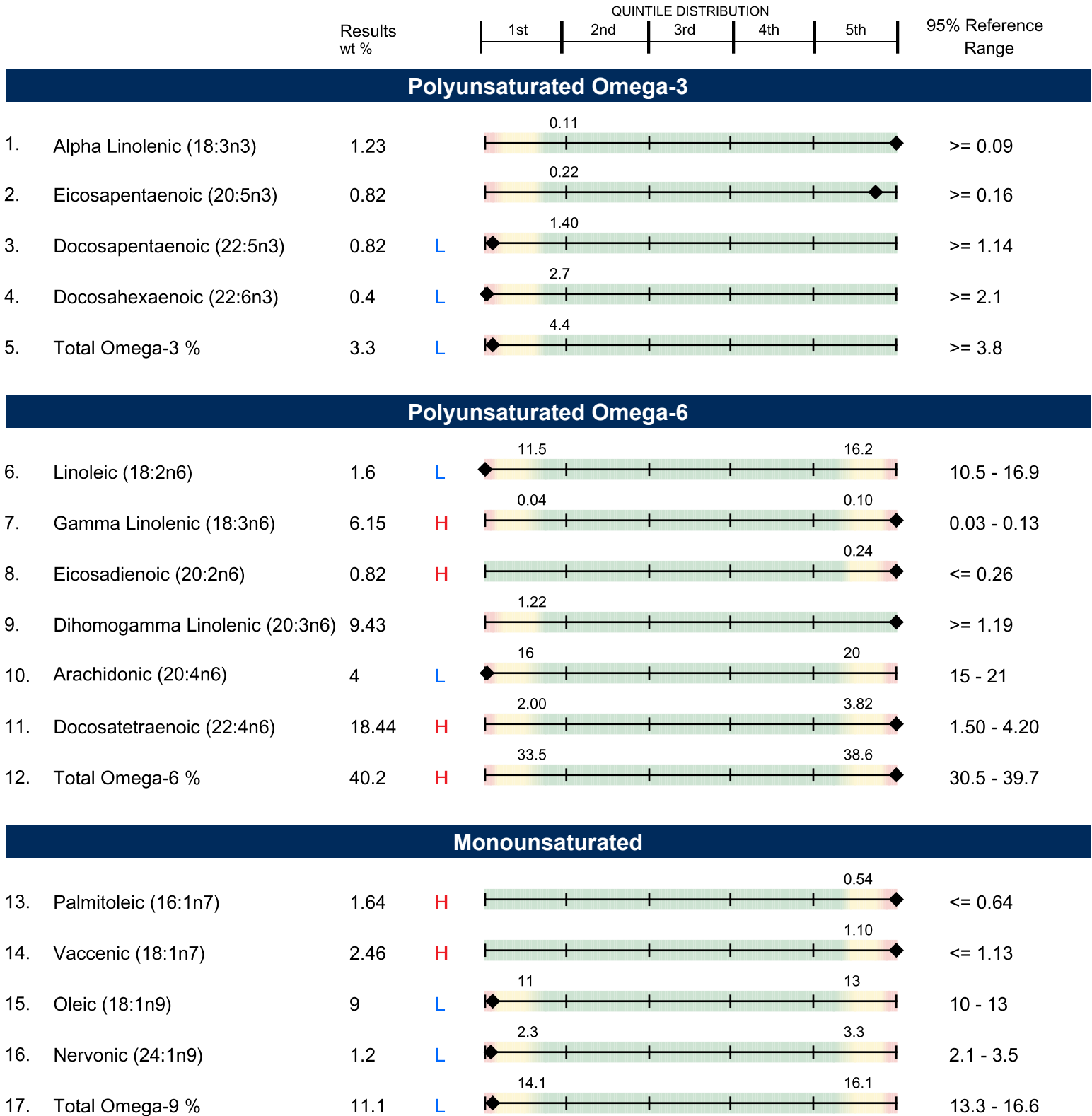
There is no consensus in the literature regarding optimal levels of 25-Hydroxyvitamin D. Higher levels of 25-Hydroxyvitamin D may be concerning in patients with renal failure. Levels below 30 ng/mL are considered insufficient by most medical associations.

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
 >UL = greater than upper linearity limit
 NR = Not Reportable

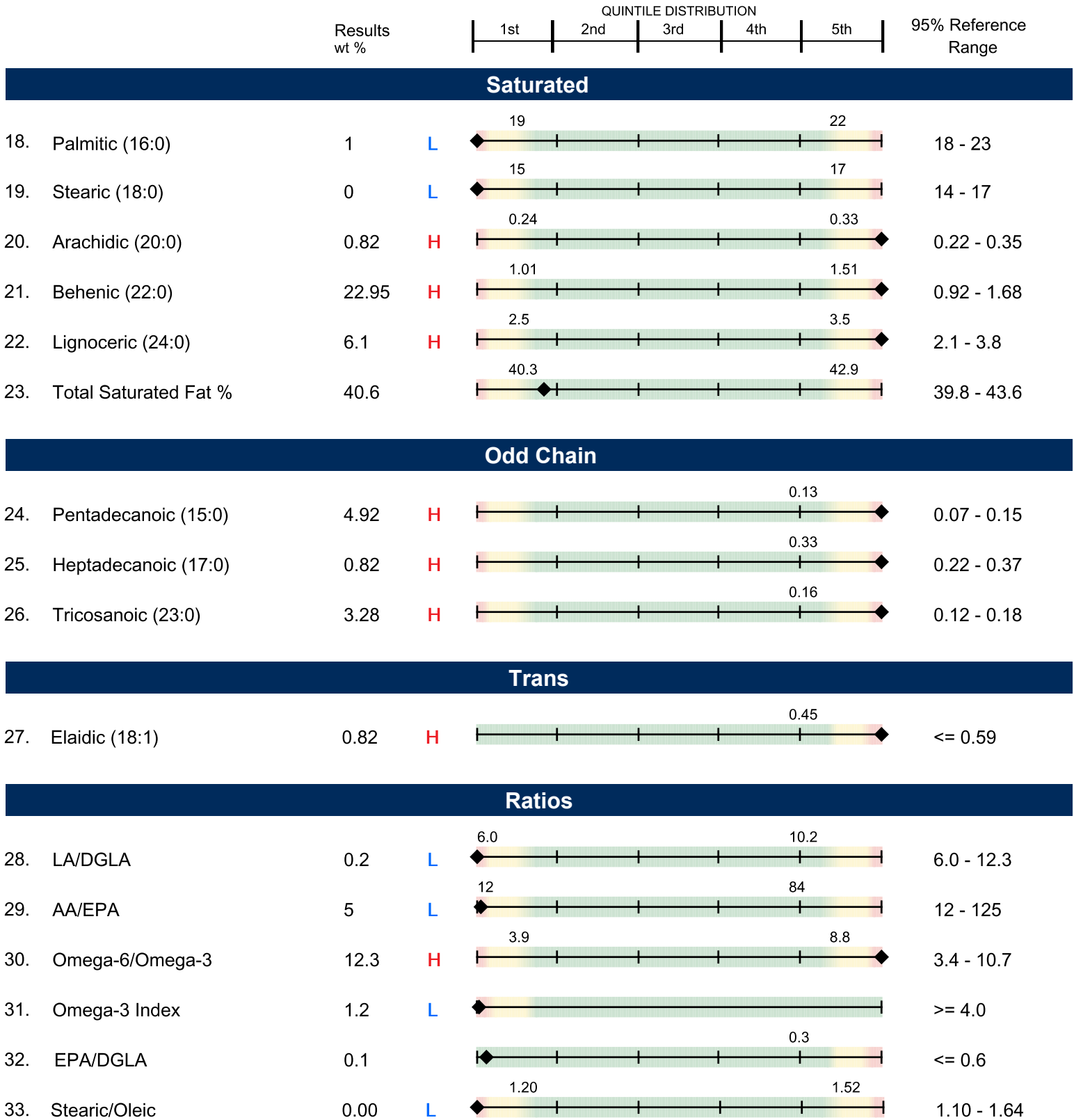
Fatty Acids Profile - RBC

Methodology: Gas Chromatography/Mass Spectrometry



Fatty Acids Profile - RBC

Methodology: Gas Chromatography/Mass Spectrometry

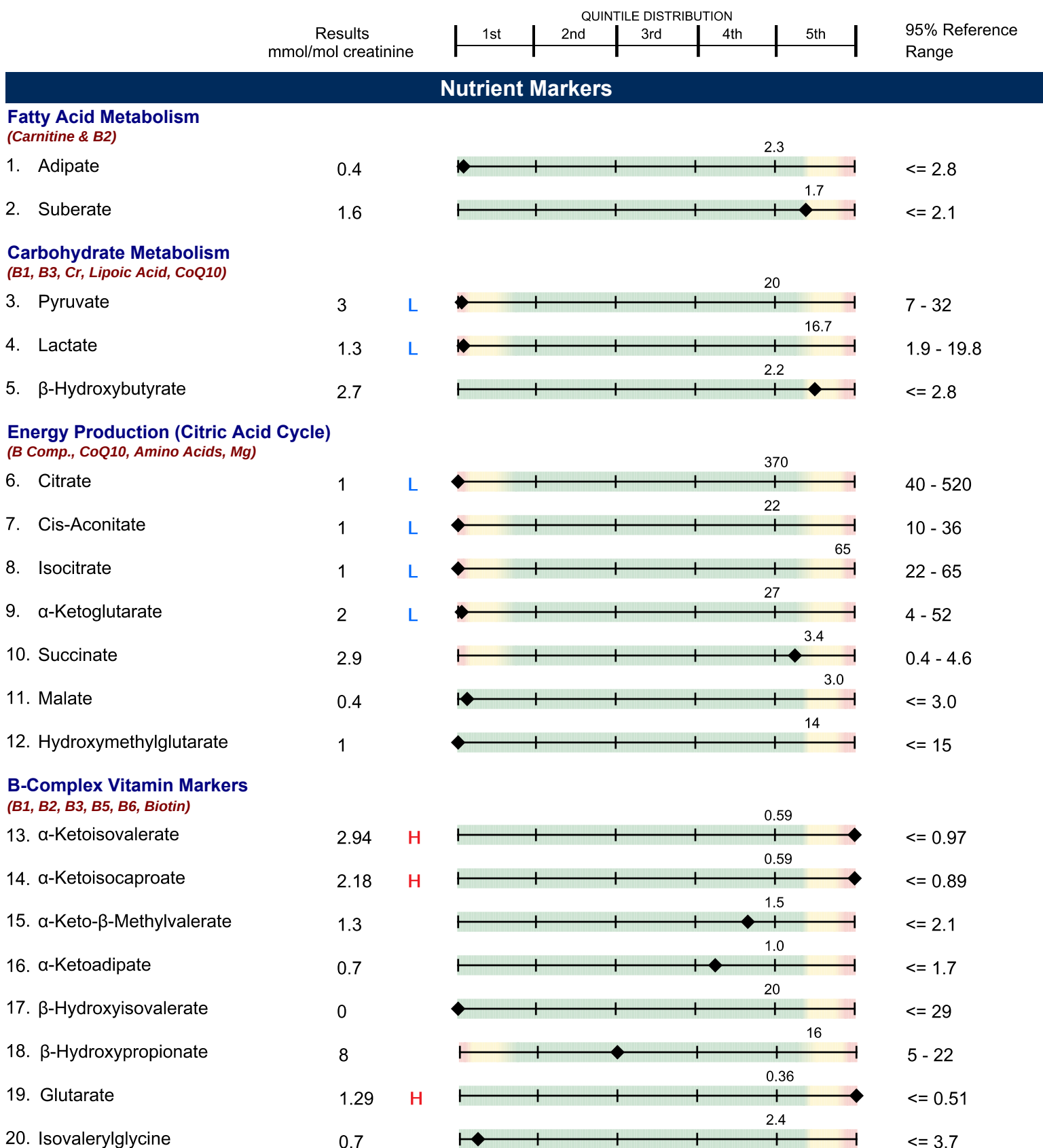


NR = Not Reportable

Organix ® #3301 - Urine

Methodology: GC/MS, LC/MS/MS, Alkaline Picrate, Colorimetric

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



Organix ® #3301 - Urine

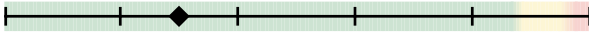
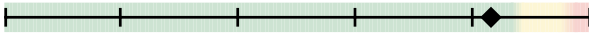
Methodology: GCMS, LC/MS/MS, Alkaline Picrate, Colorimetric

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

Results mmol/mol creatinine	QUINTILE DISTRIBUTION					95% Reference Range
	1st	2nd	3rd	4th	5th	

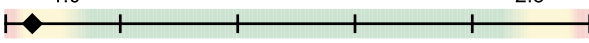
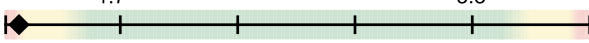
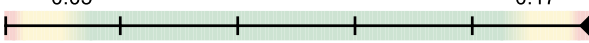
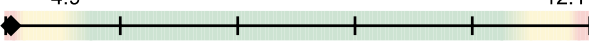
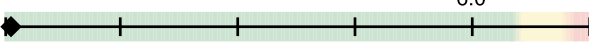
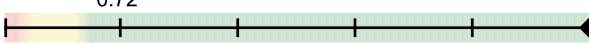
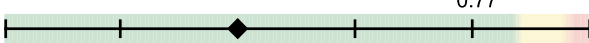
Nutrient Markers**Methylation Cofactor Markers**

(B12, Folate)

21. Methylmalonate	1.0		<= 1.9
22. Formiminoglutamate	1.3		<= 1.5

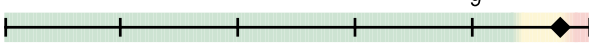
Cell Regulation Markers**Neurotransmitter Metabolism Markers**

(Tyrosine, Tryptophan, B6, Antioxidants)

23. Vanilmandelate	0.6		0.4 - 3.6
24. Homovanillate	1.2		1.2 - 5.3
25. 3-Methyl-4-Hydroxyphenylglycol	0.62	H 	0.02 - 0.22
26. 5-Hydroxyindoleacetate	1.5	L 	3.8 - 12.1
27. Kynurenate	0.9		<= 7.1
28. Quinolate	0.3		<= 9.1
29. Kynurenate/Quinolate	3.00		>= 0.44
30. Xanthurenate	0.55		<= 0.96

Oxidative Damage and Antioxidant Markers

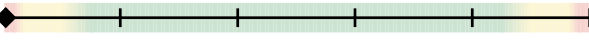
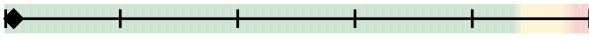
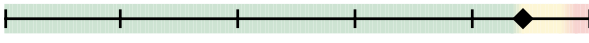
(Vitamin C and Other Antioxidants)

31. 8-Hydroxy-2-deoxyguanosine	15		<= 15
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(Units for 8-hydroxy-2-dexoyguanosine are mcg/g creatinine)

Toxicants and Detoxification**Detoxification Indicators**

(Arg, NAC, Met, Mg, Antioxidants)

32. Orotate	1.09	H 	0.33 - 1.01
33. α-Hydroxybutyrate	1.09	H 	<= 0.83
34. Pyroglutamate	1	L 	16 - 34
35. α-Hydroxyisobutyrate	1.6		<= 6.7
36. α-Ketophenylacetate	0.38		<= 0.46

Organix ® #3301 - Urine

Methodology: GCMS, LC/MS/MS, Alkaline Picrate, Colorimetric

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

Results mmol/mol creatinine	QUINTILE DISTRIBUTION					95% Reference Range
	1st	2nd	3rd	4th	5th	

Compounds of Bacterial or Yeast/Fungal Origin**Bacterial - General**

37. Benzoate	1.86	H	0.05	<= 0.05
38. Hippurate	2		329	<= 603
39. Phenylacetate	0.42	H	0.08	<= 0.12
40. Indoleacetate	0.3		2.4	<= 4.2
41. p-Hydroxyphenylacetate	0		25	<= 29
42. m-Hydroxyphenylacetate	1.9		4.6	<= 8.1

Clostridial Species

43. 3,4-Dihydroxyphenylpropionate	0.3		2.9	<= 5.3
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Yeast / Fungal

44. D-Arabinitol	0		32	<= 36
45. Citramalate	0.8		3.3	<= 5.8
46. Tartarate	1		7	<= 15

Oxalate Markers**Oxalates**

47. Glycerate	1.1	L	13.6	3.5 - 16.4
48. Glycolate	1		43	<= 67
49. Oxalate	1		40	<= 78

Creatinine

Results mmol/L			
50. Urine Creatinine ♦	8.8		3.1 - 19.5

<DL = less than detection limit

>UL = greater than upper linearity limit

NR = Not Reportable



Commentary

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.

Homocysteine: The reference range for the biomarker Homocysteine is based on the sex-specific 5th to 95th percentile values for men and women (20 to 39 years of age) in the NHANES nutritionally replete cohort. Annals of Internal Medicine 1999; 141 (331-338).



ION Analyte Pattern Analysis

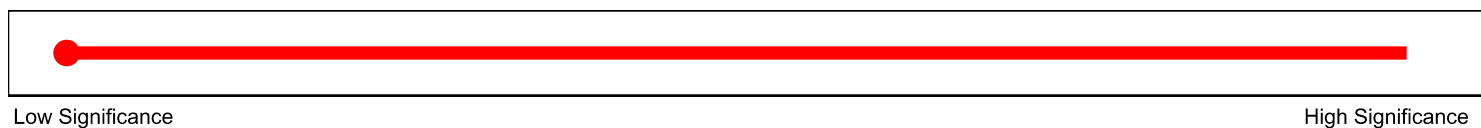
A multi-analyte report can provide greater insight about health risks and special nutrient needs. Patterns of abnormalities can reinforce the degree of significance indicated by a single measurement. Analytes from the various profiles in the ION report are combined below into categories associated with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

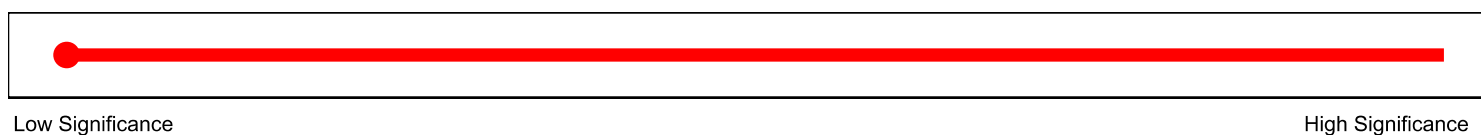
Cardiovascular System

Arginine	$\downarrow$	Homocysteine	8-OHdG*	$\uparrow$	Magnesium	$\downarrow$
Coenzyme Q10		alpha-Tocopherol **	gamma-Tocopherol **		Lipid Peroxides	$\uparrow$
AA/EPA						



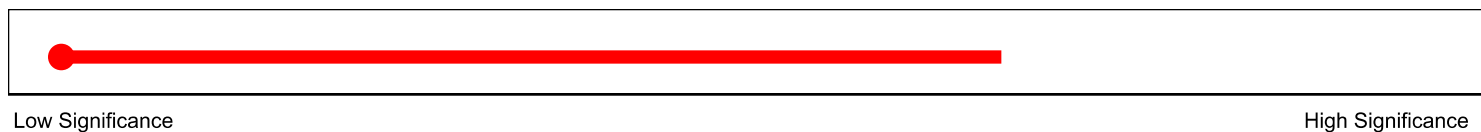
Fatigue

Isoleucine	$\downarrow$	Leucine	$\downarrow$	Phenylalanine	$\downarrow$	Valine	$\downarrow$
Magnesium	$\downarrow$	Coenzyme Q10		Adipate		Suberate	
α -Ketoglutarate		Succinate		Malate		Xanthurenate	
Methylmalonate		Formiminoglutamate					



Metabolic Syndrome (Syndrome X)

Magnesium	$\downarrow$	Palmitic (16:0)	Stearic (18:0)	α -Hydroxybutyrate	$\uparrow$
β -Hydroxybutyrate	$\uparrow$	β -Hydroxyisovalerate			



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

**Indicates testing performed at Labcorp Burlington 1447 York Court, Burlington, NC 27215-3361 Lab Director = Sanjai Nagendra, MD CLIA # 34D0655059

3102 ION ® Profile - Blood/Urine



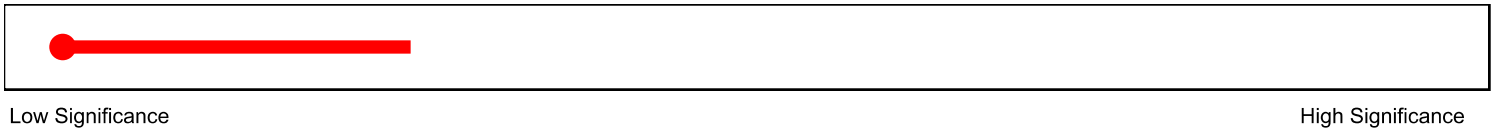
Mental/Emotional

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



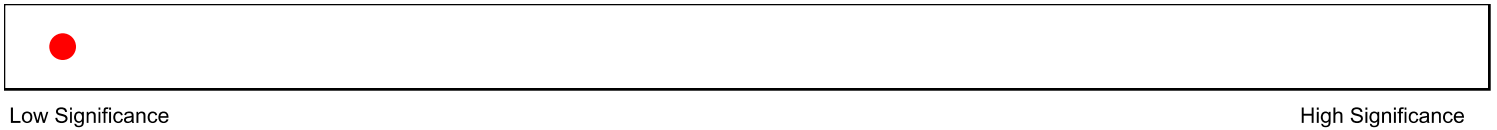
Intestinal/Bacterial Metabolites

Phenylacetate	↑	Lactate	3,4-DHPP*	p-Hydroxyphenylacetate
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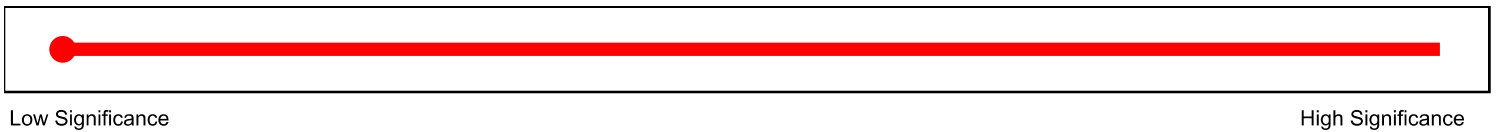
Intestinal Yeasts/Fungal Metabolites

D-Arabinitol



Digestion/Absorption

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



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

3102 ION ® Profile - Blood/Urine



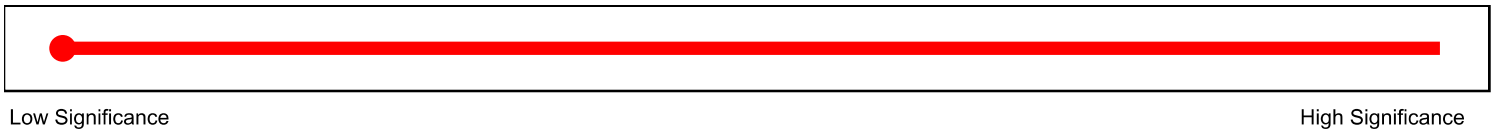
Toxic Exposure

Arsenic	Cadmium	Lead	Isocitrate
Mercury	Citrate	Quinolate	Orotate
Cis-Aconitate			↑



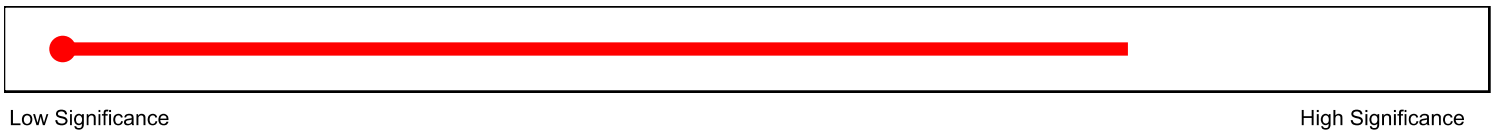
Detoxification Impairment

Methionine	↓	Glycine	↓	Serine	↓	Taurine	↓
Glutamine	↓	Pyroglutamate	↓	Benzoate	↑		



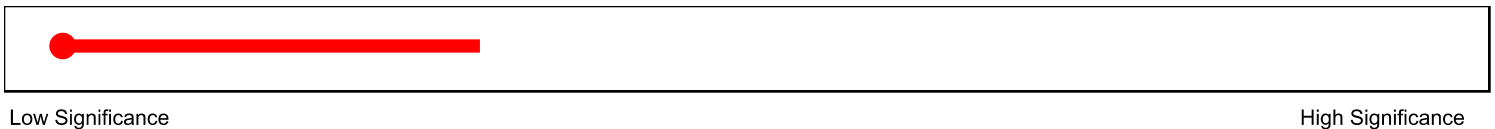
Oxidative Stress/Antioxidant Insufficiency

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



Mitochondrial Functional Impairment

Magnesium	↓	Coenzyme Q10	Adipate	Suberate
Succinate		Pyruvate	Lactate	α-Hydroxybutyrate
β-Hydroxybutyrate	↑	Malate		↑



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

**Indicates testing performed at Labcorp Burlington 1447 York Court, Burlington, NC 27215-3361 Lab Director = Sanjai Nagendra, MD CLIA # 34D0655059

3102 ION ® Profile - Blood/Urine



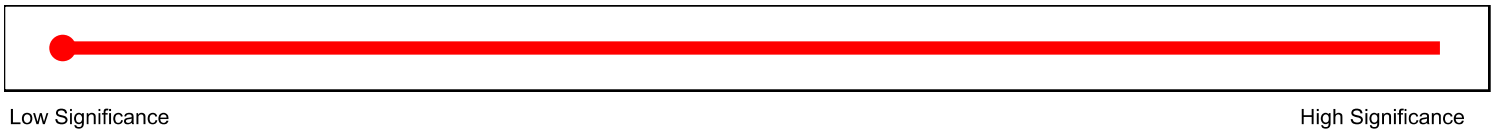
Amino Acid Insufficiency

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



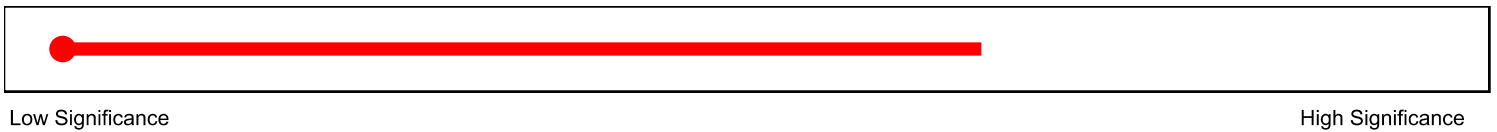
Essential Fatty Acid Insufficiency

Arachidonic	↓	Alpha Linoleic		Eicosapentaenoic		Docosahexaenoic	↓
Linoleic	↓	Gamma Linolenic		Dihomogamma Linolenic		Palmitoleic	↑



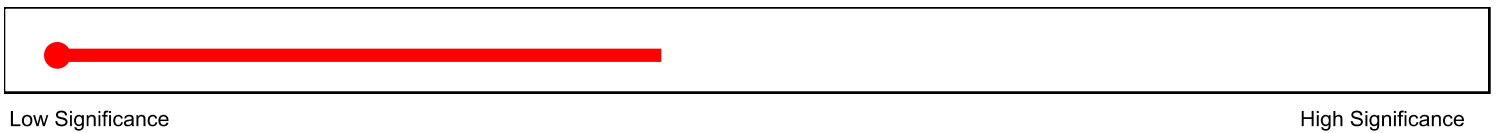
Disordered Methyl Group (Single Carbon) Transfer

Homocysteine		Pentadecanoic	↑	Heptadecanoic	↑	Kynurenate
Tricosanoic	↑	Xanthurenate		Methylmalonate		Formiminoglutamate



Disordered Tryptophan Metabolism

Tryptophan	↓	Xanthurenate		5-Hydroxyindole acetate	↓	Kynurenate
Quinolate						





Additional Considerations

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. Final recommendations should be based on consideration of the patient's medical history and current clinical condition.

Nutrient	Nutrient Need	Clinician Recommendations
Vitamin A	High: 6000-8000 IU	
Vitamin C	Moderate: 500-1000 mg	
Vitamin D	Moderate: 1000-2000 IU	
Vitamin E (mixed tocopherols)	High: 200-400 IU	
Vitamin B-1 (Thiamin)	Low: 10-25 mg	
Vitamin B-2 (Riboflavin)	Low: 10-25 mg	
Vitamin B-3 (Niacin)	Moderate: 50-200 mg	
Vitamin B-5 (Pantothenic Acid)	Moderate: 25-75 mg	
Vitamin B-6 (Pyridoxine)	Moderate: 25-50 mg	
Vitamin B-12 (Cobalamin)	Moderate: 250-500 mcg	
Folic Acid	Low: 250-500 mcg	
Biotin	Moderate: 200-500 mcg	
Magnesium	High: 300-500 mg	
Zinc	Moderate: 10-20 mg	
Selenium	Low: 50-100 mcg	
Dietary Olive Oil	Moderate	
Lipoic Acid	Low: 50-100 mg	
N-Acetylcysteine	Moderate: 200-500 mg	
Need for other antioxidants	Moderate	
L-Arginine	Moderate: 500-1000 mg	
Glycine	Moderate: 1000-3000 mg	
L-Glutamine	Moderate: 1000-3000 mg	
L-Isoleucine	Moderate: 500-750 mg	
L-Leucine	Moderate: 1000-2000 mg	
L-Lysine	Moderate: 1000-2000 mg	
L-Methionine	Moderate: 500-1000 mg	
L-Phenylalanine	Moderate: 500-1000 mg	
Taurine	Moderate: 500-1000 mg	
L-Threonine	Moderate: 500-1000 mg	

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