Dr Test Doctor (Test Doctor) Test Clinic. 123 Test Street, Test Suburb Victoria 3125

Lab ID
Patient ID P000060
Ext ID 26114-0341

Test Patient

Sex: Female • 56yrs • 01-Jan-70
123 Home Street, Test Suburb VIC 3125

RECEIVED
24-Apr-26

ORGANIC ACIDS & ENVIRONMENTAL TOXINS

Specimen type - Urine, Spot

Collected
06-Jul-26 02:46pm

MICROBIAL OVERGROWTH

3-Hydroxypropionic Acid (3-HPA)

YEAST/FUNGAL METABOLITES

N/A

ENVIRONMENTAL EXPOSURES

N/A

MITOCHONDRIA/ENERGY

Citric Acid
Lactic Acid
Pyruvic Acid
Succinic Acid

FATTY ACID / KETONE METABOLISM

N/A

CARBOHYDRATE / GLYCAEMIC METABOLISM

Lactic Acid
Pyruvic Acid

NEUROTRANSMITTER METABOLISM

HVA/VMA Ratio
Kynurenic/Quinolinic Ratio
Picolinic Acid

AMINO ACIDS METABOLISM

N/A

VITAMINS / NUTRITIONAL MARKERS

Picolinic Acid
Pyridoxic Acid (Vit B6)

DETOXIFICATION / GLUTATHIONE FUNCTION

Orotic Acid

OXIDATIVE DAMAGE / INFLAMMATION

N/A

OXALATE METABOLISM

Oxalic Acid

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ORGANIC ACIDS INTRODUCTION

Organic acids are small carbon-based molecules produced as by-products of everyday metabolic processes in the body. They are measurable in urine and serve as functional windows into the biochemical pathways that govern energy production, detoxification, immune regulation, neurotransmitter synthesis, and nutritional status. Organic acid testing offers a uniquely deep and clinically meaningful picture of a patient's metabolic health.

The Organic Acids Test (OAT) is a comprehensive urine-based analysis that examines over 120 individual metabolic markers across the following key domains:

Microbial Overgrowth - Identifies markers associated with bacterial dysbiosis and overgrowth of potentially pathogenic organisms in the gastrointestinal tract, including phenolic and aromatic compounds produced by microbial fermentation of dietary substrates.

Yeast & Fungal Metabolites - Screens for metabolites associated with yeast and fungal overgrowth, including Candida-related markers such as arabinitol, tartaric acid, and tricarballylic acid, which may interfere with mitochondrial function and nutrient absorption.

Mitochondrial & Energy Metabolism - Evaluates the functional integrity of the citric acid (TCA) cycle through measurement of key intermediates including citric acid, cis-aconitic acid, isocitric acid, and alpha-ketoglutaric acid.

Fatty Acid Oxidation & Ketone Metabolism - Assesses the efficiency of both mitochondrial beta-oxidation and the alternative omega-oxidation pathway through dicarboxylic acid markers, providing insight into fatty acid handling, carnitine sufficiency, and metabolic flexibility.

Amino Acid & Branched-Chain Metabolism - Examines the catabolism of essential and branched-chain amino acids, identifying impairments in leucine, isoleucine, valine, methionine, threonine, and tyrosine pathways that may contribute to fatigue, mood dysregulation, and neurological symptoms.

Neurotransmitter Metabolism -Profiles the major catecholamine and indole pathways, including dopamine, norepinephrine, and serotonin metabolites, as well as the tryptophan-kynurenine pathway, offering functional insight into mood, cognition, stress response, and sleep regulation.

Vitamins & Nutritional Cofactor Markers - Provides functional assessment of B-vitamin status (B1, B2, B3, B5, B6, B12, folate, biotin), glutathione and antioxidant capacity, and key cofactors required for enzymatic activity across multiple metabolic pathways.

Detoxification & Glutathione Function - Evaluates markers of phase I and phase II hepatic detoxification, glutathione cycling via pyroglutamic acid, and NAC status, reflecting the body's capacity to manage oxidative burden and chemical exposure.

Oxidative Stress & Inflammation - Measures markers of DNA oxidative damage and inflammatory mediators, including 8-hydroxy-deoxyguanosine and leukotriene E4, providing a functional picture of systemic oxidative load.

Oxalate Metabolism - Screens for markers of excess oxalate production or absorption, which may be associated with gut dysbiosis, dietary factors, or impaired detoxification.

Environmental & Xenobiotic Exposures - Identifies urinary metabolites of common environmental chemicals including xylene, benzene, toluene, phthalates, parabens, and endocrine-disrupting compounds such as Bisphenol A (BPA) and Bisphenol S (BPS), providing objective evidence of toxic load.

Please Note: We acknowledge that certain compounds appear in multiple sections of the report. This is intentional, as these analytes have relevance across different clinical pathways. Their inclusion in multiple categories supports more accurate pattern recognition and enhances the interpretive value of Organic Acids testing.

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MICROBIAL OVERGROWTH

	TEST	RESULT	H/L	REFERENCE	UNITS
1	Benzoic Acid	0.58		(<9.30)	mmol/molCR
2	Hippuric Acid	245.8		(<603.0)	mmol/molCR
3	4-Hydroxybenzoic Acid (4-HBA)	0.16		(<0.57)	mmol/molCR
4	3,4-Dihydroxybenzoic Acid (3,4-DHBA)	4.76		(<45.00)	mmol/molCR
5	3-Hydroxyphenylacetic Acid (3-HPAA)	2.56		(<10.00)	mmol/molCR
6	3,4-Dihydroxyphenylpropionic Acid (DHPPA)	0.20		(<5.30)	mmol/molCR
7	Furancarbonylglycine	0.05		(<2.00)	mmol/molCR
	Amino Acid Metabolism				
8	Phenylacetic Acid (PAA)	2.57		(<3.90)	mmol/molCR
9	Phenylpropionic Acid	0.03		(<0.10)	mmol/molCR
10	3-Phenyllactic Acid (3-PLA)	0.26		(<2.00)	mmol/molCR
11	2-Hydroxyphenylacetic Acid (2-HPAA)	0.24		(0.05-0.70)	mmol/molCR
12	4-Hydroxyphenyllactic Acid (4-HPLA)	0.36		(<3.90)	mmol/molCR
	SCFA Metabolism				
13	3-Hydroxypropionic Acid (3-HPA)	20.04	H	(<17.00)	mmol/molCR
	Clostridial Markers				
14	4-Cresol	1.19		(<3.00)	ug/mgCR
15	4-Hydroxyphenylacetic Acid (4-HPAA)	3.38		(<14.60)	mmol/molCR
16	Indoleacetic Acid (IAA)	3.23		(<11.00)	mmol/molCR
17	3-(3-Hydroxyphenyl)-3-hydroxypropionic Acid (HPHPA)	7.32		(<120.00)	mmol/molCR

YEASTS & FUNGAL METABOLITES

	TEST	RESULT	H/L	REFERENCE	UNITS
18	Arabinitol	3.2		(<36.0)	mmol/molCR
19	Arabinose	5.08		(<32.00)	mmol/molCR
20	Citramalic Acid	1.66		(<3.60)	mmol/molCR
21	3-Oxoglutaric Acid	0.04		(<0.50)	mmol/molCR
	Aspergillus Markers				
22	5-Hydroxymethyl-2-furoic Acid	0.54		(<10.00)	mmol/molCR
23	Furan-2,5-dicarboxylic Acid	0.60		(<15.00)	mmol/molCR
24	Tartaric Acid	1.25		(<15.00)	mmol/molCR
	Fusarium				
25	Tricarballylic Acid	0.11		(<0.44)	mmol/molCR

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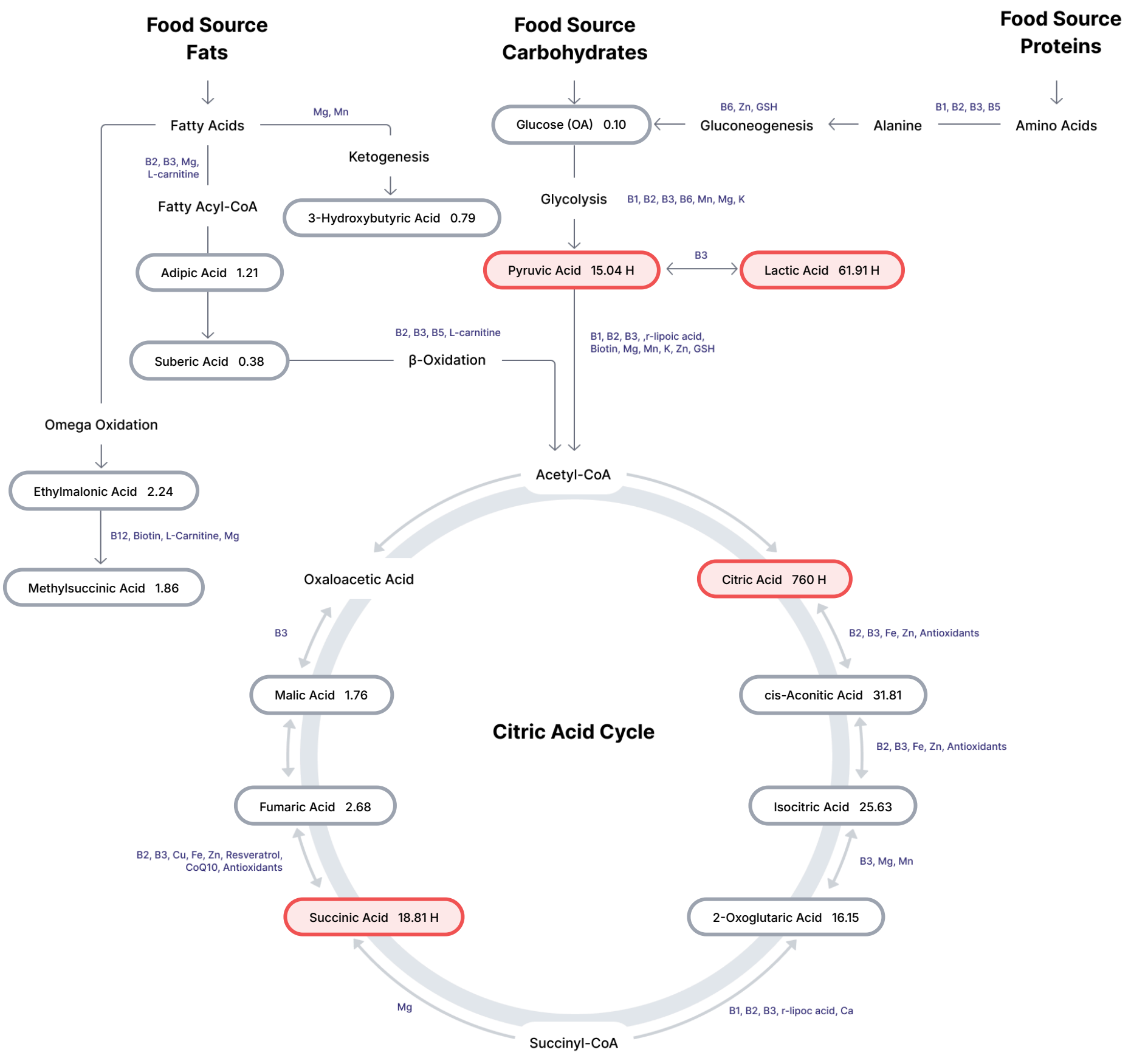
Organic Acids Pathway



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MITOCHONDRIAL & ENERGY METABOLISM

(B Comp, Cr, CoQ10, Lipoic Acid, Amino Acids, Mg)

	TEST	RESULT	H/L	REFERENCE	UNITS
	Carbohydrate & Glycaemic Metabolism				
26	Glucose (OA)	0.10		(<1.10)	ug/mgCR
27	Pyruvic Acid	15.04	H	(0.50-8.70)	mmol/molCR
28	Lactic Acid	61.91	H	(<48.00)	mmol/molCR
29	2-Hydroxybutyric Acid	3.09		(<6.90)	mmol/molCR
	Citric Acid Cycle				
30	Citric Acid	760	H	(40-507)	mmol/molCR
31	cis-Aconitic Acid	31.81		(3.50-36.00)	mmol/molCR
32	Isocitric Acid	25.63		(5.00-65.00)	mmol/molCR
33	2-Oxoglutaric Acid	16.15		(2.00-45.00)	mmol/molCR
34	Succinic Acid	18.81	H	(1.00-15.00)	mmol/molCR
35	Fumaric Acid	2.68		(<8.60)	mmol/molCR
36	Malic Acid	1.76		(<1.80)	mmol/molCR
	Ketone/Energy Intermediates				
37	Acetoacetic Acid	2.40		(<10.00)	mmol/molCR
38	3-Hydroxybutyric Acid	0.79		(<3.10)	mmol/molCR
39	2-Hydroxybutyric Acid	3.09		(<6.90)	mmol/molCR
	Mitochondrial Markers				
40	Methylsuccinic Acid	1.86		(<10.80)	mmol/molCR
41	2-Methylglutaric Acid	0.29		(<0.76)	mmol/molCR
42	3-Methylglutaric Acid	5.07		(<8.50)	mmol/molCR
43	2-Hydroxyglutaric Acid	8.47		(<15.00)	mmol/molCR
44	3-Hydroxyglutaric Acid	0.87		(<5.50)	mmol/molCR
45	Malonic Acid	1.02		(<9.70)	mmol/molCR
46	Mevalonolactone	0.56		(<2.00)	mmol/molCR
47	2,4-Dihydroxybutanoic Acid	2.89		(<10.00)	mmol/molCR
48	N-Acetylaspartic Acid	6.50		(<15.00)	mmol/molCR
49	3-Methylglutaconic Acid	1.73		(<5.50)	mmol/molCR

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FATTY ACID OXIDATION & KETONE METABOLISM

TEST		RESULT	H/L	REFERENCE	UNITS
50	Adipic Acid	1.21		(<3.80)	mmol/molCR
51	Pimelic Acid	0.79		(<4.00)	mmol/molCR
52	Suberic Acid	0.38		(<2.20)	mmol/molCR
53	Azelaic Acid	1.66		(<10.00)	mmol/molCR
54	Sebacic Acid	0.17		(<0.24)	mmol/molCR
55	Ethylmalonic Acid	2.24		(<5.80)	mmol/molCR
56	Propionylglycine	1.72		(<2.00)	mmol/molCR
57	N-Butyrylglycine	0.26		(<3.00)	mmol/molCR
58	Isovalerylglycine	0.16		(<4.50)	mmol/molCR
59	N-(2-Methylbutyryl)glycine	0.16		(<2.00)	mmol/molCR
60	3-Methylcrotonylglycine	0.22		(<10.00)	mmol/molCR
61	Tiglylglycine	0.90		(<10.00)	mmol/molCR
62	Hexanoylglycine	1.55		(<10.00)	mmol/molCR
63	Suberylglycine	0.32		(<3.00)	mmol/molCR

VITAMIN & NUTRITIONAL COFACTOR MARKERS

TEST		RESULT	H/L	REFERENCE	UNITS
B-Vitamin Functional Markers					
64	Methylmalonic Acid (MMA)	0.61		(<1.90)	mmol/molCR
65	Formiminoglutamic Acid (FIGLU)	1.36		(<1.50)	mmol/molCR
66	Xanthurenic Acid	0.77		(<0.96)	mmol/molCR
67	Kynurenic Acid	1.38		(<2.20)	mmol/molCR
68	Quinolinic Acid	0.65		(<9.10)	mmol/molCR
69	Picolinic Acid	22.60	H	(<10.28)	mmol/molCR
70	3-Hydroxyisovaleric Acid	10.23		(<29.00)	mmol/molCR
Vitamin-specific/Antioxidant Markers					
71	Pyroglutamic Acid	14.48		(4.50-33.00)	mmol/molCR
72	N-Acetylcysteine (NAC)	0.05		(0.02-0.28)	mmol/molCR
73	Glutaric Acid (Vit B2)	0.36		(0.02-0.36)	mmol/molCR
74	Pantothenic Acid (Vit B5)	9.30		(0.10-10.00)	mmol/molCR
75	Pyridoxic Acid (Vit B6)	100.00	H	(0.68-34.00)	mmol/molCR
76	Ascorbic Acid (Vit C)	5.94		(0.50-200.00)	mmol/molCR
77	Methylcitric Acid (Biotin/Vitamin H)	1.41		(0.10-15.00)	mmol/molCR
78	3-Hydroxy-3-methylglutaric Acid (CoQ10)	1.63		(0.10-5.00)	mmol/molCR

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PYRIMIDINE METABOLITES - Folate Metabolism

TEST		RESULT	H/L	REFERENCE	UNITS
79	Thymine	0.25		(<0.60)	mmol/molCR
80	Uracil	0.95		(<9.00)	mmol/molCR

AMINO ACID & BRANCHED-CHAIN METABOLISM

(B1, B2, B3, B5, B6, B12, Folate, Biotin)

TEST		RESULT	H/L	REFERENCE	UNITS
Branched-Chain Ketoacids					
81	2-Oxoisovaleric Acid	2.26		(<4.10)	mmol/molCR
82	2-Oxoisocaproic Acid	0.38		(<0.65)	mmol/molCR
83	3-Methyl-2-oxovaleric Acid	1.92		(<2.00)	mmol/molCR
84	3-Methylglutaric Acid	5.07		(<8.50)	mmol/molCR
85	Succinylacetone	0.10		(<0.50)	mmol/molCR
Downstream Metabolites					
86	2-Hydroxyisovaleric Acid	0.68		(<4.10)	mmol/molCR
87	2-Hydroxyisocaproic Acid	0.45		(<1.50)	mmol/molCR
88	2-Oxobutyric Acid	0.80		(<7.00)	mmol/molCR
89	2-Oxo-4-methiolbutyric Acid (KMBA)	0.10		(<1.50)	mmol/molCR
Amino Acid Metabolism					
90	Phenylpyruvic Acid	0.22		(<2.00)	mmol/molCR
91	Homogentisic Acid	0.05		(<1.00)	mmol/molCR
92	N-Acetylphenylalanine	1.28		(<5.00)	mmol/molCR
93	Mandelic Acid	284.9		(<340.0)	ug/gCR
94	Malonic Acid	1.02		(<9.70)	mmol/molCR
95	4-Hydroxyphenyllactic Acid (4-HPLA)	0.36		(<3.90)	mmol/molCR
96	2-Oxoadipic Acid	0.49		(<2.00)	mmol/molCR
97	Guanidinoacetic Acid	2.95		(0.50-3.00)	mmol/molCR
98	Guanidinobutyric Acid	0.81		(0.10-1.00)	mmol/molCR
99	3-Methylglutaric Acid	5.07		(<8.50)	mmol/molCR
100	N-Acetylglycine	2.60		(<5.00)	mmol/molCR

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NEUROTRANSMITTER METABOLITES

(Phenylalanine, Tyrosine)

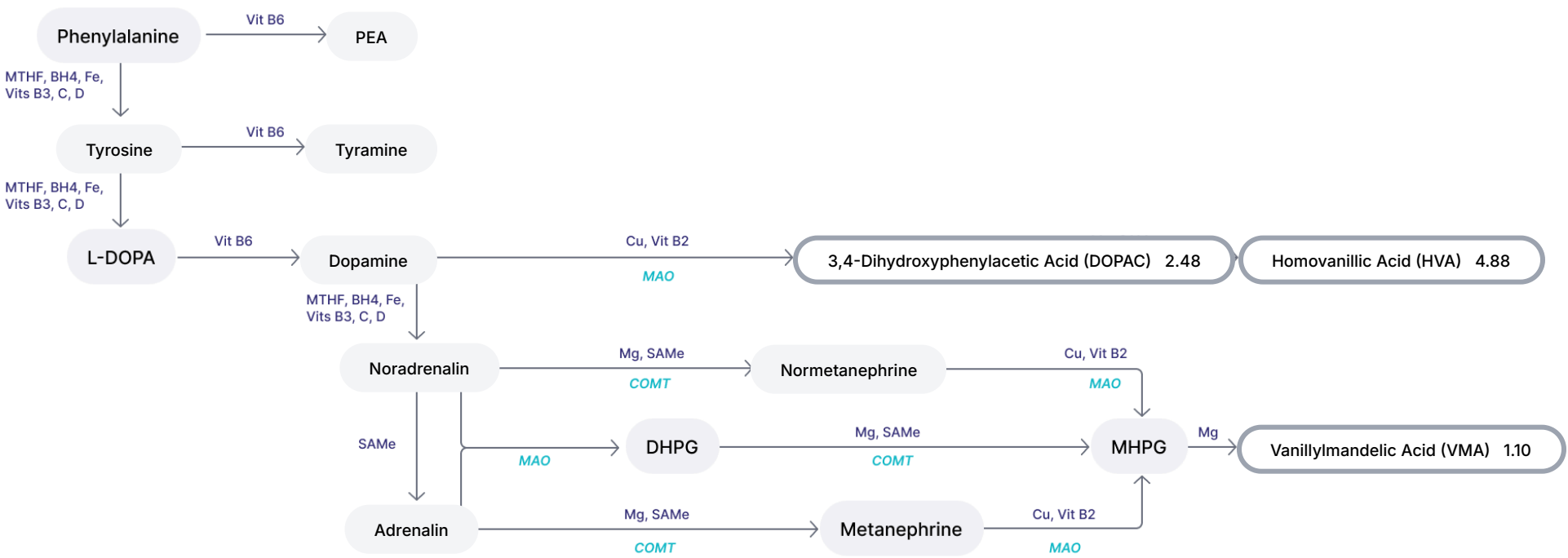
TEST	RESULT	H/L	REFERENCE	UNITS
Inhibitory (Serotonin)				
101 5-Hydroxyindoleacetic Acid (5-HIAA)	0.26		(<4.30)	mmol/molCR
Excitatory (Dopamine)				
102 3,4-Dihydroxyphenylacetic Acid (DOPAC)	2.48		(0.08-3.50)	mmol/molCR
103 3-Methyl-4-hydroxyphenylglycol (MHPG)	0.11		(0.05-0.50)	mmol/molCR
104 Homovanillic Acid (HVA)	4.88		(0.10-5.30)	mmol/molCR
105 Vanillylmandelic Acid (VMA)	1.10		(0.40-3.60)	mmol/molCR
106 HVA/DOPAC Ratio	2.0		(<10.0)	ratio
107 HVA/VMA Ratio	4.4	H	(<2.0)	ratio

ADRENAL STRESS (Overnight)

SERVICE	RESULT	H/L	REFERENCE	UNITS
108 Cortisol (OA)	108.9	H	(1.0-63.8)	ug/gCR

Legend Not Tested | Within Range | Out of Range | L = Low, LL = Critically Low | H = High, HH = Critically High | Regulator | *Enzyme*

Excitatory Pathway



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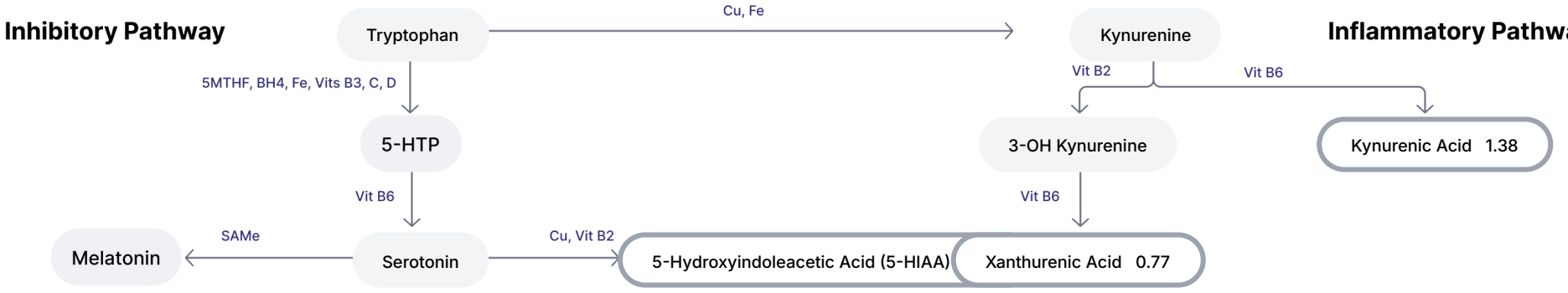
TRYPTOPHAN/KYNURENINE PATHWAY

(Tryptophan, B6, Antioxidants)

TEST	RESULT	H/L	REFERENCE	UNITS
Inhibitory				
109 5-Hydroxyindoleacetic Acid (5-HIAA)	0.26		(<4.30)	mmol/molCR
Inflammatory				
110 Kynurenic Acid	1.38		(<2.20)	mmol/molCR
111 Quinolinic Acid	0.65		(<9.10)	mmol/molCR
112 Picolinic Acid	22.60	H	(<10.28)	mmol/molCR
113 Xanthurenic Acid	0.77		(<0.96)	mmol/molCR
114 Kynurenic/Quinolinic Ratio	2.1	H	(<2.0)	ratio
115 Quinolinic Acid/5-HIAA Ratio	2.5		(<5.0)	ratio



Legend Not Tested | Within Range | Out of Range | L = Low, LL = Critically Low | H = High, HH = Critically High | Regulator | *Enzyme*

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DETOXIFICATION & GLUTATHIONE FUNCTION

(Arg, NAC, Meth, Mg, Antioxidants)

TEST		RESULT	H/L	REFERENCE	UNITS
Ammonia Metabolism					
116	Orotic Acid	3.20	H	(<3.20)	mmol/molCR
Glutathione Metabolism					
117	Pyroglutamic Acid	14.48		(4.50-33.00)	mmol/molCR
118	N-Acetylcysteine (NAC)	0.05		(0.02-0.28)	mmol/molCR
119	Glucaric Acid	3.12		(<11.00)	mmol/molCR
Phase I / Xenobiotic Markers					
120	2-Hydroxyhippuric Acid	0.23		(<1.50)	mmol/molCR
121	5-Hydroxymethyl-2-furoic Acid	0.54		(<10.00)	mmol/molCR
122	Furan-2,5-dicarboxylic Acid	0.60		(<15.00)	mmol/molCR

OXIDATIVE STRESS & INFLAMMATION

(Vitamin C, Other Antioxidants)

TEST		RESULT	H/L	REFERENCE	UNITS
123	8-hydroxy-deoxyguanosine	0.99		(<2.70)	umol/molCR
124	Leukotriene E4	3.31		(<100.00)	pg/mgCR
125	Quinolinic Acid	0.65		(<9.10)	mmol/molCR
126	Pyroglutamic Acid	14.48		(4.50-33.00)	mmol/molCR
127	Ascorbic Acid (Vit C)	5.94		(0.50-200.00)	mmol/molCR
128	Quercetin	0.65		(0.01-2.00)	mmol/molCR

OXALATE METABOLISM

TEST		RESULT	H/L	REFERENCE	UNITS
129	Glycolic Acid	53.63		(<67.00)	mmol/molCR
130	Glyceric Acid	0.65		(<6.00)	mmol/molCR
131	Oxalic Acid	108.53	H	(<78.00)	mmol/molCR

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ENVIRONMENTAL / XENOBIOTIC EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
Toluene Exposure				
132 Hippuric Acid	245.8		(<603.0)	mmol/molCR
133 Benzoic Acid	0.58		(<9.30)	mmol/molCR
Paraben Exposure				
134 4-Hydroxybenzoic Acid (4-HBA)	0.16		(<0.57)	mmol/molCR
Styrene Exposure				
135 Mandelic Acid	284.9		(<340.0)	ug/gCR
136 Phenylglyoxylic Acid	84.1		(<300.0)	ug/gCR
137 Mandelic Acid + Phenylglyoxylic Acid	369.0		(<610.0)	ug/gCR
Benzene Exposure				
138 t,t-Muconic Acid	0.03		(<0.12)	mmol/molCR
Phthalate Exposure				
139 Phthalic Acid	36.91		(<170.00)	ug/gCR
140 Monoethyl Phthalate	3.83		(<100.00)	ug/gCR
141 Quinolinic Acid	0.65		(<9.10)	mmol/molCR
METB Exposure				
142 2-Hydroxylsobutyric Acid	2.06		(<6.90)	mmol/molCR
Xylene Exposure				
143 2-Methylhippuric Acid	0.04		(<0.04)	mmol/molCR
144 3-Methylhippuric Acid	0.02		(<0.11)	mmol/molCR
145 4-Methylhippuric Acid	1.08		(<1.80)	mmol/molCR
Trimethylbenzene Exposure				
146 3,4-Dimethylhippuric Acid	0.00		(<0.01)	mmol/molCR
147 4-Hydroxyhippuric Acid	2.16		(<16.50)	mmol/molCR
Nucleotide Turnover/Methylation				
148 5-Methylcytosine	34.48		(10.00-50.00)	mmol/molCR
149 Uracil	0.95		(<9.00)	mmol/molCR
150 Thymine	0.25		(<0.60)	mmol/molCR

TEST	RESULT	H/L	REFERENCE	UNITS
151 Creatinine, Urine	2.03	L	(2.47-19.20)	mmol/L

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NUTRITION GUIDE

SERVICE	Nutritional Need	DOSE	UNITS
Vitamins			
Vitamin-B1	HIGH	125.0	mg
Vitamin-B2	Moderate	125.0	mg
Vitamin-B3	HIGH	400.0	mg
Vitamin-B5	Moderate	100.0	mg
Vitamin-B6	Adequate	0.0	mg
Biotin	Mild	100.0	ug
Vitamin B12	Mild	500.0	ug
Vitamin-C	Moderate	750.0	mg
Vitamin-E	HIGH	500.0	U
Minerals			
Chromium	Moderate	150.0	ug
Iron	Adequate	15.0	mg
Magnesium	HIGH	300.0	mg
Manganese	Moderate	6.0	mg
Vanadium	Mild	50.0	ug
Antioxidants/Cofactors			
alpha-Lipoic Acid	Moderate	200.0	mg
Calcium-D-glucarate	Mild	500.0	mg
Coenzyme Q10	Moderate	200.0	mg
Glutathione	Moderate	300.0	mg
N-Acetylcysteine	Moderate	300.0	mg

NUTRITION GUIDE

SERVICE	Nutritional Need	DOSE	UNITS
Amino Acids			
5-HTP	HIGH	100.0	mg
Acetyl-L-Carnitine	Moderate	500.0	mg
L-Arginine	Moderate	1500.0	mg
Aspartic Acid	HIGH	1000.0	mg
Glutamine	Moderate	1000.0	mg
Glycine	Mild	500.0	mg
Lysine	Mild	500.0	mg
Methionine	Mild	200.0	mg
Ornithine	Moderate	1000.0	mg
Phenylalanine	Moderate	500.0	mg
Serine	Moderate	1000.0	mg
Taurine	Moderate	1000.0	mg
Tryptophan	Moderate	600.0	mg
Tyrosine	Moderate	1000.0	mg
Probiotics			
D-Lactate-free probiotics	Moderate	40.0	billion CFU
Lactobacillus	Moderate	30.0	billion CFU
Probiotics (Multistrain)	Mild	20.0	billion CFU
Other			
Malic Acid	HIGH	600.0	mg
EPA/DHA	Mild	1000.0	mg
Folinic Acid	HIGH	400.0	ug

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Test Patient

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About the Nutrition Guide & Supplement Schedule

The Nutrition Guide presented in this report represents a personalised supplementation schedule generated directly from the organic acid findings of this individual patient. It is not a generic recommendation it is dynamically calculated for each patient based on the specific metabolic pattern identified across all measured domains.

The schedule is generated using a proprietary weighted algorithm developed by our clinical and scientific team. The algorithm analyses the full pattern of organic acid results not individual markers in isolation and assigns a weighted score to each finding based on its functional significance, its relationship to nutrient-dependent enzymatic pathways, and its interaction with other metabolic markers present in the same report. The outcome of this calculation determines both the nutritional priority level (Adequate, Mild, Moderate, or High) and the suggested starting dose for each nutrient, amino acid, probiotic, or cofactor listed.

Important Disclaimer

The Nutrition Guide and supplementation suggestions in this report are generated for clinical decision-support purposes only and are not intended as standalone medical advice or a prescription.

The proprietary algorithm used to generate this schedule is based on established relationships between organic acid biomarkers and nutritional cofactor requirements. However, it operates solely on biochemical data and cannot account for a patient's complete medical history, current medications, existing diagnoses, organ function, pregnancy or breastfeeding status, or any other health condition that may influence the safety or appropriateness of the suggested nutrients and doses.

The final therapeutic decision including whether to implement, modify, or withhold any recommendation in this report rests entirely with the treating practitioner. It is the practitioner's responsibility to integrate these findings with the full clinical picture before making any therapeutic recommendation.

This report does not diagnose, treat, cure, or prevent any disease or medical condition.

Nutritional Guide Practitioner Notes

Bacterial Dysbiosis Comment

3-HYDROXYPROPANOIC ACID ELEVATED (URINE):

Elevated urinary 3-hydroxypropanoic acid suggests altered propionate metabolism or increased microbial production of short-chain organic acids.

Clinically, elevated levels may be associated with fatigue, gastrointestinal symptoms, or metabolic inefficiency, although symptoms are non-specific.

From an organic acid pattern perspective, elevation may be observed alongside other short-chain fatty acid metabolites, reflecting altered gut microbial fermentation or metabolic handling of propionate.

From a functional medicine perspective, elevated 3-hydroxypropanoic acid should be interpreted in the context of gut microbial balance, vitamin B12 status, and overall short-chain fatty acid metabolism.

Consider: B12, Magnesium and Biotin.

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Mitochondrial/Energy Metabolism Comment

CITRIC ACID ELEVATED (URINE):

Elevated urinary citric acid suggests increased TCA cycle flux or compensatory mitochondrial activity.

Clinically, symptoms are variable and often non-specific.

From an organic acid pattern perspective, elevated citric acid may coexist with elevated succinic or alpha-ketoglutaric acid, suggesting downstream enzymatic bottlenecks.

From a functional medicine perspective, this pattern should be interpreted in the context of mitochondrial efficiency rather than concentration alone.

Consider: Supplementation with glutathione, NAC and arginine.

SUCCINIC ACID ELEVATED (URINE):

Elevated urinary succinic acid suggests impaired downstream processing within the tricarboxylic acid (TCA) cycle or reduced efficiency of the electron transport chain. Accumulation of succinic acid may reflect mitochondrial bottlenecks or altered redox balance.

Clinically, elevated succinic acid may be associated with fatigue, reduced exercise tolerance, and symptoms related to impaired aerobic energy production.

From an organic acid pattern perspective, elevated succinic acid often occurs alongside elevations in alpha-ketoglutaric acid and other downstream TCA intermediates, indicating congestion within mitochondrial energy pathways and increased reliance on compensatory metabolic mechanisms.

From a functional medicine perspective, elevated succinic acid should be interpreted in the context of mitochondrial efficiency, oxidative stress, and overall metabolic demand rather than concentration alone.

Elevated succinate may indicate a deficiency of Riboflavin and CoQ10.

Carbohydrate Metabolism Comment

PYRUVIC ACID ELEVATED (URINE):

Elevated urinary pyruvic acid suggests increased glycolytic activity with relative inefficiency in downstream mitochondrial oxidation. This may reflect increased metabolic demand, reduced pyruvate dehydrogenase activity, or impaired entry of pyruvate into the TCA cycle.

Clinically, elevated pyruvic acid may be associated with fatigue, exercise intolerance, muscle discomfort, or symptoms related to impaired aerobic energy production.

From an organic acid pattern perspective, elevated pyruvic acid is often observed alongside elevated lactic acid and alterations in TCA cycle intermediates, suggesting a shift toward anaerobic metabolism or a functional bottleneck at the pyruvate dehydrogenase step.

From a functional medicine perspective, elevated pyruvic acid should be interpreted in the context of mitochondrial function, B-vitamin cofactor status (particularly thiamine and riboflavin), oxygen delivery, and metabolic stress rather than concentration alone.

LACTIC ACID ELEVATED (URINE):

Elevated urinary lactic acid suggests increased reliance on anaerobic glycolysis. This may occur in the setting of increased metabolic demand, reduced oxygen delivery, mitochondrial inefficiency, or impaired pyruvate oxidation.

Clinically, elevated lactic acid may be associated with fatigue, muscle soreness, exercise intolerance, and post-exertional malaise.

From an organic acid pattern perspective, elevated lactic acid commonly occurs alongside elevated pyruvic acid and disrupted TCA cycle intermediates, indicating reduced efficiency of aerobic energy production and increased anaerobic compensation.

From a functional medicine perspective, elevated lactic acid should be interpreted in the context of mitochondrial function, tissue oxygenation, nutrient cofactor status, and inflammatory or infectious burden rather than as an isolated abnormality.

Consider: B1, B2, B3, B5, lipoate, CoQ10.

Nutritional Markers

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VITAMIN B6 (PYRIDOXIC ACID) ELEVATED (URINE):

Elevated urinary pyridoxic acid suggests increased vitamin B6 intake, enhanced utilisation, or increased renal excretion. Vitamin B6 is a key cofactor in amino acid metabolism, neurotransmitter synthesis, and the kynurenine pathway.

Clinically, elevated B6 is most commonly benign and reflects supplementation; however, in some cases it may be associated with sensory neuropathy or dysregulated neurotransmitter balance if intake is excessive or prolonged.

From an organic acid pattern perspective, elevated B6 may be seen alongside normalisation or reduction of xanthurenic acid, kynurenic acid, and quinolinic acid, indicating improved tryptophan pathway handling. Persistently elevated B6 with ongoing abnormalities in these metabolites may suggest downstream metabolic bottlenecks or inflammatory drivers rather than true deficiency.

From a functional medicine perspective, interpretation should consider supplementation dose and duration, overall B-vitamin balance, and whether elevated intake is appropriately translating into improved organic acid patterns.

Consider: A diet low in B6; including lamb, eggs, cheese, noodles.

Neurotransmitter Metabolism Comment

HVA/VMA RATIO ELEVATED:

Description:

A high HVA/VMA ratio indicates relative predominance of dopaminergic metabolite production over noradrenergic/adrenergic metabolism, suggesting relatively greater dopamine activity or impaired conversion of dopamine to norepinephrine.

Clinical Significance:

Elevated ratio may indicate DBH deficiency or relative noradrenergic insufficiency alongside dopaminergic excess. Associated with orthostatic hypotension, fatigue, impaired stress response, and in extreme cases, dopamine beta-hydroxylase deficiency syndrome.

Suggested Treatment:

Evaluate DBH function and copper status (DBH is a copper-dependent enzyme). Assess for orthostatic symptoms. Support copper and vitamin C adequacy. Investigate for dopamine beta-hydroxylase deficiency if ratio is markedly elevated.

CORTISOL ELEVATED (URINE):

Elevated urinary cortisol reflects increased adrenal output and heightened hypothalamic–pituitary–adrenal (HPA) axis activation. Cortisol plays a central role in stress adaptation, glucose regulation, and immune modulation.

Clinically, elevated cortisol may be associated with anxiety, sleep disturbance, irritability, central weight gain, hypertension, and impaired immune regulation.

From an organic acid pattern perspective, elevated cortisol may be associated with increased catecholamine metabolites such as vanilmandellic acid, increased protein and amino acid catabolism, and altered glycolytic markers (e.g. elevated pyruvic or lactic acid) due to sustained gluconeogenic drive.

From a functional medicine perspective, management focuses on identifying drivers of HPA axis activation (psychological stress, inflammation, sleep disruption, stimulant use), stabilising blood glucose, and restoring circadian rhythm integrity rather than suppressing cortisol in isolation.

PICOLINIC ACID ELEVATED (URINE):

Elevated urinary picolinic acid suggests increased flux through the kynurenine pathway of tryptophan metabolism. Picolinic acid is a downstream metabolite of tryptophan catabolism and plays a role in immune modulation and mineral chelation, particularly zinc.

Clinically, elevated picolinic acid may be associated with non-specific symptoms such as fatigue, immune activation, or neurocognitive complaints, although findings are context dependent.

From an organic acid pattern perspective, elevated picolinic acid is often observed alongside other kynurenine pathway metabolites, such as quinolinic acid, reflecting immune or inflammatory diversion of tryptophan metabolism.

From a functional medicine perspective, this finding should be interpreted in the context of immune activation, inflammatory burden, and overall balance of tryptophan metabolism rather than as an isolated abnormality.

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Consider: Supplementation with omega-3 fatty acids i.e. DHA, EPA.

KYNURENIC ACID/QUINOLINIC ACID RATIO ELEVATED:

Description:

A high kynurenic/quinolinic ratio indicates predominance of the neuroprotective kynurenic acid branch of tryptophan catabolism relative to the neurotoxic quinolinic acid pathway.

Clinical Significance:

While generally more favourable than a low ratio, very high kynurenic acid levels relative to quinolinic acid may reflect excessive NMDA receptor antagonism, associated with dissociation, cognitive blunting, and psychotic-spectrum symptoms. May also indicate reduced kynurenine aminotransferase pathway flux under specific metabolic conditions.

Suggested Treatment:

Context-dependent assessment required. If kynurenic acid is excessively elevated, evaluate for schizophrenia-spectrum presentations. Ensure balanced tryptophan and B-vitamin cofactor status. Monitor cognitive symptoms. Consider neurological consultation if clinically warranted.

Detoxification / Oxidative Damage Comment:

OROTIC ACID ELEVATED (URINE):

Orotic acid is involved in pyrimidine synthesis. Elevation may reflect urea cycle stress, ammonia burden, or mitochondrial dysfunction.

Clinically, elevations may be associated with fatigue, headaches, cognitive symptoms, or exercise intolerance. Results should be interpreted in conjunction with dietary intake, medications, and overall clinical context.

From a functional medicine perspective, management focuses on supporting urea cycle function, improving nitrogen balance, and addressing mitochondrial efficiency, with attention to correcting underlying biochemical drivers rather than treating the marker in isolation.

Consider: Magnesium, B3, B6, folic acid, glutamine, glycine, serine, arginine, aspartic acid

Oxalate Metabolism Comment

OXALIC ACID ELEVATED (URINE):

Oxalic acid may arise from dietary sources or endogenous metabolism. Elevation reflects increased oxalate load or impaired clearance.

Clinically, elevations may be associated with urinary discomfort, kidney stone risk, joint pain, or fatigue. Results should be interpreted alongside diet, environmental exposures, medications, and overall clinical context.

From a functional medicine perspective, management focuses on reviewing high-oxalate foods, ensuring adequate calcium and magnesium intake, and supporting gut oxalate metabolism, with emphasis on reducing exposure and supporting metabolic clearance pathways.

Consider: Reducing vitamin C intake/supplementation. May supplement with B6, arginine, vitamin E, taurine, omega-3 fatty acids to reduce levels.

Environmental/Xenobiotic Exposure Comment:

ENVIRONMENTAL POLLUTANTS PROFILE:

The reported markers in the Environmental Pollutants Profile commonly originate from industrial/manufacturing products or their associated byproducts. Exposures are often occupationally-related and typically through either inhalation or topical exposure.

Metabolism of these products occurs via the liver detoxification pathways leading to excretion into the urine. Chronic exposures may also lead to build up of these products in fatty tissue deposits.

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CYSTEINE DERIVATIVES

TEST	RESULT	H/L	REFERENCE	UNITS
N-Acetyl (3,4-Dihydroxybutyl) cysteine (NADB)	17.76		(<250.00)	ug/gCR
N-Acetyl (carbomoylethyl) cysteine	<DL		(<190.00)	ug/gCR
N-Acetyl phenyl cysteine (SPMA)	<DL		(<5.00)	ug/gCR
N-Acetyl (propyl) cysteine (NAPR)	<DL		(<25.00)	ug/gCR

ENVIRONMENTAL PHENOLS

TEST	RESULT	H/L	REFERENCE	UNITS
4-Nonylphenol	2.34		(<3.00)	ug/gCR
Bisphenol A (BPA)	1.65		(<4.00)	ug/gCR
Bisphenol S (BPS)	1.25	H	(<0.80)	ug/gCR
Triclosan (TCS)	17.83		(<50.00)	ug/gCR

HERBICIDES (Synthetic Auxins)

TEST	RESULT	H/L	REFERENCE	UNITS
2,4-Dichlorophenoxyacetic acid (2,4-D)	<DL		(<1.00)	ug/gCR

HERBICIDES (Photosynthetic Inhibitors)

TEST	RESULT	H/L	REFERENCE	UNITS
Atrazine	<DL		(<0.50)	ug/gCR
Atrazine mercapturate	<DL		(<0.50)	ug/gCR

HERBICIDES (EPSP Inhibitors)

TEST	RESULT	H/L	REFERENCE	UNITS
Aminomethylphosphonic Acid (AMPA)	2.16	H	(<2.00)	ug/gCR
Glyphosate	1.3	H	(<1.0)	ppb

METHYLTERT-BUTYL ETHER (MTBE) EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
2-Hydroxylsobutyric Acid	2.06		(<6.90)	mmol/molCR

MITOCHONDRIAL MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
Tiglylglycine	1.25		(<10.00)	ug/gCR

PARABENS

TEST	RESULT	H/L	REFERENCE	UNITS
Benzylparaben	0.05		(<2.00)	ug/gCR

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TEST	RESULT	H/L	REFERENCE	UNITS
Butylparaben	<DL		(<1.00)	ug/gCR
Ethylparaben	0.71		(<7.00)	ug/gCR
Methylparaben	4.27		(<120.00)	ug/gCR
4-Hydroxybenzoic Acid (4-HBA)	0.16		(<0.57)	mmol/molCR
Propylparaben	2.29		(<35.00)	ug/gCR

PESTICIDES

TEST	RESULT	H/L	REFERENCE	UNITS
3-Phenoxybenzoic Acid (3PBA)	<DL		(<3.00)	ug/gCR
Diethyl Phosphate (DEP)	<DL		(<9.00)	ug/gCR
Diethyldithiophosphate (DEDTP)	<DL		(<0.20)	ug/gCR
Diphenyl phosphate (DPP)	9.57	H	(<2.50)	ug/gCR
Diethylthiophosphate (DETP)	0.18		(<1.00)	ug/gCR

PFA's

TEST	RESULT	H/L	REFERENCE	UNITS
Perfluorobutanoic acid (PFBA)	0.62		(<1.20)	ug/gCR
Perfluorooctanoic Acid (PFOA)	0.03		(<0.10)	ug/gCR
Perfluorooctane Sulphonic Acid (PFOS)	<DL		(<0.60)	ug/gCR

PHTHALATES

TEST	RESULT	H/L	REFERENCE	UNITS
Butyl Benzyl phthalate (BBP)	0.97		(<1.00)	ug/gCR
Mono-Benzyl phthalate (mBzP)	<DL		(<3.00)	ug/gCR
Mono-n-Butyl phthalate (mBP)	32.68		(<55.00)	ug/gCR
Mono (3-carboxypropyl) phthalate (mCPP)	<DL		(<31.00)	ug/gCR
Mono-ethyl phthalate (MEtP)	3.83		(<100.00)	ug/gCR
Mono-2-ethylhexyl phthalate (MEHP)	35.86	H	(<11.00)	ug/gCR
Mono-(2-ethy-5-hydroxyhexyl) phthalate (MEHHP)	2.92		(<12.00)	ug/gCR
Mono-(2-ethy-5-oxohexyl) phthalate (MEOHP)	<DL		(<27.00)	ug/gCR
Mono-n-octyl phthalate (mOP)	1.37		(<2.00)	ug/gCR
Phthalic Acid	36.91		(<170.00)	ug/gCR
Quinolinic Acid	0.65		(<9.10)	mmol/molCR

VOLATILE ORGANIC COMPOUNDS

TEST	RESULT	H/L	REFERENCE	UNITS
2-hydroxyethyl-mercapturic acid (HEMA)	<DL		(<5.00)	ug/gCR
Mandelic Acid	284.9		(<340.0)	ug/gCR

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TEST	RESULT	H/L	REFERENCE	UNITS
Phenylglyoxylic Acid	84.1		(<300.0)	ug/gCR
Mandelic Acid + Phenylglyoxylic Acid	369.0		(<610.0)	ug/gCR

BENZENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
t,t-Muconic Acid	0.03		(<0.12)	mmol/molCR
3,4-Dimethylhippuric Acid	0.00		(<0.01)	mmol/molCR

TOLUENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
Benzoic Acid	0.58		(<9.30)	mmol/molCR
Hippuric Acid	245.8		(<603.0)	mmol/molCR

XYLENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
2-Methylhippuric Acid	0.04		(<0.04)	mmol/molCR
3-Methylhippuric Acid	0.02		(<0.11)	mmol/molCR

TEST	RESULT	H/L	REFERENCE	UNITS
Creatinine, Urine	2.03	L	(2.47-19.20)	mmol/L

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Herbicides Comment

GLYPHOSATE ELEVATED (URINE):

Elevated urinary glyphosate suggests recent exposure and renal excretion of this widely used herbicide. Urinary glyphosate reflects short-term exposure rather than tissue accumulation.

Clinically, glyphosate exposure has been associated with gastrointestinal symptoms, oxidative stress, and potential endocrine or microbiome-related effects, though findings vary with dose and chronicity.

From a functional medicine perspective, this result should be interpreted in the context of dietary patterns, occupational or residential herbicide exposure, and cumulative pesticide burden, with emphasis on minimising ongoing exposure rather than treating the metabolite itself.

Treatment considerations: Focus on microbiome repair, liver support, antioxidant nutrients, and avoidance of glyphosate-laden foods and environments.

AMINOMETHYLPHOSPHONIC ACID (AMPA) ELEVATED (URINE):

Elevated urinary aminomethylphosphonic acid (AMPA) suggests exposure to glyphosate, as AMPA is the primary environmental and metabolic degradation product of glyphosate. Urinary AMPA reflects recent exposure and renal clearance.

Clinically, AMPA itself is considered a marker of glyphosate exposure rather than an independent toxicant. Potential health effects relate to cumulative glyphosate exposure and may include non-specific symptoms such as fatigue or gastrointestinal disturbance, although clinical significance is exposure dependent.

From a functional medicine perspective, this finding should be interpreted in the context of dietary and environmental exposure sources, including agricultural contact, residential herbicide use, and food residues, with emphasis on exposure identification and reduction.

Treatment considerations: Treatment parallels glyphosate - focus on microbiome repair, liver support, antioxidant nutrients, and avoidance of glyphosate-laden foods and environments.

Pesticides Comment

DIPHENYL PHOSPHATE (DPP) ELEVATED (URINE):

Elevated urinary diphenyl phosphate (DPP) suggests exposure to organophosphate flame retardants and plasticisers, such as triphenyl phosphate. DPP reflects recent exposure and renal elimination.

Clinically, exposure to these compounds has been associated with endocrine disruption and metabolic effects in experimental studies, though clinical manifestations are often subtle.

From a functional medicine perspective, this finding should be interpreted in the context of exposure to flame-retardant-treated materials, plastics, and indoor environments, with emphasis on reducing ongoing exposure.

Treatment considerations: Eliminate exposure sources such as flame retardants, plasticizers, lubricants, hydraulic fluids.

Phthalates Comment

MONO-2-ETHYLHEXYL PHTHALATE (MEHP) ELEVATED (URINE):

Elevated urinary mono-2-ethylhexyl phthalate (MEHP) reflects exposure to di-2-ethylhexyl phthalate (DEHP), a widely used plasticiser in food packaging, medical devices, and flexible plastics.

Clinically, DEHP exposure has been associated with endocrine and reproductive effects, particularly with sustained exposure.

From a functional medicine perspective, this result should be interpreted in the context of dietary packaging exposure, medical device history, and cumulative phthalate load.

Treatment considerations: Avoid DEHP sources (e.g., PVC plastics, processed foods). Antioxidant therapy, dietary fiber, and sauna therapy may assist excretion. Evaluate for other endocrine disruptors.

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Methodology

Liquid Chromatography-Mass Spectrometry (LC-MS/MS/MS), Gas Chromatography-MS (GC/MS), Automated Chemistry/Immunochemistry