



Accession Number: **A0711180035**

Reference Number:

Patient: **Sample Report**

Age: 42 Sex: M

Date of Birth: 02/25/1965

Date Collected: 11/18/07

Date Received: 11/18/07

Report Date: 12/5/07

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Reprinted: 1/2/08

Comment:

Ordering Physician:

250193 - 274217

Metametrix Research Account

3425 Corporate Way

Duluth, GA 30096

0090 ION Profile

Ranges have been modified due to routine updating of reference populations:

RBC Elements

Plasma Fatty Acids

Formiminoglutamate

5-Hydroxyindoleacetate

Pyroglutamate

Hippurate

Sulfate

Vanadium is removed from the RBC Element profile.

Erythrocyte nutrient element ranges have been established for ages 12 and under.

Coenzyme Q10 and vitamin ranges have been modified due to analytical method improvements. Vitamin E is now reported as individual components alpha-Tocopherol and gamma-Tocopherol. Specific benefits of gamma tocopherol include anti-inflammatory effects, scavenging of ROS, enhanced platelet eNOS activity, improved serum lipid profile and reduced platelet activity (1,2).

1. Traber MG, Kayden HJ. Preferential incorporation of alpha-tocopherol vs gamma-tocopherol in human lipoproteins. Am J Clin Nutr. 1989;49(3):517-526.

2. Dietrich M, Traber MG, Jacques PF, Cross CE, Hu Y, Block G. Does gamma-tocopherol play a role in the primary prevention of heart disease and cancer? A review. J Am Coll Nutr. Aug 2006;25(4):292-299.

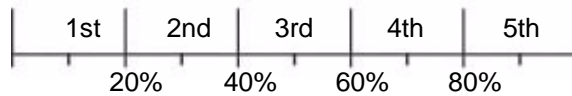
Amino Acid Analysis - 20 Plasma

Methodology: ION Exchange HPLC

Ranges are for ages 13 and over.

Result
umol/L

Percentile Ranking by Quintile



**95%
Reference
Interval**

Essential Amino Acids

Rank	Amino Acid	Result (umol/L)	Reference Interval
1	Arginine	59	39 - 115
2	Histidine	58 L	42 - 96
3	Isoleucine	44	31 - 88
4	Leucine	85	60 - 152
5	Lysine	140	95 - 216
6	Methionine	15 L	13 - 28
7	Phenylalanine	51	39 - 76
8	Threonine	65 L	57 - 165
9	Tryptophan	42	26 - 61
10	Valine	137 L	118 - 295

Essential Amino Acid Derivatives

Neuroendocrine Metabolism

Rank	Amino Acid	Result (umol/L)	Reference Interval
11	Glycine	232	124 - 431
12	Serine	78	48 - 119
13	Taurine	34 L	25 - 116
14	Tyrosine	33 L	31 - 85

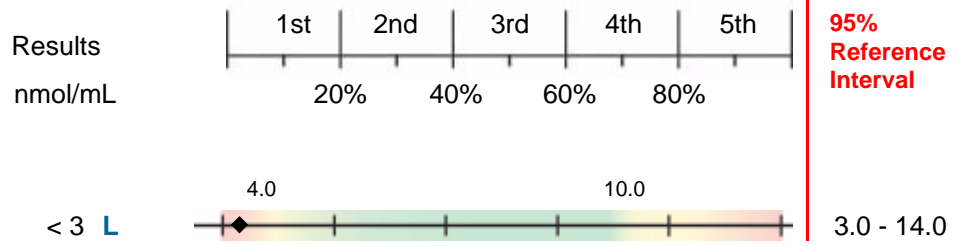
Ammonia/Energy Metabolism

Rank	Amino Acid	Result (umol/L)	Reference Interval
15	Asparagine	28 L	25 - 58
16	Aspartic Acid	8	4 - 15
17	Citrulline	24	16 - 49
18	Glutamic Acid	46	19 - 153
19	Glutamine	393 L	303 - 626
20	Ornithine	30 L	24 - 99

Homocysteine - Plasma

Methodology: Competitive Immunoassay

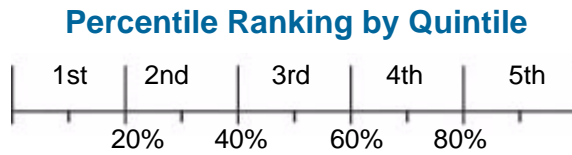
Percentile Ranking by Quintile



Element - Erythrocytes and Whole Blood

Methodology: Inductively Coupled Plasma /Mass Spectroscopy

Ranges are for ages 13 and over.



95%
Reference
Interval

Results

Reference Limits

Nutrient Elements

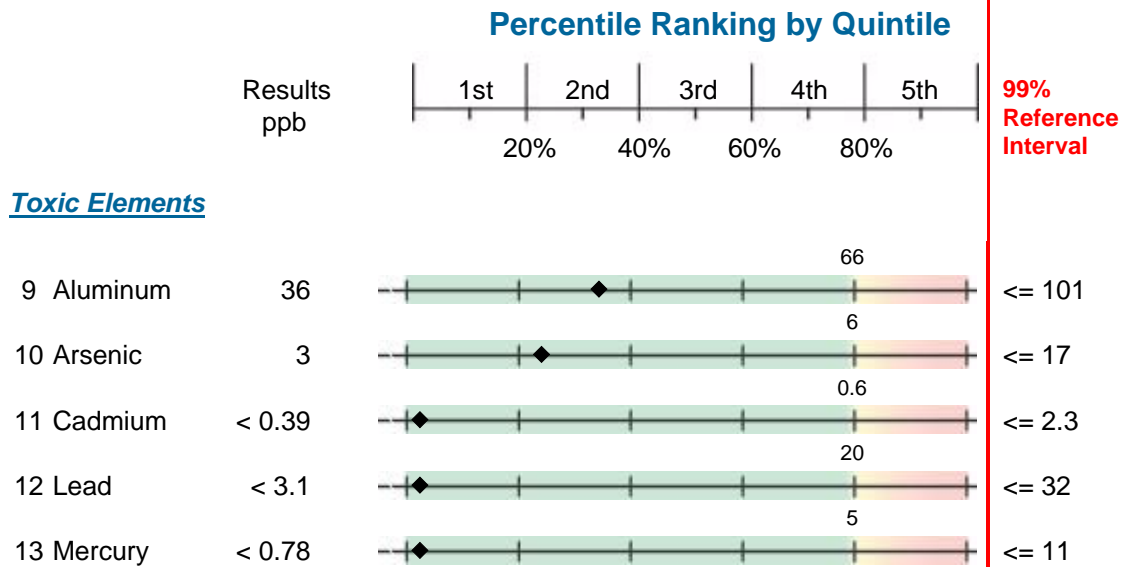
Rank	Element	Value	Unit	Reference Range	Unit
1	Potassium	1,469	L	1,099 - 2,492	ppm packed cells
2	Magnesium *	22	L	18 - 40	ppm packed cells
3	Zinc	5.4		4.2 - 9.3	ppm packed cells
4	Copper	303	L	275 - 534	ppb packed cells
5	Manganese	26	L	22 - 43	ppb packed cells
6	Chromium	2.3	L	1.3 - 7.5	ppb packed cells
7	Selenium	0.26		0.15 - 0.41	ppm whole blood
8	Calcium	21		12 - 36	ppm packed cells

Relevant to membrane permeability, not nutritional status.

*The expanded abnormal range approximates the population at risk for magnesium insufficiency disorders. See: Johnson S, Med Hypotheses. Feb 2001;56(2):163-170.

Element - Erythrocytes and Whole Blood

Methodology: Inductively Coupled Plasma /Mass Spectroscopy



Results for whole blood toxic elements that are within normal limits do not rule out metal accumulation in other tissues. This can be evaluated by urinary porphyrin or 24-hour urine chelation challenge tests.

Lead Levels Considered Elevated in Adults(1)

- ◆ At levels above 800 ppb, serious, permanent health damage may occur (extremely dangerous).
- ◆ Between 400 and 800 ppb, serious health damage may be occurring, even if there are no symptoms (seriously elevated).
- ◆ Between 250 and 400 ppb, regular exposure is occurring. There is some evidence of potential physiological problems (elevated).
- ◆ Between 100 and 250 ppb, lead is building up in the body and exposure is occurring.

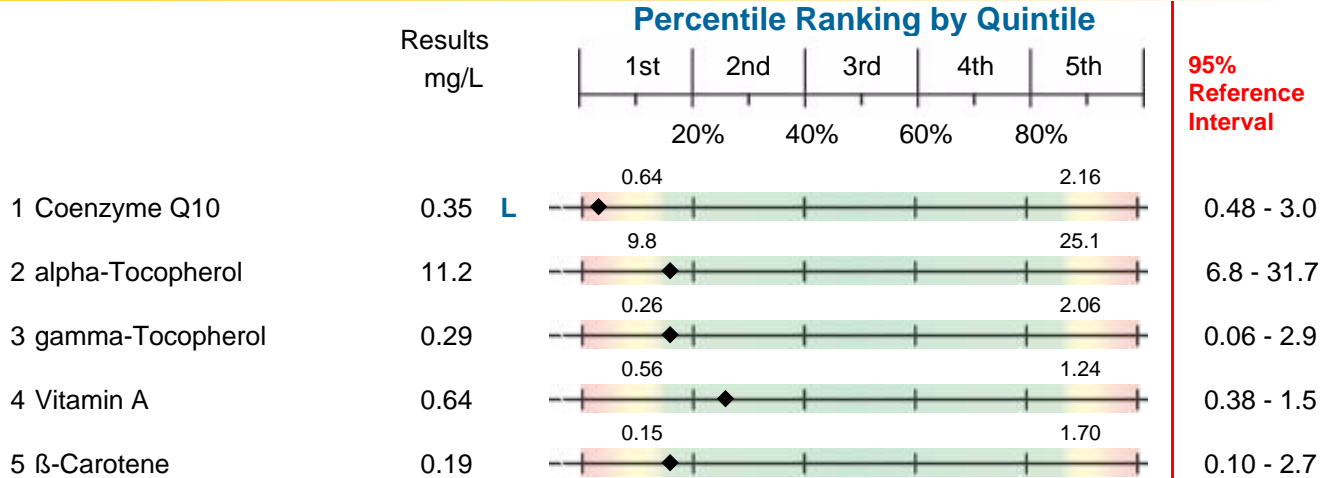
(1)Lead Exposure in Adults. A Guide for Health Care Providers, State of New York, Department of Public Health.

In children, lead levels even below 100 ppb are associated with IQ deficits.(2)

(2) Lanphear BP, Hornung R, Khoury J, et al. Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. *Environ Health Perspect.* Jul 2005;113(7):894-899.

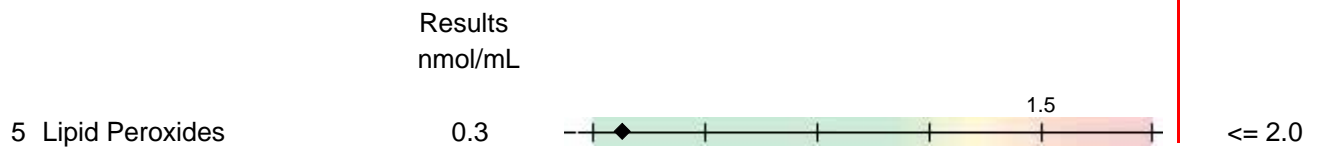
CoEnzyme Q10 Plus Vitamin Panel - Serum

Methodology: High Performance Liquid Chromatography



Lipid Peroxide - Serum

Methodology: High Performance Liquid Chromatography



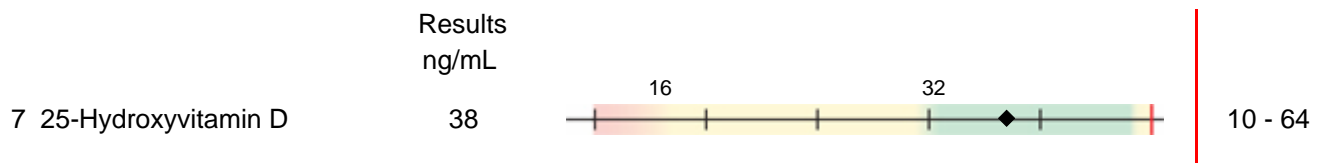
8-Hydroxy-2 deoxyguanosine - Urine

Methodology: LC/Tandem Mass Spectroscopy, Colorimetric



Vitamin D - Serum

Methodology: Chemiluminescent immunoassay (CLIA)



Levels of 25-hydroxyvitamin D that fall below 16 ng/mL (40 nmol/L) reflect frank vitamin D deficiency. Studies based on functional markers have identified levels below 32 ng/mL (80 nmol/L) as hypovitaminosis D where stores are depleted and PTH levels may begin to rise. Optimal values lie in the 32-40 ng/ml range (4th and 5th quintiles) for the Metamatrix reference population that comes largely from North America. Extremely high levels may be toxic.

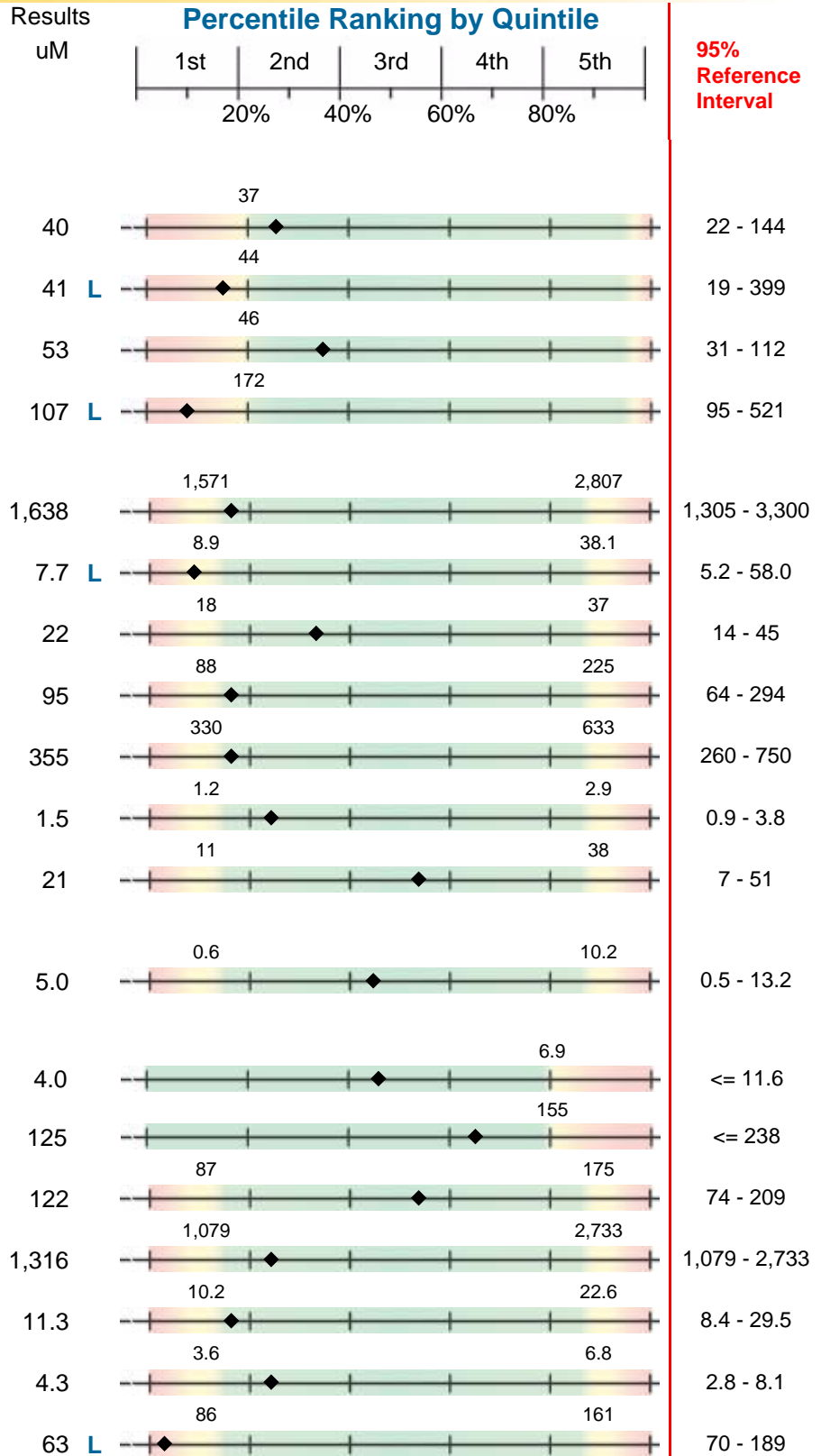
1. Zittermann A. Vitamin D in preventive medicine: are we ignoring the evidence? Br J Nutr. May 2003;89(5):552-572.
2. Hollis BW. Circulating 25-hydroxyvitamin D levels indicative of vitamin D sufficiency: implications for establishing a new effective dietary intake recommendation for vitamin D. J Nutr. Feb 2005;135(2):317-322.

Conversion factors: nmol/L = ng/mL x 2.5 | ng/mL = nmol/L x 0.4

Fatty Acids - Plasma

Methodology: Capillary Gas Chromatography/Mass Spectrometry

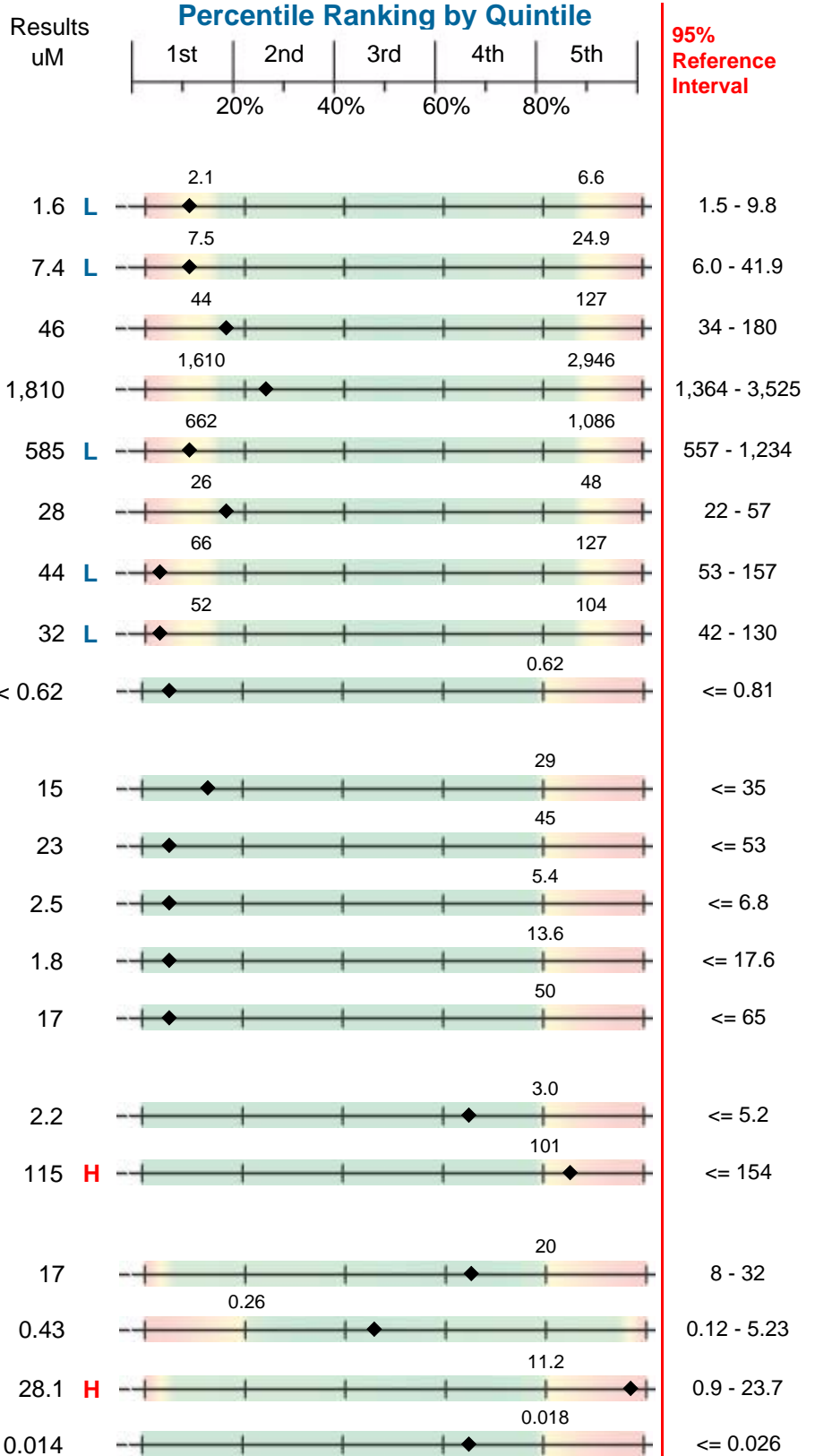
Ranges are for ages 13 and over.



Fatty Acids - Plasma

Methodology: Capillary Gas Chromatography/Mass Spectrometry

Ranges are for ages 13 and over.

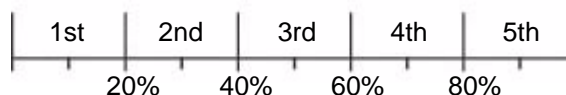


Organix™ Comprehensive - Urine

Methodology: LC/Tandem Mass Spectroscopy, Colorimetric

Results are expressed as mcg/mg creatinine.
Ranges are for ages 13 and over.

Percentile Ranking by Quintile



**95%
Reference
Interval**

NUTRIENT MARKERS

Results

Fatty Acid Metabolism
(Carnitine & B2)

1 Adipate	5.4	5.7	<= 10.3
2 Suberate	1.0	1.8	<= 3.3
3 Ethylmalonate	3.8	5.5	<= 8.5

Carbohydrate Metabolism

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

4 Pyruvate	1.2	4.1	<= 7.1
5 Lactate	8.3	19.4	2.5 - 57.0
6 β-Hydroxybutyrate	0.1	2.8	<= 12.8

Energy Production (Citric Acid Cycle)

(B comp., Q10, Amino acids, Mg)

7 Citrate	495	948	127 - 1,550
8 Cis-Aconitate	55	76	29 - 122
9 Isocitrate	81	92	36 - 130
10 α-Ketoglutarate	17.6	27.8	2.6 - 60.0
11 Succinate	9.5	12.3	1.1 - 34.0
12 Fumarate	< 0.1	0.71	<= 1.40
13 Malate	0.8	2.3	<= 4.3
14 Hydroxymethylglutarate	7.4 H	6.8	<= 9.7

B-Complex Vitamin Markers

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

15 α-Ketoisovalerate	0.43	0.60	<= 0.94
16 α-Ketoisocaproate	0.20	0.39	<= 0.58
17 α-Keto-β-Methylvalerate	0.5	1.6	<= 2.7
18 Xanthurenate	0.3	0.6	<= 1.2
19 β-Hydroxyisovalerate	7.6	9.0	<= 15.3

Methylation Cofactor Markers

(B12, Folate)

20 Methylmalonate	3.7 H	2.3	<= 3.4
21 Formiminoglutamate	0.71	1.21	<= 2.28

Organix™ Comprehensive - Urine

Methodology: LC/Tandem Mass Spectroscopy, Colorimetric

Ranges are for ages 13 and over.

* Units for 8-Hydroxy-2-deoxyguanosine are ng/mg creatinine

CELL REGULATION MARKERS

Neurotransmitter Metabolism Markers
(Tyrosine, Tryptophan, B6, antioxidants)

Item	Value	Flag	Percentile Ranking	95% Reference Interval
22 Vanilmandelate	7.0	H	1.1	0.4 - 5.3
23 Homovanillate	5.1		1.6	0.7 - 17.0
24 5-Hydroxyindoleacetate	3.1		1.5	0.7 - 26.0
25 Kynurenate	1.1		1.6	<= 2.5
26 Quinolinate	5.3		10.2	<= 16.5

Oxidative Damage and Antioxidant Markers
(Vitamin C and other antioxidants)

27 p-Hydroxyphenyllactate	0.5		0.7	<= 1.4
28 8-Hydroxy-2-deoxyguanosine*	3.0		5.3	<= 7.6

TOXICANTS AND DETOXIFICATION

Detoxification Indicators
(Arg, NAC, Met, Mg and antioxidants)

29 2-Methylhippurate	0.036		0.047	<= 0.106
30 Orotate	0.9		1.0	<= 1.6
31 Glucarate	7.3	H	7.0	<= 11.9
32 a-Hydroxybutyrate	0.1		1.2	<= 2.2
33 Pyroglutamate	67	H	43	< 72
34 Sulfate	163		123	89 - 432

COMPOUNDS OF BACTERIAL OR YEAST/FUNGAL ORIGIN

Bacterial - general

35 Benzoate	1.9		2.5	<= 8.2
36 Hippurate	321		542	<= 1,099
37 Phenylacetate	< 0.06		0.06	<= 0.20
38 Phenylpropionate	< 0.5		0.5	<= 0.5
39 p-Hydroxybenzoate	0.2		1.2	<= 2.8
40 p-Hydroxyphenylacetate	13		20	<= 35
41 Indican	55		80	<= 124
42 Tricarballoylate	1.3		1.6	<= 3.6

L. acidophilus / general bacterial

43 D-Lactate	1.1		5.5	<= 11.0
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Clostridial species

44 3,4-Dihydroxyphenylpropionate	< 0.16		0.16	<= 0.40
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Yeast / Fungal

45 D-Arabinitol	30		32	<= 59
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Creatinine =206 mg/dl

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 H or L appears when the patient result is in the fifth quintile (80%) of the population. An additional **X** next to an analyte indicates that the patient result is outside the 95% reference interval for that analyte.

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 reports provide the detail upon which these thermometers are based.

Cardiovascular System

Arginine	Hcys	Calcium	Magnesium L
CoQ10 X L	a-Tocopherol	Lipid Peroxide	8-OHdG
AA/EPA X H			



Low significance

High significance

Fatigue

Isoleucine	Leucine	Phenylalanine	Valine L
Magnesium L	CoQ10 X L	Adipate	Suberate
a-KG	Succinate	Malate	Xanthurenate
Methylmal X H	FIGLU		



Low significance

High significance

Metabolic Syndrome (Syndrome X)

Chromium L	Magnesium L	Zinc	Palmitic
Stearic	AHB	BHB	bHiVal



Low significance

High significance

Mental/Emotional

Tryptophan	Tyrosine L	Magnesium L	EPA L
DHA L	Xanthurenate	Methylmal X H	FIGLU
VMA X H	5-HIA		



Low significance

High significance

Intestinal Bacterial Metabolites

PhAc	PhProp	pHBenz	pHPhAc
Indican	Tricarballylate	D-Lactate	3,4-DHPP



Low significance

High significance

Intestinal Yeasts / Fungal Metabolites

D-Arabinitol



Low significance

High significance

Digestion/Absorption

Arginine	Histidine	L	Isoleucine	Leucine
Lysine	Methionine	L	Phenylalanine	Threonine
Tryptophan	Valine	L	Chromium	L
Manganese	L	Selenium	Zinc	Copper
				L



Low significance

High significance

Toxic Exposure

Aluminum	Cadmium		Lead	Mercury
Palmitelaicid	C18TrFA	H	Citrate	Cis-Aconitate
Isocitrate	Quinolate		2-MeHipp	Orotate
Glucarate	H			



Low significance

High significance

Detoxification Impairment

Methionine	L	Glycine	Serine	Taurine	L
Glutamine	L	Pyroglutamate	H	Sulfate	Benzoate



Low significance

High significance

Oxidative Stress/Antioxidant Insufficiency

Taurine	L	Copper	L	Manganese	L	Selenium
Zinc		Lead		Mercury		a-Tocopherol
g-Tocopherol		Vitamin A		β-Carotene		Lipid Peroxide
8-OHdG		pHPHLac		Sulfate		

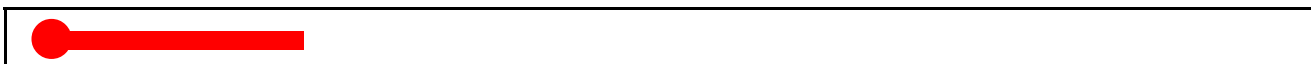


Low significance

High significance

Mitochondrial Functional Impairment

Magnesium	L	CoQ10	X L	Adipate		Suberate
EtMal		Pyruvate		Lactate		AHB
BHB		Succinate		Fumarate		Malate

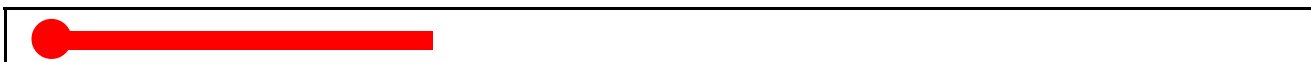


Low significance

High significance

Amino Acid Insufficiency

Arginine		Histidine	L	Isoleucine		Leucine
Lysine		Methionine	L	Phenylalanine		Threonine L
Tryptophan		Valine	L	a-KG		Succinate
Sulfate						



Low significance

High significance

Essential Fatty Acid Insufficiency

ALA		EPA	L	DHA	L	LA
GLA	L	DGLA		Palmitoleic		Mead
Triene/Tetra						



Low significance

High significance

Disordered Methyl Group (Single carbon) Transfer

Hcys		Pentadeca		Heptadeca		Nonadecanoic
Tricosanoic		Xanthurenate		Methylmal	X H	FIGLU
Kynurenate						



Low significance

High significance

Disordered Tryptophan Metabolism

Tryptophan	Xanthurenate	5-HIA	Kynurenate
Quinolinate	Indican		



Low significance

High significance

<u>Abbreviation</u>	<u>Analyte Name</u>	<u>Abbreviation</u>	<u>Analyte Name</u>
2-MeHipp	2-Methylhippurate	DHA	Docosahexaenoic (22:6n3)
5-HIA	5-Hydroxyindoleacetate	3,4-DHPP	3,4-Dihydroxyphenylpropionate
8-OhdG	8-Hydroxy-2-deoxyguanosine	EPA	Eicosapentaenoic (20:5n3)
AA/EPA	Arachidonic (20:4n6)/Eicosapentaenoic (20:5n3)	FIGLU	Formiminoglutamate
AHB	a-Hydroxybutyrate	GLA	Gamma Linolenic (18:3n6)
aKbMeVal	a-Keto-β-Methylvalerate	Hcys	Homocysteine
aKiCap	a-Ketoisocaproate	HVA	Homovanillate
aKiVal	a-Ketoisovalerate	HMG	Hydroxymethylglutarate
ALA	Alpha Linolenic (18:3n3)	LA	Linoleic (18:2n6)
a-Tocopherol	alpha-Tocopherol	Pentadeca	Pentadecanoic (15:0)
BHB	β-Hydroxybutyrate	PhAc	Phenylacetate
BHiVal	β-Hydroxyisovalerate	PhProp	Phenylpropionate
C18TrFa	Total C:18 Trans	pHBenz	p-Hydroxybenzoate
CoQ10	Coenzyme Q10	pHPhAc	p-Hydroxyphenylacetate
DGLA	Dihomogamma Linolenic (20:3n6)	pHPhLac	p-Hydroxyphenyllactate
		Triene/Tetraene	Mead/Arachidonic Ratio
		VMA	Vanilmandelate

Supplement Recommendation Summary

With knowledge of a patient's full medical history and concerns, the ION Profile laboratory results may be used to help create an individually optimized nutritional support program. Based strictly on the results from this test, the summary table below shows estimates of nutrient doses that may help to normalize nutrient-dependent metabolic functions. All amounts are adult doses that should be reduced for children according to body weight.

Customized Vitamin and Mineral Formulation

Nutrients listed in this section are normally contained in a multi-vitamin preparation. "Base" amounts may be used for insurance of health even when no abnormalities are found.

Customized preparations of the multi-vitamin/mineral formula shown below may be produced by compounding pharmacies. If such a product is made according to these specifications each dose should be thoroughly stirred into a few ounces of water or diluted fruit juice to fully release carbonates and avoid stomach bloating effects.

	Daily Amounts	
	Base	Units Added
Vitamin A	2500 IU	
B-Carotene	5500 IU	
Vitamin C	250 mg	500 mg
Vitamin D	400 IU	200 IU
Vitamin E	100 IU	200 IU
Vitamin K*	100 mcg	
Thiamin (B1)	5 mg	
Riboflavin (B2)	5 mg	
Niacin (B3)	25 mg	
Pyridoxine (B6)	15 mg	
Folic Acid	400 mcg	
Vitamin B12	50 mcg	800 mcg
Biotin	100 mcg	
Pantothenic Acid (B5)	25 mg	
Calcium	500 mg	500 mg
Iodine*	75 mcg	
Magnesium	250 mg	200 mg
Zinc	15 mg	
Selenium	100 mcg	50 mcg
Copper	1 mg	2 mg
Manganese	5 mg	6 mg
Chromium	200 mcg	200 mcg
Molybdenum*	25 mcg	
Boron*	1 mg	
Citric Acid*	200 mg	
Malic Acid*	200 mg	

* Nutrients with an asterisk are not modified based on the ION test results.

Other Items Indicated for individual supplementation

Various conditionally essential nutrients and other potentially beneficial interventions appear in this section only if relevant abnormalities are present. These ingredients are not included in the customized vitamin formula on the previous page.

Amino acids listed on this page result from functional markers of individual amino acid insufficiency and do not reflect amino acids measured in plasma.

Item	Amount
Alpha-Ketoglutarate	700 mg
Black Currant Oil	4 gm
Coenzyme Q10	300 mg
Fish Oil	6 gm
Glycine	4000 mg
N-Acetylcysteine	750 mg
Need for Other Antioxidants	Moderate
Potassium	600 mg

Customized Free-Form Amino Acids

The table below shows the recommended custom amino acid formula based on the results of your laboratory test for fasting plasma amino acid levels. The Base Formula contains a constant percentage of the essential amino acids. To achieve your optimal formula, additional amounts of individual amino acids ("Grams Added") are added and the "Base Formula amount" is adjusted to assure the total appropriate amount of powder. The final percentage in your powder will be different from those in the table because of the addition of specific amounts of each essential amino acid.

Directions: Adults mix 1 and 1/2 measuring teaspoon (5g) into juice or water 2 times daily between meals as a dietary supplement, or as directed by a health care practitioner. Children under 12 years old: 1 teaspoon 1-2 times daily between meals.

Base Formula amount:	264 gm	% of Base	Grams Added	mg per day
	5-Hydroxytryptophan*	0.0 % +	1	33
	Arginine	9.4 % +	0	827
	Histidine	10.1 % +	2	955
	Isoleucine	9.4 % +	0	827
	Leucine	12.9 % +	0	1135
	Lysine	9.4 % +	0	827
	Methionine	7.7 % +	5	844
	Phenylalanine	12.9 % +	0	1135
	Taurine	0.0 % +	10	333
	Threonine	8.1 % +	9	1013
	Valine	11.1 % +	9	1277
	Pyridoxal-5-phosphate	.3 % +	0	26
	Alpha-ketoglutaric acid	8.5 % +	0	748
	* ...or L-Tryptophan (Requires doctor's order)		5	167

Only the essential amino acids are included in this formula because from these all of the other amino acids can be formed, raising the levels of any that might be low. Pyridoxal-5-phosphate (an active form of B6) and alpha-ketoglutaric acid cofactor nutrients are key factors needed for the body's utilization of amino acids. The formula may be ordered as a powder that dissolves easily in beverages or may be added to foods such as applesauce. Other forms of supplemental dietary protein or amino acids may need to be restricted while using your customized formula. If enhanced energy levels prevent sleep, avoid bedtime use.

In addition to the above customized amino acid formula, this patient may benefit from further use of single amino acids, as evidenced by profiles other than plasma amino acids. See the category, "Other Indicated Nutrients" on your Supplement Recommendation Summary Page.