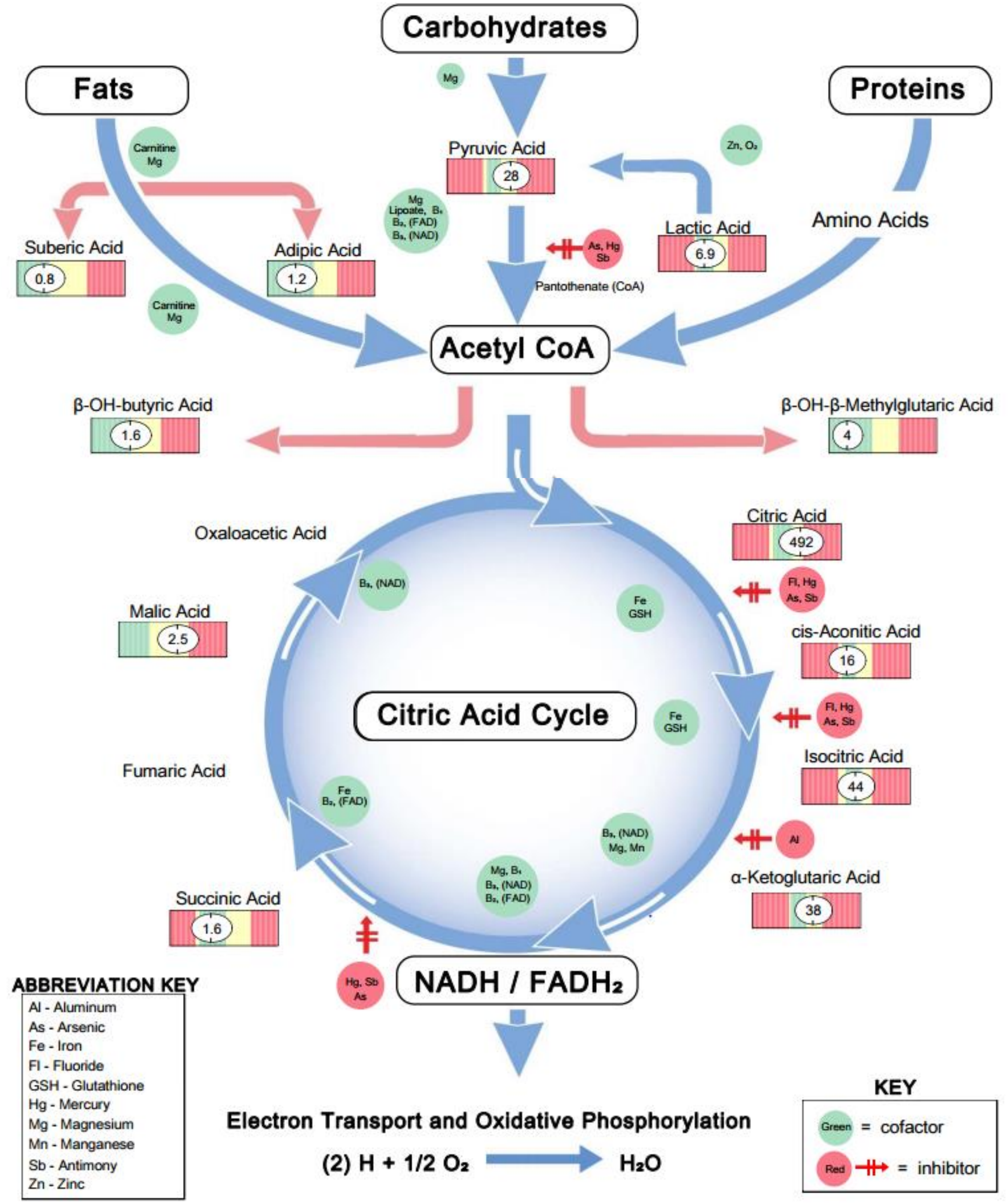
Krebs Cycle At-A-Glance



All biomarkers reported in mmol/mol creatinine unless otherwise noted.

Metabolic Analysis Markers (Urine)

Malabsorption and Dysbiosis Markers

Malabsorption Markers

Marker	Result	Reference Range
Indoleacetic Acid (IAA)	0.7	<= 4.2
Phenylacetic Acid (PAA)	0.07	<= 0.12

Bacterial Dysbiosis Markers

Marker	Result	Reference Range
Dihydroxyphenylpropionic Acid (DHPPA)	0.3	<= 5.3
3-Hydroxyphenylacetic Acid	2.3	<= 8.1
4-Hydroxyphenylacetic Acid	9	<= 29
Benzoic Acid	0.06	<= 0.05
Hippuric Acid	<dl	<= 603

Yeast / Fungal Dysbiosis Markers

Marker	Result	Reference Range
Arabinose	41	<= 96
Citramalic Acid	3.1	<= 5.8
Tartaric Acid	<dl	<= 15

Cellular Energy & Mitochondrial Metabolites

Carbohydrate Metabolism

Marker	Result	Reference Range
Lactic Acid	6.9	1.9-19.8
Pyruvic Acid	28	7-32
β-OH-Butyric Acid (BHBA)	1.6	<= 2.8

Energy Metabolism

Marker	Result	Reference Range
Citric Acid	492	40-520
Cis-Aconitic Acid	16	10-36
Isocitric Acid	44	22-65
α-Ketoglutaric Acid (AKG)	38	4-52
Succinic Acid	1.6	0.4-4.6
Malic Acid	2.5	<= 3.0
β-OH-β-Methylglutaric Acid (HMG)	4	<= 15

Fatty Acid Metabolism

Marker	Result	Reference Range
Adipic Acid	1.2	<= 2.8
Suberic Acid	0.8	<= 2.1

Creatinine Concentration

Marker	Result	Reference Range
Creatinine ◆	25.5	3.1-19.5 mmol/L

Neurotransmitter Metabolites

Marker	Result	Reference Range
Vanilmandelic Acid	1.0	0.4-3.6
Homovanillic Acid	1.8	1.2-5.3
5-OH-indoleacetic Acid	5.8	3.8-12.1
3-Methyl-4-OH-phenylglycol	0.04	0.02-0.22
Kynurenic Acid	3.2	<= 7.1
Quinolinic Acid	4.7	<= 9.1
Kynurenic / Quinolinic Ratio	0.68	>= 0.44

Vitamin Markers

Marker	Result	Reference Range
α-Ketoadipic Acid	0.8	<= 1.7
α-Ketoisovaleric Acid	0.56	<= 0.97
α-Ketoisocaproic Acid	0.78	<= 0.89
α-Keto-β-Methylvaleric Acid	2.0	<= 2.1
Formiminoglutamic Acid (FIGlu)	1.0	<= 1.5
Glutaric Acid	0.19	<= 0.51
Isovalerylglycine	1.4	<= 3.7
Methylmalonic Acid	1.3	<= 1.9
Xanthurenic Acid	0.35	<= 0.96
3-Hydroxypropionic Acid	9	5-22
3-Hydroxyisovaleric Acid	17	<= 29

Toxin & Detoxification Markers

Marker	Result	Reference Range
α-Ketophenylacetic Acid (from Styrene)	0.23	<= 0.46
α-Hydroxyisobutyric Acid (from MTBE)	3.1	<= 6.7
Orotic Acid	0.74	0.33-1.01
Pyroglutamic Acid	18	16-34

Tyrosine Metabolism

Marker	Result	Reference Range
Homogentisic Acid	4	<= 19
2-Hydroxyphenylacetic Acid	0.37	<= 0.76

Metabolic Analysis Reference Ranges are Age Specific

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.

Amino Acids (Urine FMV)

All biomarkers reported in micromol/gm creatinine unless otherwise noted.

Nutritionally Essential Amino Acids

Amino Acid	Result	Reference Range
Arginine	19	10-64
Histidine	581	296-1,136
Isoleucine	39	24-58
Leucine	42	30-87
Lysine	42	45-286
Methionine	62	30-82
Phenylalanine	38	26-71
Taurine	265	68-538
Threonine	111	65-252
Tryptophan	35	28-111
Valine	25	23-61

Nonessential Protein Amino Acids

Amino Acid	Result	Reference Range
Alanine	187	146-486
Asparagine	84	49-182
Aspartic Acid	94	35-86
Cysteine	43	21-78
Cystine	17	26-78
γ-Aminobutyric Acid	12	<= 31
Glutamic Acid	31	5-21
Glutamine	212	172-570
Proline	2	2-18
Tyrosine	60	33-124

Creatinine Concentration

	Result	Reference Range
Creatinine ◆	24.4	3.1-19.5 mmol/L

Amino Acid Reference Ranges are Age Specific

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.

Intermediary Metabolites

B Vitamin Markers

	Result	Reference Range
α-Aminoadipic Acid	43	11-73
α-Amino-N-butyric Acid	21	9-49
β-Aminoisobutyric Acid	29	22-192
Cystathionine	5	6-33
3-Methylhistidine	188	131-318

Urea Cycle Markers

	Result	Reference Range
Ammonia	17.9	14.0-49.0 mmol/g creatinine
Citrulline	19	12-45
Ornithine	6	4-21
Urea ◆	130	168-465 mmol/g creatinine

Glycine/Serine Metabolites

	Result	Reference Range
Glycine	965	639-3,306
Serine	223	187-568
Ethanolamine	268	208-514
Phosphoethanolamine	15	18-70
Phosphoserine	31	28-63
Sarcosine	34	<= 48

Dietary Peptide Related Markers

	Result	Reference Range
Anserine (dipeptide)	7	7-126
Carnosine (dipeptide)	37	10-104
1-Methylhistidine	116	92-1,046
β-Alanine	10	<= 21

Markers for Urine Representativeness

	Result	Reference Range
Glutamine/Glutamate	7	>= 10
Ammonia	17.9	14.0-49.0 mmol/g creatinine
Arginine/Ornithine	3.2	>= 1.1

	Result	
Urine Representativeness Index	8	Ref Range 5 10

Essential and Metabolic Fatty Acids Markers (RBCs)

Omega 3 Fatty Acids

Analyte (cold water fish, flax, walnut)	Result	Reference Range
α-Linolenic (ALA) 18:3 n3	0.11	>= 0.09 wt %
Eicosapentaenoic (EPA) 20:5 n3	0.50	>= 0.16 wt %
Docosapentaenoic (DPA) 22:5 n3	1.60	>= 1.14 wt %
Docosahexaenoic (DHA) 22:6 n3	4.3	>= 2.1 wt %
% Omega 3s	6.5	>= 3.8

Omega 9 Fatty Acids

Analyte (olive oil)	Result	Reference Range
Oleic 18:1 n9	12	10-13 wt %
Nervonic 24:1 n9	2.8	2.1-3.5 wt %
% Omega 9s	15.3	13.3-16.6

Saturated Fatty Acids

Analyte (meat, dairy, coconuts, palm oils)	Result	Reference Range
Palmitic C16:0	19	18-23 wt %
Stearic C18:0	18	14-17 wt %
Arachidic C20:0	0.31	0.22-0.35 wt %
Behenic C22:0	1.15	0.92-1.68 wt %
Tricosanoic C23:0	0.28	0.12-0.18 wt %
Lignoceric C24:0	3.0	2.1-3.8 wt %
Pentadecanoic C15:0	0.12	0.07-0.15 wt %
Margaric C17:0	0.32	0.22-0.37 wt %
% Saturated Fats	41.8	39.8-43.6

Omega 6 Fatty Acids

Analyte (vegetable oil, grains, most meats, dairy)	Result	Reference Range
Linoleic (LA) 18:2 n6	13.4	10.5-16.9 wt %
γ-Linolenic (GLA) 18:3 n6	0.08	0.03-0.13 wt %
Dihomo-γ-linolenic (DGLA) 20:3 n6	1.31	>= 1.19 wt %
Arachidonic (AA) 20:4 n6	17	15-21 wt %
Docosatetraenoic (DTA) 22:4 n6	2.39	1.50-4.20 wt %
Eicosadienoic 20:2 n6	0.27	<= 0.26 wt %
% Omega 6s	34.7	30.5-39.7

Monounsaturated Fats

Omega 7 Fats	Result	Reference Range
Palmitoleic 16:1 n7	0.32	<= 0.64 wt %
Vaccenic 18:1 n7	1.00	<= 1.13 wt %
Trans Fat		
Elaidic 18:1 n9t	0.42	<= 0.59 wt %

Delta - 6 Desaturase Activity

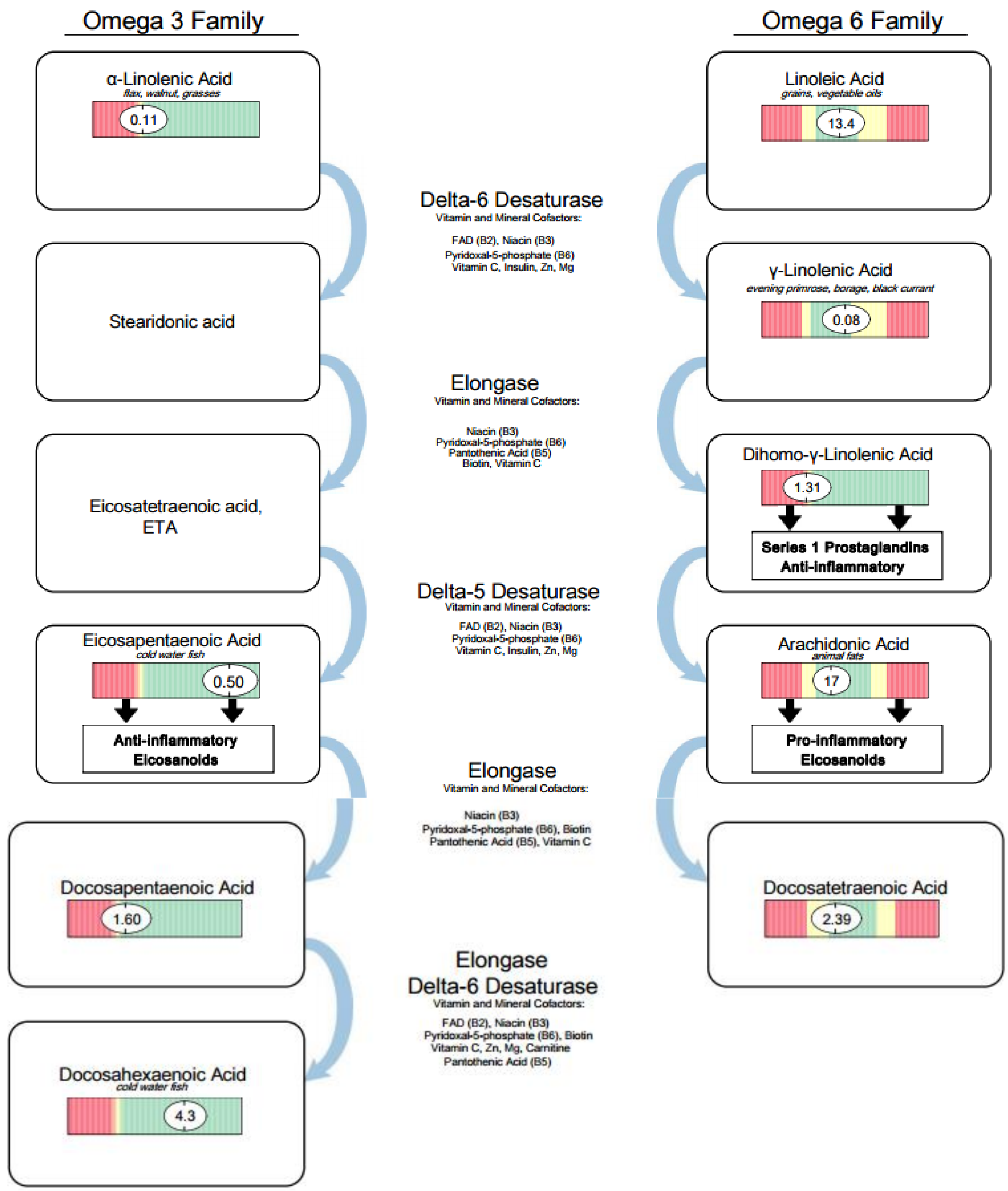
Upregulated Functional Impaired

Analyte	Result	Reference Range
Linoleic / DGLA 18:2 n6 / 20:3 n6	10.2	6.0-12.3

Cardiovascular Risk

Analyte	Result	Reference Range
Omega 6s / Omega 3s	5.3	3.4-10.7
AA / EPA 20:4 n6 / 20:5 n3	34	12-125
Omega 3 Index	4.8	>= 4.0

Essential Fatty Acid Metabolism



This test was developed and its performance characteristics determined by Genova Diagnostics, Inc. It has not been cleared by the U.S. Food and Drug Administration.

Oxidative Stress Markers

Oxidative Stress Markers

		Reference Range
Glutathione (whole blood)	982	>=669 micromol/L
Lipid Peroxides (urine)	4.3	<=10.0 micromol/g Creat.
8-OHdG (urine)	5	<=16 mcg/g Creat.
Coenzyme Q10, Ubiquinone (plasma)	0.99	0.43-1.49 mcg/mL

The Oxidative Stress reference ranges are based on an adult population.

Elemental Markers (RBCs)

Nutrient Elements

Element	Reference Range	Reference Range
Copper	0.582	0.466-0.721 mcg/g
Magnesium	45.6	30.1-56.5 mcg/g
Manganese	0.018	0.007-0.038 mcg/g
Potassium	2,907	2,220-3,626 mcg/g
Selenium	0.24	0.25-0.76 mcg/g
Zinc	10.4	7.8-13.1 mcg/g

The Elemental reference ranges are based on an adult population.

Toxic Elements

Element	Reference Range	Reference Range
Lead	0.012	<= 0.048 mcg/g
Mercury	<dl	<= 0.0039 mcg/g
Antimony	0.001	<= 0.002 mcg/g
Arsenic	0.009	<= 0.071 mcg/g
Cadmium	0.000	<= 0.001 mcg/g
Tin	<dl	<= 0.0009 mcg/g