GENOVA DIAGNOSTICS
3425 Corporate Way
Duluth, GA 30096

ION INDIVIDUAL • OPTIMAL • NUTRITIONAL

Patient: **SAMPLE PATIENT**
DOB:
Sex:
MRN:

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

Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromotography

Ranges: Ages 13 and over.

		Results µmol/L		QUINTILE DISTRIBUTION (1st / 2nd / 3rd / 4th / 5th)	95% Reference Range
Essential Amino Acids					
Limiting Amino Acids					
1.	Lysine	200		147 – 263	120 - 318
2.	Methionine	14		17 – 34	14 - 48
3.	Tryptophan	25	L	39 – 69	31 - 83
Branched Chain Amino Acids					
4.	Isoleucine	30	L	40 – 82	35 - 104
5.	Leucine	57	L	87 – 164	74 - 196
6.	Valine	159		167 – 316	146 - 370
Other Essential Amino Acids					
7.	Phenylalanine	42		48 – 77	42 - 95
8.	Histidine	62		63 – 97	57 - 114
9.	Threonine	100		88 – 172	73 - 216
Conditionally Essential Amino Acids					
10.	Arginine	69		43 – 107	29 - 137
11.	Taurine	89		36 – 99	29 - 136
12.	Glycine	600	H	192 – 418	155 - 518
13.	Serine	94		74 – 139	60 - 172

Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromotography

Ranges: Ages 13 and over.

	Results µmol/L		QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Functional Categories				
Vitamin B6 Status Markers				
14. α-aminoadipic acid	0.7		0.5	<= 1.5
15. α-Amino-n-butyric acid (α-ANB)	20		28	<= 39
16. γ-aminobutyric acid (GABA)	0.7		0.6	<= 1.5
17. Cystathionine	<0.3		0.3	<= 0.3
Vascular Function				
18. Arginine	69		43 – 107	29 - 137
19. Taurine	89		36 – 99	29 - 136
20. α-aminoadipic acid	0.7		0.5	<= 1.5
Neurotransmitters and Precursors				
21. Phenylalanine	42		48 – 77	42 - 95
22. Tyrosine	60		45 – 87	38 - 110
23. Tryptophan	25	L	39 – 69	31 - 83
24. Glutamic Acid	250	H	33 – 136	24 - 214
25. Taurine	89		36 – 99	29 - 136
Sulfur Amino Acids (Glutathione - related)				
26. Methionine	14		17 – 34	14 - 48
27. Cystathionine	<0.3		0.3	<= 0.3
28. Homocystine	<0.6		0.6	<= 0.6
29. Cystine	13.0		1.6 – 16.3	0.8 - 27.5
30. Taurine	89		36 – 99	29 - 136

Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromotography

Ranges: Ages 13 and over.

	Results µmol/L		QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Functional Categories				
Urea Cycle and Ammonia Detoxification				
31. Arginine	69		43 107	29 - 137
32. Citrulline	70	H	22 45	18 - 57
33. Ornithine	45		36 86	28 - 117
34. Glutamine	500		458 771	372 - 876
35. Asparagine	25	L	39 71	31 - 90
36. Aspartic Acid	13.1	H	3.5 8.6	2.9 - 12.6
Glycine, Serine and Related Amino Acids				
37. Alanine	350		284 559	230 - 681
38. Glycine	600	H	192 418	155 - 518
39. Sarcosine	10.0		12.1	<= 19.5
40. Serine	94		74 139	60 - 172
41. Phosphoserine	<0.5		0.5	<= 0.8
42. Ethanolamine	6.0		9.3	<= 11.6
43. Phosphoethanolamine	3.2		4.6	<= 7.4
Collagen - Related Amino Acids				
44. Proline	180		119 279	99 - 363
45. Hydroxyproline	13		16	<= 26
46. Lysine	200		147 263	120 - 318
47. Hydroxylysine	0.6		0.6	<= 0.6

Amino Acids 40 Profile - Plasma

Methodology: High Performance Liquid Chromotography

Ranges: Ages 13 and over.

	Results µmol/L		QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Functional Categories				
β -Amino Acids and Derivatives				
48. β-Alanine	2.5		2.8	<= 5.0
49. Histidine	62		63 97	57 - 114
50. Carnosine	2.6		4.8	<= 6.3
51. 1-Methylhistidine	5.0		7.2	<= 9.8
52. Anserine	20		36	<= 43
DNA (Thymine) Degradation				
53. β-Aminoisobutyric Acid	1.6		1.5	<= 3.2
Muscle-Specific Amino Acids				
54. 3-Methylhistidine	25		37	<= 52
Ratios				
55. Phenylalanine/Tyrosine	0.70			<= 1.10
56. Glutamic Acid/Glutamine	0.50	H	0.07 0.17	0.06 - 0.23
57. Hydroxyproline/Proline	0.072			<= 0.152
58. α-ANB/Leucine	0.35	H		<= 0.22
59. Tryptophan/LNAA*	0.072	L	0.096 0.101	0.090 - 0.102

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

NR = Not Reportable

	Results	QUINTILE DISTRIBUTION (1st / 2nd / 3rd / 4th / 5th)	95% Reference Range

Homocysteine Assay - Plasma

Methodology: Enzymatic Assay

Ranges: Ages 13 and over.

1.	Homocysteine	20.7	H	4.0 / 10.0	3.0 - 14.0 nmol/mL

Nutrient & Toxic Elements Profile - Blood

Methodology: Inductively Coupled Plasma/Mass Spectrometry

Nutrient Elements

Erythrocytes (packed cells)

1.	Potassium	2,519		2,672	2,303 - 3,374 ppm
2.	Magnesium	38		44	34 - 63 ppm
3.	Calcium*	31		44	24 - 65 ppm

Plasma

4.	Zinc	782		815	643 - 1,594 ppb
5.	Copper	952		929	753 - 1,920 ppb

Whole Blood

6.	Selenium	0.17		0.16	0.13 - 0.32 ppm

Toxic Elements

Whole Blood

7.	Aluminum	26		45	<= 113 ppb
8.	Arsenic	11.5	H	5.1	<= 10.0 ppb
9.	Cadmium	0.21		0.60	<= 1.10 ppb
10.	Lead	22		18	<= 29 ppb
11.	Mercury	3.8		4.3	<= 9.8 ppb

*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.

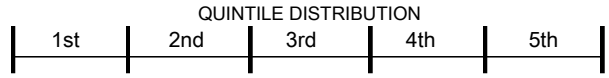
NR = Not Reportable

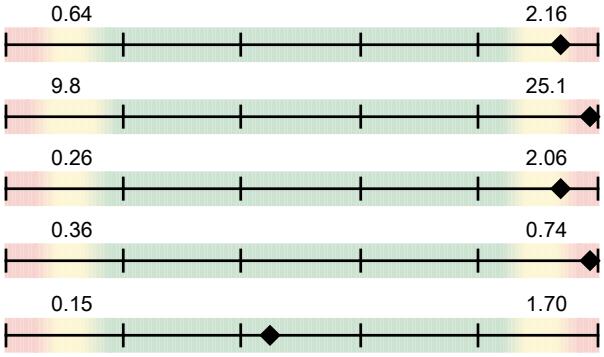
Coenzyme Q10 Plus Vitamins Profile - Serum

Methodology: High Performance Liquid Chromotography

Ranges: Ages 13 and over.

		Results mg/L		95% Reference Range
1.	Coenzyme Q10	2.73		0.48 - 3.04
2.	alpha-Tocopherol	42.6	H	6.8 - 31.7
3.	gamma-Tocopherol	2.19		0.06 - 2.99
4.	Vitamin A (Retinol)	1.39	H	0.29 - 1.05
5.	β-Carotene	0.47		0.10 - 2.71





Lipid Peroxides Assay - Serum

Methodology: High Performance Liquid Chromotography

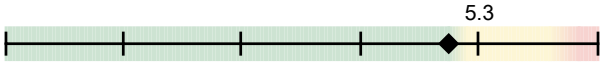
		Results nmol/mL	95% Reference Range
6.	Lipid Peroxides	1.47	<= 2.60

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

Methodology: LC/Tandem Mass Spectrometry, Colorimetric

Ranges: Ages 13 and over.

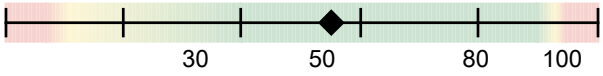
		Results ng/mg creatinine	95% Reference Range
7.	8-Hydroxy-2-deoxyguanosine	4.9	<= 7.6



Vitamin D Profile - Serum

Methodology: LC/Tandem Mass Spectrometry

		Results ng/mL	Reference Range
8.	25-Hydroxyvitamin D	57.1	30.0 - 100.0
9.	25-Hydroxyvitamin D2	<0.1	
10.	25-Hydroxyvitamin D3	57.0	



Total 25-Hydroxyvitamin D is considered the best assessment of vitamin D status. The test reflects vitamin D from all sources (diet, supplements, and sun exposure).

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

<DL = less than detection limit

NR = Not Reportable

Fatty Acids Profile - Plasma

Methodology: Capillary Gas Chromatography/Mass Spectrometry

Ranges: Ages 13 and over

		Results µmol/L	QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Polyunsaturated Omega-3				
1.	Alpha Linolenic (18:3n3)	25	20	13 - 80
2.	Eicosapentaenoic (20:5n3)	29	17	5 - 210
3.	Docosapentaenoic (22:5n3)	21	16	11 - 50
4.	Docosahexaenoic (22:6n3)	110	59	31 - 213
Polyunsaturated Omega-6				
5.	Linoleic (18:2n6)	1,275	930 1,669	821 - 2,032
6.	Gamma Linolenic (18:3n6)	5	7 33	5 - 46
7.	Eicosadienoic (20:2n6)	12.3	6.4 15.3	5.2 - 22.5
8.	Dihomogamma Linolenic (20:3n6)	39	34 102	27 - 140
9.	Arachidonic (20:4n6)	299	201 451	158 - 521
10.	Docosadienoic (22:2n6)	0.8	0.9	<= 2.0
11.	Docosatetraenoic (22:4n6)	5.3	3.7 13.8	2.6 - 18.1
Polyunsaturated Omega-9				
12.	Mead (20:3n9)	2.3	5.3	<= 8.3
Monounsaturated				
13.	Myristoleic (14:1n5)	1.9	1.2 6.1	0.8 - 9.7
14.	Palmitoleic (16:1n7)	52	40 155	30 - 256
15.	Vaccenic (18:1n7)	71	48 93	40 - 122
16.	Oleic (18:1n9)	1,058	555 1,182	466 - 1,470
17.	11-Eicosenoic (20:1n9)	7.6	4.6 10.3	3.7 - 18.1
18.	Nervonic (24:1n9)	1.9	1.1 2.2	1.1 - 2.7

Fatty Acids Profile - Plasma

Methodology: Capillary Gas ChromatographyMass Spectrometry

Ranges: Ages 13 and over

		Results µmol/L		QUINTILE DISTRIBUTION (1st | 2nd | 3rd | 4th | 5th)	95% Reference Range
Saturated					
19.	Capric (10:0)	1.3		1.4 – 4.0	0.8 - 6.2
20.	Lauric (12:0)	4.7		3.3 – 14.5	2.2 - 27.3
21.	Myristic (14:0)	26		20 – 87	15 - 139
22.	Palmitic (16:0)	1,339		792 – 1,794	667 - 2,526
23.	Stearic (18:0)	545		294 – 511	250 - 629
24.	Arachidic (20:0)	3.0		1.5 – 3.2	1.3 - 4.7
25.	Behenic (22:0)	0.9		0.8 – 2.0	0.6 - 2.9
26.	Lignoceric (24:0)	1.31		0.84 – 1.66	0.63 - 2.45
27.	Hexacosanoic (26:0)	0.35		0.36	<= 0.43
Odd Chain					
28.	Pentadecanoic (15:0)	9.5		14.5	<= 20.6
29.	Heptadecanoic (17:0)	18.3		19.3	<= 24.4
30.	Nonadecanoic (19:0)	1.83		1.51	<= 1.89
31.	Heneicosanoic (21:0)	0.38		0.50	<= 0.74
32.	Tricosanoic (23:0)	0.80	H	0.62	<= 0.78
Trans					
33.	Palmitelaidic (16:1n7t)	1.0		0.4	<= 1.8
34.	Total C:18 Trans	21		42	<= 59
Ratios					
35.	LA/DGLA	33		30	11 - 46
36.	EPA/DGLA	0.74		0.24	0.07 - 5.98
37.	AA/EPA	10		20	1 - 57
38.	Triene/Tetraene	0.008		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

		Results mcg/mg creatinine		QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Nutrient Markers					
Fatty Acid Metabolism *(Carnitine & B2)*					
1.	Adipate	7.8		6.2	<= 11.1
2.	Suberate	0.9		2.1	<= 4.6
3.	Ethylmalonate	7.9	H	3.6	<= 6.3
Carbohydrate Metabolism *(B1, B3, Cr, Lipoic Acid, CoQ10)*					
4.	Pyruvate	<DL		3.9	<= 6.4
5.	L-Lactate	8.6		8.5	0.6 - 16.4
6.	β-Hydroxybutyrate	2.5		2.1	<= 9.9
Energy Production (Citric Acid Cycle) *(B comp., CoQ10, Amino Acids, Mg)*					
7.	Citrate	570		601	56 - 987
8.	Cis-Aconitate	35		51	18 - 78
9.	Isocitrate	91		98	39 - 143
10.	α-Ketoglutarate	<DL		19.0	<= 35.0
11.	Succinate	21.0	H	11.6	<= 20.9
12.	Fumarate	<DL		0.59	<= 1.35
13.	Malate	1.1		1.4	<= 3.1
14.	Hydroxymethylglutarate	3.6		3.6	<= 5.1
B-Complex Vitamin Markers *(B1, B2, B3, B5, B6, Biotin)*					
15.	α-Ketoisovalerate	<DL		0.25	<= 0.49
16.	α-Ketoisocaproate	<DL		0.34	<= 0.52
17.	α-Keto-β-Methylvalerate	<DL		0.38	<= 1.10
18.	Xanthurenate	<DL		0.34	<= 0.46
19.	β-Hydroxyisovalerate	4.5		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

		Results mcg/mg creatinine	QUINTILE DISTRIBUTION 1st | 2nd | 3rd | 4th | 5th	95% Reference Range
Nutrient Markers				
Methylation Cofactor Markers *(B12, Folate)*				
20.	Methylmalonate	0.6	1.7	<= 2.3
21.	Formiminoglutamate	0.5	1.2	<= 2.2
Cell Regulation Markers				
Neurotransmitter Metabolism Markers *(Tyrosine, Tryptophan, B6, Antioxidants)*				
22.	Vanilmandelate	3.8	1.6 – 3.9	1.2 - 5.3
23.	Homovanillate	4.3	1.9 – 5.7	1.4 - 7.6
24.	5-Hydroxyindoleacetate	6.8	2.1 – 5.6	1.6 - 9.8
25.	Kynurenate	1.1	1.0	<= 1.5
26.	Quinolinate	2.6	4.0	<= 5.8
27.	Picolinate	5.6	8.0	2.8 - 13.5
Oxidative Damage and Antioxidant Markers *(Vitamin C and Other Antioxidants)*				
28.	p-Hydroxyphenyllactate	0.47	0.39	<= 0.66
29.	8-Hydroxy-2-deoxyguanosine	4.9	5.3	<= 7.6
Toxicants and Detoxification				
Detoxification Indicators *(Arg, NAC, Met, Mg, Antioxidants)*				
30.	2-Methylhippurate	0.111	0.084	<= 0.192
31.	Orotate	0.57	0.69	<= 1.01
32.	Glucarate	9.9	6.3	<= 10.7
33.	α-Hydroxybutyrate	<DL	0.3	<= 0.9
34.	Pyroglutamate	67	59	28 - 88
35.	Sulfate	1,531	958 – 2,347	690 - 2,988

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

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

		Results mcg/mg creatinine		QUINTILE DISTRIBUTION 1st 2nd 3rd 4th 5th	95% Reference Range
Compounds of Bacterial or Yeast/Fungal Origin					
Bacterial - General					
36.	Benzoate	<DL		0.6	<= 9.3
37.	Hippurate	709		548	<= 1,070
38.	Phenylacetate	0.17		0.11	<= 0.18
39.	Phenylpropionate	<DL			<= 0.06
40.	p-Hydroxybenzoate	0.5		1.1	<= 1.8
41.	p-Hydroxyphenylacetate	10		19	<= 34
42.	Indican	93	H	64	<= 90
43.	Tricarballylate	<DL		0.73	<= 1.41
L. acidophilus / General Bacterial					
44.	D-Lactate	0.2		2.0	<= 4.1
Clostridial Species					
45.	3,4-Dihydroxyphenylpropionate	<DL			<= 0.05
Yeast / Fungal					
46.	D-Arabinitol	40		36	<= 73

Creatinine = 48 mg/dL

<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.

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 preceeding laboratory results provide the detail upon which these thermometers are based.

Cardiovascular System

Arginine	Homocysteine ↑	Calcium	Magnesium ↓
Coenzyme Q10	alpha-Tocopherol	gamma-Tocopherol	Lipid Peroxides
8-OHdG*	AA/EPA		

Low Significance High Significance

Fatigue

Isoleucine ↓	Leucine ↓	Phenylalanine ↓	Valine ↓
Magnesium ↓	Coenzyme Q10	Adipate ↑	Suberate
α-Ketoglutarate	Succinate ↑	Malate	Xanthurenate
Methylmalonate	Formiminoglutamate		

Low Significance High Significance

Metabolic Syndrome (Syndrome X)

Magnesium ↓	Palmitic (16:0)	Stearic (18:0) ↑	α-Hydroxybutyrate
β-Hydroxybutyrate ↑	β-Hydroxyisovalerate		

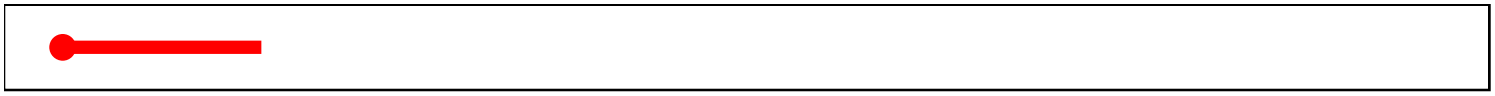
Low Significance High Significance

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

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

Mental/Emotional

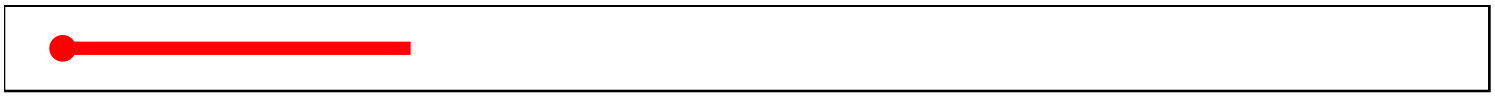
Tryptophan ↓	Tyrosine	Magnesium ↓	Eicosapentanoic
Docosahexaenoic	Xanthurenate	Methylmalonate	Formiminoglutamate
Vanilmandelate	5-Hydroxyindoleacetate ↑		



Low Significance High Significance

Intestinal/Bacterial Metabolites

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



Low Significance High Significance

Intestinal Yeasts/FungalMetabolites

D-Arabinitol ↑

Low Significance High Significance

Digestion/Absorption

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

Low Significance High Significance

*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	

Low Significance High Significance

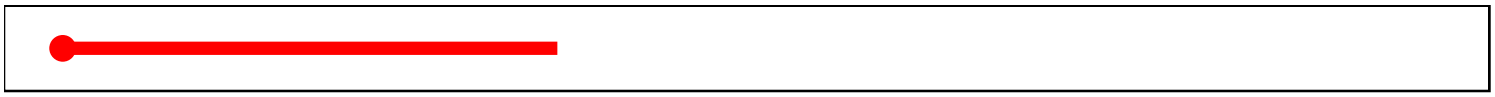
Essential Fatty Acid Insufficiency

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

Low Significance High Significance

Disordered Methyl Group (Single Carbon) Transfer

Homocysteine ↑	Pentadecanoic	Heptadecanoic	Nonadecanoic ↑
Tricosanoic ↑	Xanthurenate	Methylmalonate	Formiminoglutamate
Kynurenate ↑			



Low Significance High Significance

Disordered Tryptophan Metabolism

Tryptophan ↓	Xanthurenate	5-Hydroxyindoleacetate ↑	Kynurenate ↑
Quinolinate	Indican ↑		

Low Significance High Significance

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	Clinician Recommendations
Vitamin C	Low: 250-500 mg	
Vitamin B-1 (Thiamin)	Optional: 0-10 mg	
Vitamin B-2 (Riboflavin)	Low: 10-25 mg	
Vitamin B-3 (Niacin)	Optional: 0-10 mg	
Vitamin B-5 (Pantothenic Acid)	Optional: 0-10 mg	
Vitamin B-6 (Pyridoxine)	Moderate: 25-50 mg	
Vitamin B-12 (Cobalamin)	Moderate: 250-500 mcg	
Folic Acid	Low: 250-500 mcg	
Magnesium	Moderate: 200-300 mg	
Zinc	Optional: 0-10 mg	
Black Current Oil/Evening Primrose Oil	Optional	
Carnitine	Low: 100-250 mg	
Coenzyme Q10	Moderate: 60-100 mg	
Lipoic Acid	Optional: 0-100 mg	
N-Acetylcysteine	Optional: 0-200 mg	
Need for other antioxidants	Optional	
L-Isoleucine	Moderate: 500-750 mg	
L-Leucine	Moderate: 1000-2000 mg	
L-Methionine	Low: 250-500 mg	
L-Phenylalanine	Low: 250-500 mg	
L-Tryptophan	Moderate: 500-1000 mg	
L-Valine	Low: 250-500 mg	

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

Checklist (Prior to Shipping)

Includes Blood & Urine Specimens

1. Tubes

- ❑ Patient's first and last name, date of birth, gender, and date of collection are written on all tubes and vials
- ❑ All the tubes and vials are capped tightly

2. Frozen

- ❑ Clear cap plastic vial (urine)
- ❑ 3 red top amber transfer tubes
- ❑ Lavender top clear transfer tube
- ❑ 3 ice packets

3. Room Temperature

- ❑ Royal-blue top Na-EDTA tube, trace mineral free

4. Test Requisition Form with Payment

- ❑ Test Requisition Form is complete
- ❑ Questionnaire is complete
- ❑ Payment is included

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 IS-MM-10820 rev 0414

ION™ Profile - Clinician

Blood Specimen Collection Instructions

This specimen collection kit can be used for the following test(s):

***0090 ION Profile -** Blood/Urine
0190 ION Profile NY - Blood/Urine
***0490 ION Profile w/Amino Acids 40 -** Blood/Urine
0590 ION Profile w/Amino Acids 40 NY - Blood/Urine
***0068 Chemistries -** Serum
***0088 Neopterin/Biopterin Profile -** Urine
***0030 UMFA Profile -** Serum
***0031 Vitamin K Assay -** Serum

Please Note: The ION Profile requires the patient to collect urine at home. This should be done prior to the blood collection. **All specimens, urine and blood, must be shipped together.** Patient must be fasting for blood draw. (Urine collection instructions are explained in the ION Profile - Clinician Specimen Collection Instructions.)

IMPORTANT:

All patient specimens require two unique identifiers ***patient's name and date of birth***, as well as ***date of collection***. **Patient's first and last name, date of birth, gender,** and **date of collection** must be recorded on the **Test Requisition Form** as well as on all tube(s) and/or vial(s), using a permanent marker, or the test may not be processed.

Specimen

Serum, ~9 ml (3 tubes, ~3 ml each), frozen; **Plasma**, 2.5 - 3 ml, frozen;
Whole Blood, room temperature; **Overnight Urine**, 12 ml, frozen

Collection Materials

- 3 red/gray top serum separator tubes
- Royal-blue top Na-EDTA tube, trace mineral free
- Lavender top EDTA tube
- 3 red top amber transfer tubes
- Lavender top clear transfer tube
- 3 disposable pipettes

*Not Available in New York

Shipping Materials

- Plastic shell tube tray
- 2 absorbent pads
- 3 ice packets
- Test Requisition Form
- Questionnaire
- Biohazard bag with side pocket
- Specimen collection kit box
- FedEx® Clinical Lab Pak and Billable Stamp

*International shipping may vary, please see shipping instructions for more details.

Please read all instructions carefully before you begin.

Patient Preparation

- It is best to **ship the specimen within 24 hours of collection**. Please refer to the enclosed shipping instructions **before** you collect to determine the days that the specimen can be shipped.
- Please check to make sure the patient has fasted prior to drawing blood.

Blood Collection

1. **Write** patient's **first and last name, date of birth**, **gender,** and **date of collection** on the Test Requisition Form (located in the pouch on top of the Specimen Collection Kit Box), as well as on all tube(s) and/or vial(s), using a permanent marker.
   - **IMPORTANT**: To ensure accurate test results, you **MUST** provide the requested information.
2. **Freeze** the ice packets.
3. **Red/gray top serum separator tubes and red top amber transfer tubes**
   - **Draw** the 3 red/gray top serum separator tubes .
   - **Place** upright in a rack at room temperature for 20 to 30 minutes to clot blood.
   - **Centrifuge** the red/gray top serum separator tubes for 15 minutes. The serum must be free of hemolysis or red blood cells.
   - **Pipette** all of the serum off of the 3 red/gray separator tubes into the 3 red top amber transfer tubes. (**DO NOT** fill more than ¾ full to allow for freezing). **Cap** each tube tightly.
   - **Freeze** the red top amber transfer tubes..
4. **Royal-blue top Na-EDTA tube, trace mineral free**
   - **Draw** the royal-blue top Na-EDTA tube completely.
   - **Invert** the tube gently 15 times immediately after the blood draw.
   - **Leave** the tube at room temperature. Do not centrifuge or transfer.
5. **Lavender top EDTA tube and lavender top clear transfer tube**
   - » **Draw** the lavender top EDTA tube completely.
   - » **Invert** the lavender top EDTA tube 10 times to mix the EDTA with the blood.
   - » **Centrifuge** immediately for 15 minutes. The plasma must be free of hemolysis or red blood cells.
   - » **Remove** the lavender top EDTA tube after centrifuging; **DO NOT INVERT THE TUBE**.
   - » **Pipette** plasma, using a fresh disposable pipette, 2.5 - 3 ml to the lavender top clear transfer tube.
   - » **Freeze** the lavender top clear transfer tube.
   - »

Specimen Preparation

1. **Place** all of the frozen transfer tubes and the frozen urine collection into the slots or the ends of the plastic shell tube tray (an exact fit is not necessary). **Place** the absorbent pad over the tubes. **Place** the frozen ice packets at each end of the tubes in the tray and one in the middle. **Snap** the tray closed. (Do not place the royal-blue top Na-EDTA tube inside the tray).
2. **Place** the tray, along with the royal-blue top Na-EDTA tube, into the biohazard bag.
3. **Staple** payment to the bottom right-hand corner of the completed Test Requisition Form and **complete** the Personal Health Assessment Form; **Fold and Place** them in the side pocket of the biohazard bag.
4. **Seal** the biohazard bag; **Place** it into the specimen collection kit box, and close the box.

8. Checklist (Prior to Shipping)

Includes Blood & Urine Specimens

1. Tubes

- ❑ Patient's first and last name, date of birth, gender, and date of collection are written on all tubes and vials
- ❑ All the tubes and vials are capped tightly

2. Frozen

- ❑ Clear cap plastic vial (urine)
- ❑ 3 red top amber transfer tubes
- ❑ Lavender top clear transfer tube
- ❑ 3 ice packets

3. Room Temperature

- ❑ Green top Na-heparin tube

4. Test Requisition Form with Payment

- ❑ Test Requisition Form is complete
- ❑ Questionnaire is complete
- ❑ Payment is included

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 11821 rev 0414

ION™ Pediatric Profile - Clinician

Blood Specimen Collection Instructions

This specimen collection kit can be used for the following test(s):

0090 Pediatric ION Profile - Blood/Urine

0190 Pediatric ION Profile NY - Blood/Urine

0490 Pediatric ION Profile w/Amino Acids 40 - Blood/Urine

0590 Pediatric ION Profile w/Amino Acids 40 NY - Blood/Urine

0068 Chemistries - Serum*

0088 Neopterin/Biopterin Profile - Urine*

0030 UMFA Profile - Serum*

0031 Vitamin K Assay - Serum*

Please Note: The ION Pediatric Profile requires the patient to collect urine at home. This should be done prior to the blood collection. All specimens, urine and blood, must be shipped together. Patient must be fasting for blood draw. (Urine collection instructions are explained in the ION Pediatric Profile-Patient Specimen Collection Instructions.)

IMPORTANT:

All patient specimens require two unique identifiers ***patient's name and date of birth***, as well as ***date of collection***. **Patient's first and last name, date of birth, gender,** and **date of collection** must be recorded on the **Test Requisition Form** as well as on all tube(s) and/or vial(s), using a permanent marker, or the test may not be processed.

Specimen

Serum, 6 ml (3 tubes, 2 ml each), frozen; **Plasma**, 2.5 - 3 ml, frozen;

Whole Blood, room temperature; **Overnight Urine**, 12 ml, frozen

**Additional 2 ml of serum is required if ordering #0030 with ION Profile*

Collection Materials

- 4 red/gray top serum separator tubes
- Green top Na-heparin tube
- Lavender top EDTA tube
- 3 red top amber transfer tubes
- Lavender top clear transfer tube
- 2 disposable pipettes

***Not available in New York**

Shipping Materials

- Plastic shell tube tray
- Absorbent pad
- 3 ice packets
- Test Requisition Form
- Questionnaire
- Biohazard bag with side pocket
- Specimen collection kit box
- FedEx® Clinical Lab Pak and Billable Stamp

Please read all instructions carefully before you begin.

Patient Preparation

- It is best to **ship the specimen within 48 hours of collection**. Please refer to the enclosed shipping instructions **before** you collect to determine the days that the specimen can be shippped.
- Please check to make sure the patient has fasted prior to drawing blood.
- **Note**: The total volume of blood necessary to be drawn is approximately 22 ml *(26 ml if ordering #0030). Children weighing less than 40 pounds may require multiple blood draws. Please discuss this with the guardian before they schedule the blood draw. Information on multiple blood draws for pediatric patients is available on our website at www.metametrix.com or call client services at 800-221-4640.

Blood Collection

1. **Write** patient's **first and last name, date of birth**, **gender,** and **date of collection** on the Test Requisition Form (located in the pouch on top of the Specimen Collection Kit Box), as well as on all tube(s) and/or vial(s), using a permanent marker.
   - **IMPORTANT**: To ensure accurate test results, you must provide the requested information.
2. **Freeze** the ice packets.
3. **Red/gray top serum separator tubes and red top amber transfer tubes**
   - **Draw** 3 red/gray top serum separator tubes *(**Draw** 4 if also ordering #0030 UMFA Assay).
   - **Place** upright in a rack at room temperature for 20 to 30 minutes to clot blood.
   - **Centrifuge** the red/gray top serum separator tubes for 15 minutes. The serum must be free of hemolysis or red blood cells.
   - **Pipette** 2 ml serum, using a fresh disposable pipette, from each of the red/gray top serum separator tubes into the 3 red top **amber** transfer tubes. *If #0030 was ordered, add **1 ml additional serum** into 2 of the 3 red top amber transfer tubes. **Cap** each tube tightly.
   - **Freeze** the red top amber transfer tubes.
4. **Green top Na-heparin tube**
   - **Draw** the green top Na-heparin tube completely.
   - **Invert** the tube gently 15 times immediately after the blood draw.
   - **Leave** the tube at room temperature. Do not centrifuge or transfer.
5. **Lavender top EDTA tube and lavender top clear transfer tube**
   - **Draw** the lavender top EDTA tube completely.
   - **Invert** the lavender top EDTA tube 10 times to mix the EDTA with the blood.
   - **Centrifuge** immediately for 15 minutes. The plasma must be free of hemolysis and red blood cells.
   - **Remove** the lavender top clear transfer tube from centrifuge; **DO NOT INVERT TUBE**.
   - **Pipette** plasma, using a fresh disposable pipette, 2.5 - 3 ml to lavender top clear transfer tube.
   - **Freeze** lavender top clear transfer tube.

Specimen Preparation

1. **Place** all of the frozen transfer tubes, and frozen urine collection into the slots or the ends of the plastic shell tube tray. (An exact fit is not necessary.)
2. **Place** the absorbent pad over the tubes.
3. **Place** the frozen ice packets at each end of the tubes in the tray and one in the middle.
4. **Snap** the tray closed (do not place green top Na-heparin tube inside the tray).
5. **Place** the tray, along with the green top Na-heparin tube, into the biohazard bag.
6. **Staple** payment to the bottom right-hand corner of the completed Test Requisition Form and **Complete** the Personal Health Assessment Form; **Fold and Place** them in the side pocket of the biohazard bag.
7. **Seal** the biohazard bag; **Place** it into the specimen collection kit box, and close the box.

Checklist (Prior to Shipping)

Includes Blood & Urine Specimens

1. **Tubes**
   - ❑ Patient's first and last name, date of birth, gender, and date of collection are written on all tubes and vials
   - ❑ All the tubes and vials are capped tightly

2. **Frozen**
   - ❑ Clear cap plastic vial (urine)
   - ❑ 3 red top amber transfer tubes
   - ❑ Lavender top clear transfer tube
   - ❑ 3 ice packets

3. **Room Temperature**
   - ❑ Royal-blue top Na-EDTA tube, trace mineral free

4. **Test Requisition Form with Payment**
   - ❑ Test Requisition Form is complete
   - ❑ Personal Health Assessment Form is complete
   - ❑ Payment is included

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 10821 rev 0414

ION™ Profile - Patient

Urine Specimen Collection Instructions

This specimen collection kit can be used for the following test(s):

0090 ION Profile - Blood/Urine

0190 ION Profile NY - Blood/Urine

0490 ION Profile w/Amino Acids 40 - Blood/Urine

0590 ION Profile w/Amino Acids 40 NY - Blood/Urine

***0068 Chemistries -** Serum

***0088 Neopterin/Biopterin Profile -** Urine

***0030 UMFA Profile -** Serum

***0031 Vitamin K Assay -** Serum

Please Note: The ION Profile requires the patient to collect urine at home. This should be done prior to the blood collection. **All specimens, urine and blood, must be shipped together.** Patient must be fasting for blood draw. (Blood collection instructions are explained in the ION Profile - Clinician Specimen Collection Instructions.)

IMPORTANT:

All patient specimens require two unique identifiers ***patient's name and date of birth***, as well as ***date of collection***. **Patient's first and last name, date of birth, gender,** and **date of collection** must be recorded on the **Test Requisition Form** as well as on all tube(s) and/or vial(s), using a permanent marker, or the test may not be processed.

Specimen

Serum, ~9 ml (3 tubes, ~3 ml each), frozen; **Plasma**, 2.5 - 3 ml, frozen;

Whole Blood, room temperature; **Overnight Urine**, 12 ml, frozen

Collection Materials

- Clean collection container (NOT included in this kit)
- Clear cap plastic vial with thymol preservative
- Disposable pipette

*Not Available in New York

Shipping Materials

- Plastic shell tube tray
- Absorbent pads
- 3 ice packets
- Test Requisition Form
- Personal Health Assessment Form
- Biohazard bag with side pocket
- Specimen collection kit box
- FedEx® Clinical Lab Pak and Billable Stamp

**International shipping may vary, please see shipping instructions for more details.*

Please read all instructions carefully before you begin.

Patient Preparation

- It is best to **ship your specimen within 24 hours of collection**. Please refer to the enclosed shipping instructions before you collect to determine what days you can ship your specimen.
- It is not necessary to discontinue nutritional supplements prior to this specimen collection. Abnormalities that may be found will reveal special needs that have not been met by recent dietary and supplemental intake.
- **Decrease** fluid intake to avoid excessive dilution of the urine.
  - » For adults, **restrict intake** to three 8 oz. glasses or less for 24 hours.
  - » Make sure that no more than 8 oz. of fluids are consumed after 8:00 the evening prior to urine collection.
- **Do Not collect** urine during menstruation.
- Vial contains preservative - **Do Not Rinse**.

Urine Collection

1. **Write** patient's **first and last name, date of birth, gender,** and **date of collection** on the Test Requisition Form (located in the pouch on top of the Specimen Collection Kit Box), as well as on all tube(s) and/or vial(s), using a permanent marker.
   - **IMPORTANT**: To ensure accurate test results, you **must** provide the requested information.
2. **Empty** bladder before going to bed at night. **DO NOT** collect this urine.
3. **Collect** urine (if any) during the night and first morning urine into a clean container.
4. **Pipette** urine, using a fresh disposable pipette, into the clear cap plastic vial to the 12 ml mark (**DO NOT OVERFILL**). **Screw** the cap on tightly.
5. **Dispose** of the remaining urine.
6. **Freeze** the clear cap plastic vial and the ice packet.

Blood Collection Preparation

7. **Schedule** a morning blood drawing appointment on a **Monday, Tuesday, Wenesday,** or **Thursday**. Inform the doctor or lab that a centrifuge is needed to prepare the blood specimens. The kit contains all of the tubes required for collection.
8. **Do not have** anything to eat or drink (other than water) after 9:00 on the night before your blood is drawn.
9. **Staple** payment to the bottom right-hand corner of the completed Test Requisition Form and **Complete** the Personal Health Assessment Form; **Fold and Place** them in the side pocket of the biohazard bag.
10. **Take** frozen urine specimen (placed in biohazard bag with frozen ice packet) and **ALL** collection and shipping materials with you to the blood drawing site. This will allow the blood and urine specimens to be shipped together to the lab.

Blood Collection Preparation

- **Schedule** a morning blood drawing appointment on a **Monday, Tuesday, Wednesday,** or **Thursday**. Inform the doctor or lab that a centrifuge is needed to prepare the blood specimens. The kit contains all of the tubes required for collection.
- **The child must be fasting** for 12 hours. Do not give the child anything to eat or drink (other than water) after 9:00 the night before blood is drawn.
- **Take** the child's frozen urine specimen (placed in biohazard bag with frozen ice packet) and ALL collection and shipping materials with you to the blood drawing site. This will allow the blood and urine specimens to be shipped together to the lab.

Checklist (Prior to Shipping)

Includes Blood & Urine Specimens

1. Tubes

- ❑ Patient's first and last name, date of birth, gender, and date of collection are written on all tubes and vials
- ❑ All the tubes and vials are capped tightly

2. Frozen

- ❑ Clear cap plastic vial (urine)
- ❑ 3 red top amber transfer tubes
- ❑ Lavender top clear transfer tube
- ❑ 3 ice packets

3. Room Temperature

- ❑ Green top Na-Heparin tube

4. Test Requisition Form with Payment

- ❑ Test Requisition Form is complete
- ❑ Personal Health Assessment Form is complete
- ❑ Payment is included

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ION™ Pediatric Profile - Patient

International Urine Specimen Collection Instructions

This specimen collection kit can be used for the following test(s):

0090 Pediatric ION Profile - Blood/Urine
0490 Pediatric ION Profile w/Amino Acids 40 - Blood/Urine
0088 Neopterin/Biopterin Profile - Urine
0031 Vitamin K Assay - Serum

Please Note: The ION Pediatric Profile requires the patient to collect urine at home. This should be done prior to the blood collection. All specimens, urine and blood, must be shipped together. (Blood collection instructions are explained in the ION Pediatric Profile - Clinician Specimen Collection Instructions.)

IMPORTANT:

All patient specimens require two unique identifiers (***patient's name and date of birth***), as well as ***date of collection***. **Patient's first and last name, date of birth, gender,** and **date of collection** must be recorded on the **Test Requisition Form** as well as on all tube(s) and/or vial(s), using a permanent marker, or the test may not be processed.

Specimen

Serum, 6 ml (3 tubes, 2 ml each), frozen; **Plasma**, 2.5 - 3 ml, frozen; **Whole Blood**, room temperature; **Overnight Urine**, 12 ml, frozen

Collection Materials

- Clean collection container (NOT included in this kit)
- Urine collection bag (infant only)
- Clear cap plastic vial with thymol preservative
- Disposable pipette

Shipping Materials

- Plastic shell tube tray
- Absorbent pad
- 3 ice packets
- Test Requisition Form
- Personal Health Assessment Form
- Biohazard bag with side pocket
- Specimen collection kit box

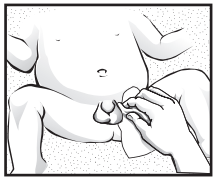
Please read all instructions carefully before you begin.

Patient Preparation

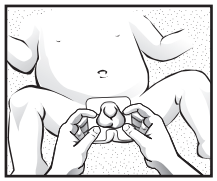
- It is best to **ship your specimen within 24 hours of collection**. Please refer to the enclosed shipping instructions **before** you collect to determine what days you can ship your specimen.
- It is not necessary to discontinue nutritional supplements prior to this specimen collection. Abnormalities that may be found will reveal special needs that have not been met by recent dietary and supplemental intake.
- **Decrease** fluid intake the entire day prior to the overnight/first morning collection to avoid excessive dilution of the urine.
- Vial contains preservative - **Do Not Rinse.**
- When collecting urine from an infant, please **use** the provided urine collection bag. Supplies for preparing the specimen for shipment (disposable pipette, transfer tube, and ice packets) are included in the biohazard bag.
- **Staple** payment to the bottom right-hand corner of the completed Test Requisition Form and Complete the Personal Health Assessment Form; **Fold and Place** them in the side pocket of the biohazard bag.

Urine Collection

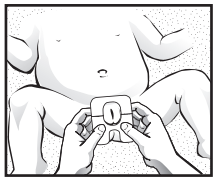
1. **Write** patient's **first and last name, date of birth**, **gender,** and **date of collection** on the Test Requisition Form (located in the pouch on top of the Specimen Collection Kit Box), as well as on all tube(s) and/or vial(s), using a permanent marker.
   - **IMPORTANT**: To ensure accurate test results you must provide the requested information.
2. Have child **empty bladder** before going to bed at night. DO NOT collect this urine.
3. **Collect** child's urine (if any) during the night and the first morning urine into a clean collection container. For infant urine collection, please use the provided pediatric urine collection bag:
4. **Prepare the child** for the urine bag application. **Do not use** any baby oils, lotions, or powders



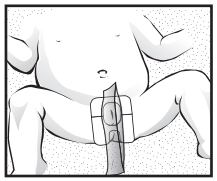
5. **Lay** the child on its back and spread its legs. If the diaper area is wet or soiled, carefully wash with mild soap and rinse with like-warm water. **Move** the washcloth down over the genitals and towards the rectal area towards the genitals. **Do not wash** from the rectal area towards the genitals. After rinsing, **pat dry** and wait a few moments to air day. **Skin must be dry before putting on the collector**



6. **For a male child, fit** the collector over the penis and testicles before removing the protective paper from the bottom half of the adhesive patch. If the genitals do not easily fit through the opening, do not use the collector. (If the boy is very active, it may be easier to keep all the paper over the adhesive until the collector is in place



7. **For a female child, remove** the protective paper from the bottom half of the adhesive patch. **Keep** the top half of adhesive covered with paper until the bottom half has been stick to the skin. **Holding** the collector, **press** the sides of you hands against her skin to gently stretch it. The first part of the adhesive should touch the skin at the narrow area between the rectum and the genitals. Then **work outward** from this point



8. **Press** the adhesive firmly against the skin and avoid wrinkles. When the bottom part is in place, **remove** the paper from the upper portion of the adhesive. **Work upward** to finish sticking the adhesive to the skin, Again, being careful to avoid wrinkles, press the adhesive all around.
9. As soon as you see urine in the collector, carefully peel the adhesive away from the skin.
10. **Pipette** urine, using a fresh disposable pipette, into the clear cap plastic vial to the 12 ml mark **(DO NOT OVERFILL)**.
11. **Screw** the cap on tightly.
12. **Dispose** of remaining urine.
13. **Freeze** the clear cap plastic vial and the ice packet.

Please Note: It is imperative to collect all urine samples from the child's bedtime to early morning awakening. If your child wakes during the night, **check** the bag for urine. If urine is present, **remove** the container and empty its contents into a clean container and **refrigerate** the sample. **Reapply** a new urine bag in the manner described by the instructions above. **This must be done for each awakening by the child overnight – making sure to empty the contents of each urine bag collection into the same refrigerated clean container.** After **mixing all** the contents of the urine bags collected overnight into a single clean container, the sample is ready to be transferred into the correct tubes