

26241-0006

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

Patient ID P000060
Ext ID 26241-0006

Test Patient

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

RECEIVED
29-Aug-26

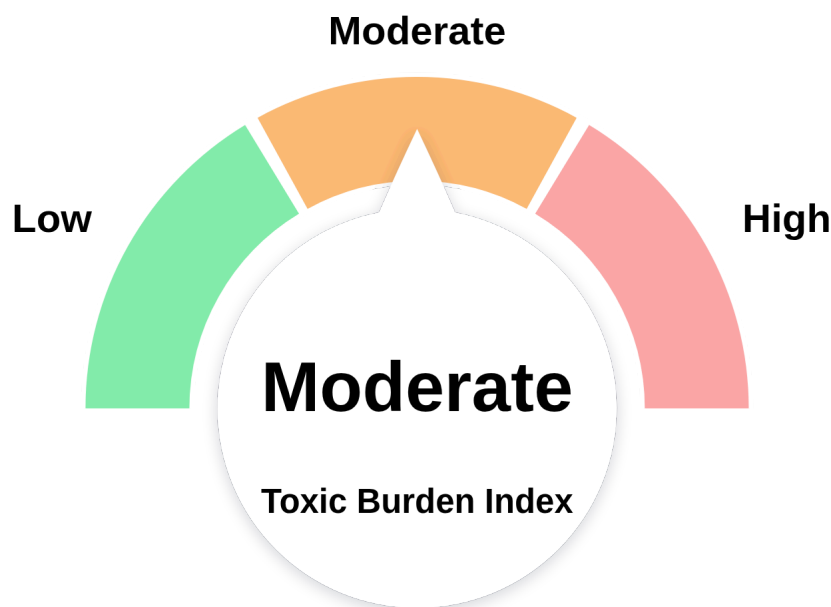
Clinical Notes .

MOE-Tox Environmental Toxins Profile

Specimen type - Urine, Spot

Collected

29-Aug-26

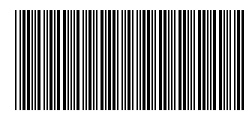


Toxic Burden Comment

Interpretation:

Moderate elevations may reflect increased exposure from environmental, dietary, or occupational sources. While concentrations are generally below levels associated with acute toxicity, cumulative effects may contribute to oxidative stress, mitochondrial dysfunction, or endocrine disruption in sensitive individuals. Management focuses on identifying and eliminating exposure sources, improving indoor air and water quality, and supporting hepatic and renal detoxification pathways. Clinical protocols may include antioxidants (vitamin C, selenium, CoQ10), glutathione or N-acetylcysteine to enhance detoxification, and binding agents such as activated charcoal or cholestyramine where indicated. Retesting after 3–6 months is advisable to confirm improvement.

Molds	Environmental Pollutants	Nutrients/Organic Acids
Tricothecenes Group Ochratoxin A	5-Methylcytosine	2-Oxoisocaproic Acid N-Acetylcysteine (NAC) 2-Hydroxyglutaric Acid 2-Methylglutaric Acid 3-Hydroxyglutaric Acid 3-Methylglutaconic Acid 4-Hydroxybenzoic Acid (4-HBA) 5-Methylcytosine Acetoacetic Acid Adipic Acid Citramalic Acid Homogentisic Acid HVA/VMA Ratio Indoleacetic Acid (IAA) Isocitric Acid Malic Acid



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AFLATOXINS GROUP

(Aflatoxins Group - B1, B2, G1, G2)

TEST	RESULT	H/L	REFERENCE	UNITS
Aflatoxin Group	0.321		(<0.800)	ppb

GLIOTOXINS GROUP

TEST	RESULT	H/L	REFERENCE	UNITS
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(Gliotoxin Derivative)

●	Gliotoxin Derivative	0.450		(<0.500)	ppb
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OCHRATOXIN GROUP

TEST	RESULT	H/L	REFERENCE	UNITS
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(Ochratoxin A)

Contaminant	Concentration (ppb)	Health Hazard	Exposure Level	Acceptable Level (ppb)	Unit
Ochratoxin A	1.970	H		<1.800	ppb

TRICHOTHECENES GROUP - Type D Macrocyclic

(Isosatrotroxin F, Roridins A, E, H, L-2, Satrotrotoxins G, H, Verrucarins A, J)

TEST	RESULT	H/L	REFERENCE	UNITS
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Tricothecenes Group 0.129 H  (<0.070) ppb

ZEARALENONE GROUP

TEST	RESULT	H/L	REFERENCE	UNITS
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(Zearalenone)

Contaminant	Concentration (ppb)	Visual Scale	Limit (ppb)	Unit
Zearalenone	0.180		(<0.500)	ppb

About These Tests:

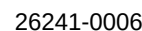
Test results should be evaluated in relation to patient symptoms, clinical history, and other laboratory findings. Individuals should review their results with a healthcare provider.

These tests were developed and the performance characteristics determined by RealTime Laboratories. They have not been cleared or approved by the U.S. Food and Drug Administration (FDA).

This laboratory is certified under the Clinical Laboratory Improvement Amendments (CLIA) as qualified to perform high complexity clinical laboratory testing.

The New York State (NYS) Department of Health (DOH) has allowed these tests to be offered in the NYS under the current RealTime Laboratories permit. The NYS DOH has not evaluated any test claims nor reviewed the accuracy of these tests.

Disclaimer: This panel employs advanced analytical technologies for accurate compound detection. Environmental compounds and organic acids in urine are quantified using tandem mass spectrometry (LC-MS/MS), while minerals and metals are measured using inductively coupled plasma mass spectrometry (ICP-MS). Urine creatinine is determined via a kinetic colorimetric assay based on the Jaffé method, and all analyte concentrations are reported as quantitative values normalized to urine creatinine to account for differences in urine concentration. Test results should always be interpreted



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Mycotoxins Comment

Elevated urinary trichothecenes indicate exposure to highly cytotoxic mycotoxins produced by *Fusarium*, *Stachybotrys*, and related species. These compounds are potent inhibitors of protein synthesis and are commonly associated with water-damaged buildings and contaminated grains.

Clinically, trichothecene exposure is associated with prominent inflammatory and neurological symptoms, including headaches, fatigue, cognitive dysfunction, mucosal irritation, gastrointestinal disturbance, and immune dysregulation. Trichothecenes are considered among the more clinically aggressive mycotoxins.

From a functional medicine perspective, management requires urgent identification and removal of environmental exposure, particularly from indoor mould sources. Supportive strategies may include inflammatory modulation, antioxidant support, gut barrier protection, and carefully titrated binders under clinical supervision. Due to their potency, treatment should be individualised and paced to avoid symptom exacerbation.

Elevated urinary ochratoxins, most commonly ochratoxin A, indicate exposure to mould-derived nephrotoxic mycotoxins produced by *Aspergillus* and *Penicillium* species. Urinary detection reflects recent exposure and renal clearance, while ochratoxins are also known to accumulate in tissues with prolonged exposure.

Clinically, ochratoxin exposure is associated with renal tubular stress, oxidative damage, immune dysregulation, and potential endocrine disruption. Reported symptoms may include fatigue, brain fog, polyuria, increased thirst, and susceptibility to recurrent infections. Chronic exposure has been linked to nephrotoxicity and carcinogenic risk in animal and epidemiological studies.

From a functional medicine perspective, management should prioritise source identification and removal, including assessment of indoor water damage, mould contamination, and dietary exposure (e.g. grains, coffee, dried fruits). Supportive strategies commonly include optimisation of hydration to promote renal clearance, nutritional support for antioxidant capacity (e.g. glutathione pathways), and use of evidence-based binders where clinically appropriate to reduce enterohepatic recirculation. Renal function should be considered when implementing detoxification strategies.

Treatment: Antioxidants (grape seed extract, NAC), phase II detox support, avoid high-risk foods (e.g., coffee, processed meats, wine).



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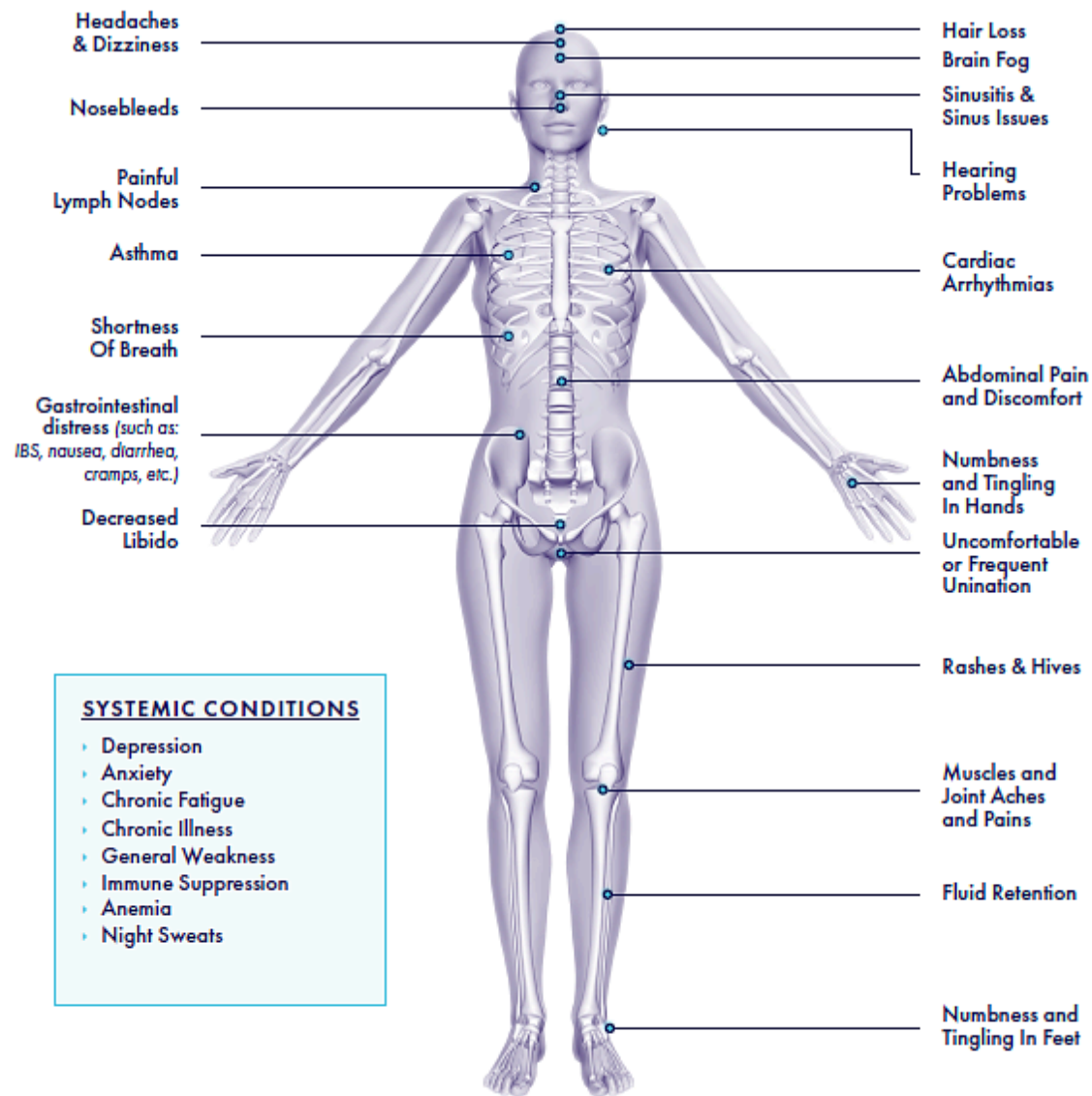
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SYMPTOMS OF **Mycotoxins**





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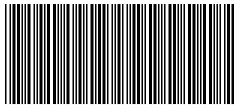
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MYCOTOXIN	Cellular Activity of Mycotoxins	Symptoms/Other	Association with a "Disease Risk"
AFLATOXINS			
Aflatoxin B1	Binds DNA and RNA replication	Shortness of breath, Weight loss, most potent and highly carcinogenic	Primarily attacks the liver, other organs include kidneys and lungs
Aflatoxin B2	Inhibits DNA and RNA replication	Impaired fetal growth	Affects the liver and kidneys
Aflatoxin G1	Cytotoxic, induces apoptosis in cells, DNA damage	A. flavus is a leading cause of invasive aspergillus in immune compromised patients	Cancer, neonatal jaundice
Aflatoxin G2	Cancer, neonatal jaundice	Aflatoxicosis in humans and animals	Malnutrition, Lung cancer
OCHRATOXIN A			
Ochratoxin A	Inhibits mitochondrial ATP, potent teratogen, immune suppressor	Fatigue, Dermatitis, Irritated bowel	Kidney disease, Cancer
MACROCYCLIC	TRICHOTHECENES		
Satratoxin G	DNA, RNA and Protein synthesis inhibition	Fatigue	Bleeding disorders, Nervous system disorders
Satratoxin H	Inhibits protein synthesis	Fatigue	Breathing issues
Isosatratoxin F	Immunosuppression	Weakened Immune System	-
Roridin A	Immunosuppression	Weakened Immune System	-
Roridin E	DNA, RNA and Protein synthesis disruption	Weakened Immune system	Lung and Nasal olfactory problems
Roridin H	Inhibits protein synthesis	Weakened Immune System	-
Roridin L-2	Immunosuppression	Weakened Immune System	-
Verrucarin A	Immunosuppression	-	-
Verrucarin J	Immunosuppression	-	-
GLIOTOXIN	DERIVATIVE		
Gliotoxin	Attacks intracellular functionin immune system	Memory and Breathing issues	Immune Dysfunction disorders
ZEARALENONE			
Zearalenone	Estrogen mimicry	Early puberty, low sperm counts, cancer	Cancer



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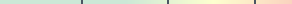
CYSTEINE DERIVATIVES

TEST	RESULT	H/L	REFERENCE	UNITS
N-Acetyl (3,4-Dihydroxybutyl) cysteine (NADB)	<DL		(<250.00)	ug/gCR
N-Acetyl (carbomoylethyl) cysteine	9.66		(<190.00)	ug/gCR
N-Acetyl phenyl cysteine (SPMA)	<DL		(<5.00)	ug/gCR
N-Acetyl (propyl) cysteine (NAPR)	0.76		(<25.00)	ug/gCR

ENVIRONMENTAL PHENOLS

TEST	RESULT	H/L	REFERENCE	UNITS
4-Nonylphenol	<DL		(<3.00)	ug/gCR
Bisphenol A (BPA)	0.48		(<4.00)	ug/gCR
Triclosan (TCS)	2.64		(<50.00)	ug/gCR
Bisphenol S (BPS)	0.79		(<0.80)	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)

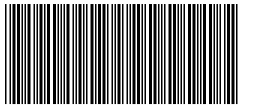
TEST	RESULT	H/L	REFERENCE	UNITS
Aminomethylphosphonic Acid (AMPA)	<DL		(<2.00)	ug/gCR
Glyphosate	0.3		(<1.0)	ppb

METHYLTERT-BUTYL ETHER (MTBE) EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
● 2-Hydroxyisobutyric Acid	1.00		(<2.98)	mmol/molCR

MITOCHONDRIAL MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
● Tiglylglycine	0.08		(<1.75)	ug/gCR



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PARABENS

TEST	RESULT	H/L	REFERENCE	UNITS
● Benzylparaben	0.07		(<2.00)	ug/gCR
● Butylparaben	0.08		(<1.00)	ug/gCR
● Ethylparaben	0.49		(<7.00)	ug/gCR
● Methylparaben	18.40		(<120.00)	ug/gCR
● 4-Hydroxybenzoic Acid (4-HBA)	0.08		(<0.57)	mmol/molCR
● Propylparaben	0.65		(<35.00)	ug/gCR

PESTICIDES

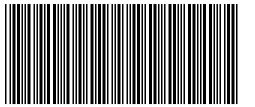
TEST	RESULT	H/L	REFERENCE	UNITS
3-Phenoxybenzoic Acid (3PBA)	<DL		(<3.00)	ug/gCR
Diethyl Phosphate (DEP)	<DL		(<9.00)	ug/gCR
Diethyldithiophosphate (DEDTP)	0.01		(<0.20)	ug/gCR
Diphenyl phosphate (DPP)	0.33		(<2.50)	ug/gCR
Diethylthiophosphate (DETP)	<DL		(<1.00)	ug/gCR

PFAS

TEST	RESULT	H/L	REFERENCE	UNITS
● Perfluorobutanoic acid (PFBA)	0.29		(<1.20)	ug/gCR
● Perfluorooctanoic Acid (PFOA)	<DL		(<0.10)	ug/gCR
● Perfluorooctane Sulphonic Acid (PFOS)	<DL		(<0.60)	ug/gCR

PHTHALATES

TEST	RESULT	H/L	REFERENCE	UNITS
● Butyl Benzyl phthalate (BBP)	0.12		(<1.00)	ug/gCR
● Mono-Benzyl phthalate (mBzP)	1.77		(<3.00)	ug/gCR
● Mono-n-Butyl phthalate (mBP)	4.97		(<55.00)	ug/gCR
● Mono (3-carboxypropyl) phthalate (mCPP)	<DL		(<31.00)	ug/gCR
● Mono-ethyl phthalate (MEtP)	12.11		(<100.00)	ug/gCR
● Mono-2-ethylhexyl phthalate (MEHP)	<DL		(<11.00)	ug/gCR
● Mono-(2-ethy-5-hydroxyhexyl) phthalate (MEHHP)	<DL		(<12.00)	ug/gCR
● Mono-(2-ethy-5-oxohexyl) phthalate (MEOHP)	<DL		(<27.00)	ug/gCR
● Mono-n-octyl phthalate (mOP)	<DL		(<2.00)	ug/gCR
● Phthalic Acid	50.31		(<111.00)	ug/gCR
● Quinolinic Acid	3.40		(<3.74)	mmol/molCR



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VOLATILE ORGANIC COMPOUNDS

TEST	RESULT	H/L	REFERENCE	UNITS
2-hydroxyethyl-mercaptopuric acid (HEMA)	<DL		(<5.00)	ug/gCR
Phenylglyoxylic Acid	112.7		(<287.0)	ug/gCR
Mandelic Acid	145.0		(<267.0)	ug/gCR
Mandelic Acid + Phenylglyoxylic Acid	257.7		(<610.0)	ug/gCR

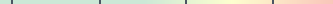
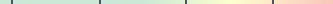
BENZENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
t,t-Muconic Acid	0.02		(<0.12)	mmol/molCR
3,4-Dimethylhippuric Acid	0.00		(<0.01)	mmol/molCR

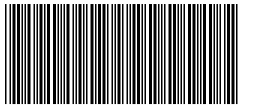
TOLUENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
● Benzoic Acid	4.50		(<9.30)	mmol/molCR
● Hippuric Acid	331.0		(<603.0)	mmol/molCR

XYLENES EXPOSURE

SERVICE	RESULT	H/L	REFERENCE	UNITS
● 2-Methylhippuric Acid	0.01		(<0.10)	mmol/molCR
● 3-Methylhippuric Acid	0.03		(<0.11)	mmol/molCR

[illegible]



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MICROBIAL OVERGROWTH

4-Hydroxybenzoic Acid (4-HBA)
Indoleacetic Acid (IAA)

YEAST/FUNGAL METABOLITES

Citramalic Acid

ENVIRONMENTAL EXPOSURES

4-Hydroxybenzoic Acid (4-HBA)
5-Methylcytosine

MITOCHONDRIA/ENERGY

2-Hydroxyglutaric Acid
2-Methylglutaric Acid
3-Hydroxyglutaric Acid
Acetoacetic Acid
Isocitric Acid
Malic Acid

FATTY ACID / KETONE METABOLISM

Adipic Acid

CARBOHYDRATE / GLYCAEMIC METABOLISM

N/A

NEUROTRANSMITTER METABOLISM

HVA/VMA Ratio

AMINO ACIDS METABOLISM

2-Oxoisocaproic Acid

VITAMINS / NUTRITIONAL MARKERS

N-Acetylcysteine (NAC)

DETOXIFICATION / GLUTATHIONE FUNCTION

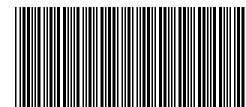
N-Acetylcysteine (NAC)

OXIDATIVE DAMAGE / INFLAMMATION

N/A

OXALATE METABOLISM

N/A



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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 tricarballic 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.

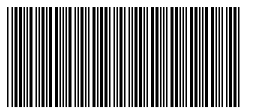
Detoxification & Glutathione Function - Evaluates markers of phase I and phase II hepatic detoxification, glutathione cycling via pyroglutamic acid, and NAC status, reflecting the body's capacity to manage oxidative burden and chemical exposure.

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

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1	Benzoic Acid	4.50			(<9.30)	mmol/molCR
2	Hippuric Acid	331.0			(<603.0)	mmol/molCR
3	4-Hydroxybenzoic Acid (4-HBA)	0.65	H		(<0.57)	mmol/molCR
4	3,4-Dihydroxybenzoic Acid (3,4-DHBA)	12.00			(<22.10)	mmol/molCR
5	3-Hydroxyphenylacetic Acid (3-HPAA)	2.00			(<5.46)	mmol/molCR
6	3,4-Dihydroxyphenylpropionic Acid (DHPPA)	0.90			(<1.62)	mmol/molCR
7	Furancarbonylglycine	0.80			(<1.10)	mmol/molCR

Amino Acid Metabolism

8	Phenylacetic Acid (PAA)	2.50		(<2.63)	mmol/molCR
9	Phenylpropionic Acid	0.08		(<0.10)	mmol/molCR
10	3-Phenyllactic Acid (3-PLA)	1.50		(<2.00)	mmol/molCR
11	2-Hydroxyphenylacetic Acid (2-HPAA)	0.60		(0.05-0.70)	mmol/molCR
12	4-Hydroxyphenyllactic Acid (4-HPLA)	0.96		(<3.50)	mmol/molCR

SCFA Metabolism

13	3-Hydroxypropionic Acid (3-HPA)	6.60	●	(<10.92)	mmol/molCR
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Clostridial Markers

14	4-Cresol	0.90		(<1.65)	ug/mgCR
15	4-Hydroxyphenylacetic Acid (4-HPAA)	5.20		(<6.56)	mmol/molCR
16	Indoleacetic Acid (IAA)	8.70 H		(<5.00)	mmol/molCR
17	3-(3-Hydroxyphenyl)-3-hydroxypropionic Acid (HPHPA)	59.00		(<108.00)	mmol/molCR

YEASTS & FUNGAL METABOLITES

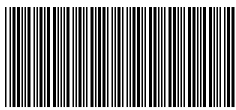
TEST		RESULT	H/L		REFERENCE	UNITS
18	Arabinitol	8.7		●	(<12.7)	mmol/molCR
19	Arabinose	12.00		●	(<17.79)	mmol/molCR
20	Citramalic Acid	2.20	H	●	(<1.66)	mmol/molCR
21	3-Oxoglutaric Acid	0.38		●	(<0.50)	mmol/molCR

Aspergillus Markers

22	5-Hydroxymethyl-2-furoic Acid	5.50		(<12.30)	mmol/molCR
23	Furan-2,5-dicarboxylic Acid	6.87		(<9.61)	mmol/molCR
24	Tartaric Acid	2.80		(<4.50)	mmol/molCR

Fusarium

25	Tricarballic Acid	0.21			(<0.44)	mmol/molCR
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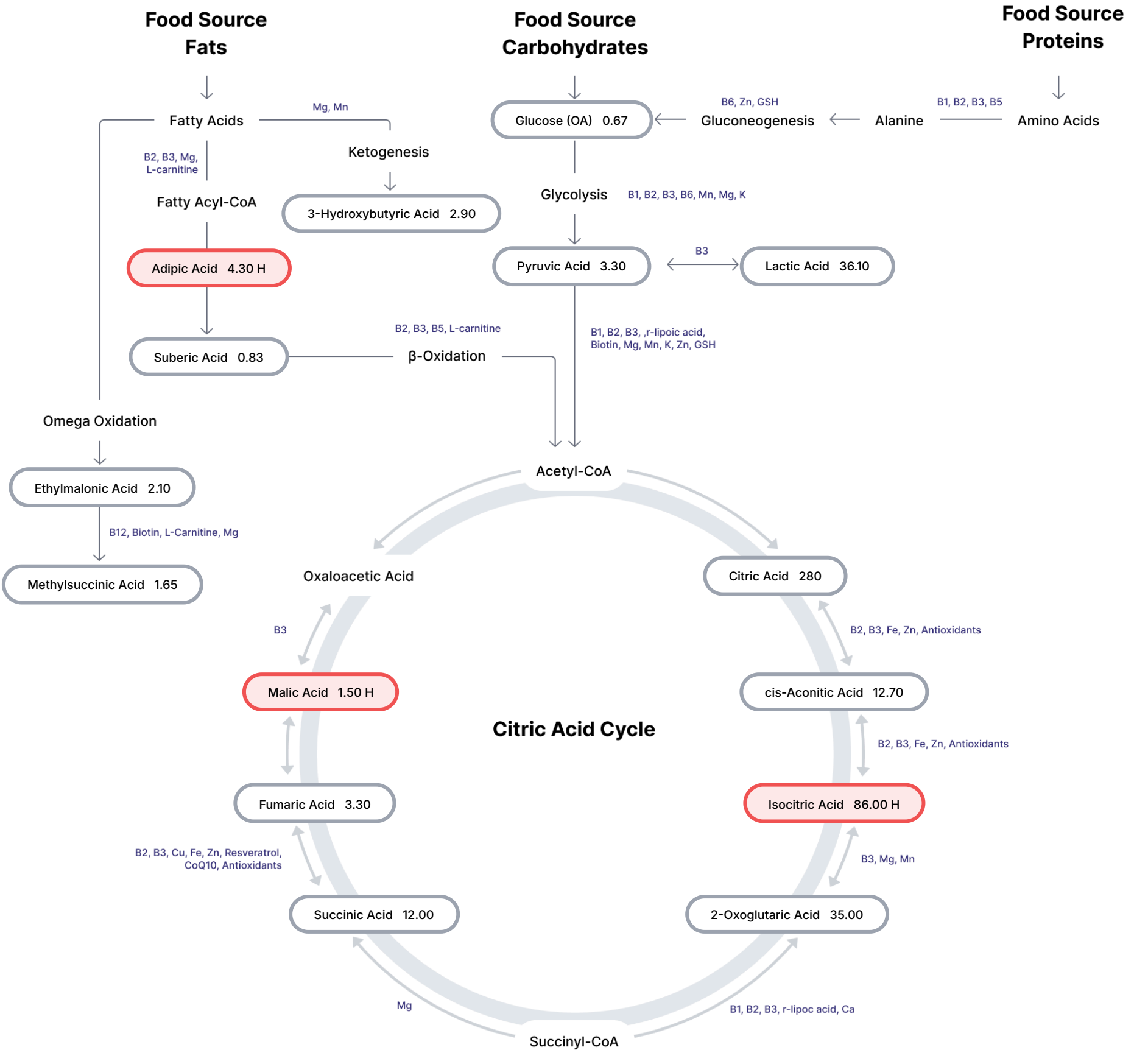
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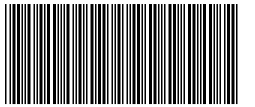
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Legend Not Tested Within Range Out of Range L = Low, LL = Critically Low H = High, HH = Critically High

Organic Acids Pathway





26241-0006

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Patient ID P000060
Ext ID 26241-0006

Test Patient

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

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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)	0.67	(<1.10)	ug/mgCR
27	Pyruvic Acid	3.30	($0.50-9.10$)	mmol/molCR
28	Lactic Acid	36.10	(<48.00)	mmol/molCR
29	2-Hydroxybutyric Acid **	2.00	(<4.06)	mmol/molCR

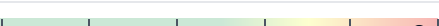
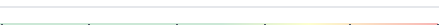
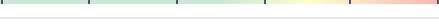
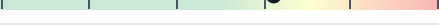
** An elevated result may indicate methylation defects and/or toxic exposure

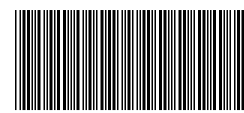
Citric Acid Cycle

30	Citric Acid	280		(40-507)	mmol/molCR
31	cis-Aconitic Acid	12.70		(3.50-30.00)	mmol/molCR
32	Isocitric Acid	86.00 H		(5.00-49.60)	mmol/molCR
33	2-Oxoglutaric Acid	35.00		(2.00-45.00)	mmol/molCR
34	Succinic Acid	12.00		(0.70-15.00)	mmol/molCR
35	Fumaric Acid	3.30		(<4.00)	mmol/molCR
36	Malic Acid	1.50 H		(<1.21)	mmol/molCR

** An elevated result may indicate methylation defects and/or toxic exposure

Mitochondrial Markers

40	Methylsuccinic Acid	1.65			(<3.50)	mmol/molCR
41	2-Methylglutaric Acid	0.45	H		(<0.45)	mmol/molCR
42	3-Methylglutaric Acid	1.90			(<6.00)	mmol/molCR
43	2-Hydroxyglutaric Acid	12.00	H		(<9.00)	mmol/molCR
44	3-Hydroxyglutaric Acid	4.20	H		(<2.07)	mmol/molCR
45	Malonic Acid	0.55			(<1.52)	mmol/molCR
46	Mevalonolactone	1.80			(<2.16)	mmol/molCR
47	2,4-Dihydroxybutanoic Acid	2.80			(<5.61)	mmol/molCR
48	N-Acetylaspartic Acid	10.40			(<14.20)	mmol/molCR
49	3-Methylglutaconic Acid	3.32	H		(<2.95)	mmol/molCR



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FATTY ACID OXIDATION & KETONE METABOLISM

TEST		RESULT	H/L		REFERENCE	UNITS
50	Adipic Acid	4.30	H		(<3.40)	mmol/molCR
51	Pimelic Acid	1.80			(<2.96)	mmol/molCR
52	Suberic Acid	0.83			(<1.16)	mmol/molCR
53	Azelaic Acid	1.98			(<3.98)	mmol/molCR
54	Sebacic Acid	0.19			(<0.33)	mmol/molCR
55	Ethylmalonic Acid	2.10			(<3.38)	mmol/molCR
56	Propionylglycine	0.46			(<0.82)	mmol/molCR
57	N-Butyrylglycine	0.38			(<1.27)	mmol/molCR
58	Isovalerylglycine	0.55			(<0.81)	mmol/molCR
59	N-(2-Methylbutyryl)glycine	0.41			(<0.69)	mmol/molCR
60	3-Methylcrotonylglycine	0.19			(<1.10)	mmol/molCR
61	Tiglylglycine	0.59			(<1.75)	mmol/molCR
62	Hexanoylglycine	2.20			(<5.40)	mmol/molCR
63	Suberylglycine	0.63			(<1.86)	mmol/molCR

VITAMIN & NUTRITIONAL COFACTOR MARKERS

* An elevated result may indicate nutrient deficiency

TEST		RESULT	H/L		REFERENCE	UNITS
B-Vitamin Functional Markers						
64	Methylmalonic Acid (MMA) *	0.77			(<1.60)	mmol/molCR
65	Formiminoglutamic Acid (FIGLU)	0.45			(<1.21)	mmol/molCR
66	Xanthurenic Acid	0.77			(<0.94)	mmol/molCR
67	Kynurenic Acid	1.29			(<1.57)	mmol/molCR
68	Quinolinic Acid	3.40			(<3.74)	mmol/molCR
69	Picolinic Acid	2.30			(<8.42)	mmol/molCR
70	3-Hydroxyisovaleric Acid	11.10			(<20.00)	mmol/molCR
Vitamin-specific/Antioxidant Markers						
71	Pyroglutamic Acid *	19.70			(4.50-25.80)	mmol/molCR
72	N-Acetylcysteine (NAC)	0.91	H		(0.02-0.28)	mmol/molCR
73	Glutaric Acid (Vit B2) *	0.12			(0.02-0.36)	mmol/molCR
74	Pantothenic Acid (Vit B5)	0.87			(0.10-10.00)	mmol/molCR
75	Pyridoxic Acid (Vit B6)	5.40			(0.68-34.00)	mmol/molCR
76	Ascorbic Acid (Vit C)	30.60			(0.50-200.00)	mmol/molCR
77	Methylcitric Acid (Biotin/Vitamin H) *	3.90			(0.10-17.50)	mmol/molCR
78	3-Hydroxy-3-methylglutaric Acid (CoQ10) *	1.20			(0.10-5.00)	mmol/molCR



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PYRIMIDINE METABOLITES - Folate Metabolism

[illegible]

AMINO ACID & BRANCHED-CHAIN METABOLISM

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

TEST	RESULT	H/L	REFERENCE	UNITS
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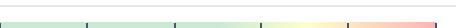
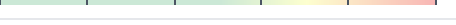
Branched-Chain Ketoacids

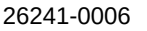
81	2-Oxoisovaleric Acid	1.95			(<3.55)	mmol/molCR
82	2-Oxoisocaproic Acid	0.88	H		(<0.46)	mmol/molCR
83	3-Methyl-2-oxovaleric Acid	0.76			(<1.22)	mmol/molCR
84	3-Methylglutaric Acid	1.90			(<6.00)	mmol/molCR
85	Succinylacetone	0.12			(<0.20)	mmol/molCR

Downstream Metabolites

86	2-Hydroxyisovaleric Acid	3.00		(<3.10)	mmol/molCR
87	2-Hydroxyisocaproic Acid	0.43		(<1.21)	mmol/molCR
88	2-Oxobutyric Acid	2.11		(<2.98)	mmol/molCR
89	2-Oxo-4-methiolbutyric Acid (KMBA)	0.40		(<1.23)	mmol/molCR

Amino Acid Metabolism

90	Phenylpyruvic Acid	0.66			(<1.54)	mmol/molCR
91	Homogentisic Acid	0.67	H		(<0.50)	mmol/molCR
92	N-Acetylphenylalanine	0.39			(<2.50)	mmol/molCR
93	Mandelic Acid	145.0			(<267.0)	ug/gCR
94	Malonic Acid	0.55			(<1.52)	mmol/molCR
95	4-Hydroxyphenyllactic Acid (4-HPLA)	0.96			(<3.50)	mmol/molCR
96	2-Oxoadipic Acid	0.38			(<1.50)	mmol/molCR
97	Guanidinoacetic Acid	1.12			(0.50-2.91)	mmol/molCR
98	Guanidinobutyric Acid	0.35			(0.10-1.00)	mmol/molCR
99	3-Methylglutaric Acid	1.90			(<6.00)	mmol/molCR
100	N-Acetylglycine	1.42			(<4.34)	mmol/molCR

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(Phenylalanine, Tyrosine)

107 HVA/VMA Ratio 1.5 H  (<1.4) ratio

108	Cortisol (OA)	12.4		(1.0-66.1)	ug/gCR
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Enzyme

Adre



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TRYPTOPHAN/KYNURENINE PATHWAY

(Tryptophan, B6, Antioxidants)

TEST	RESULT	H/L	REFERENCE	UNITS
Inhibitory				
109 5-Hydroxyindoleacetic Acid (5-HIAA)	2.11		(<4.30)	mmol/molCR
Inflammatory				
110 Kynurenic Acid	1.29		(<1.57)	mmol/molCR
111 Quinolinic Acid	3.40		(<3.74)	mmol/molCR
112 Picolinic Acid	2.30		(<8.42)	mmol/molCR
113 Xanthurenic Acid	0.77		(<0.94)	mmol/molCR
114 Kynurenic/Quinolinic Ratio	0.4		(<1.3)	ratio
115 Quinolinic Acid/5-HIAA Ratio	1.6		(<2.8)	ratio

Legend

Not Tested

Within Range

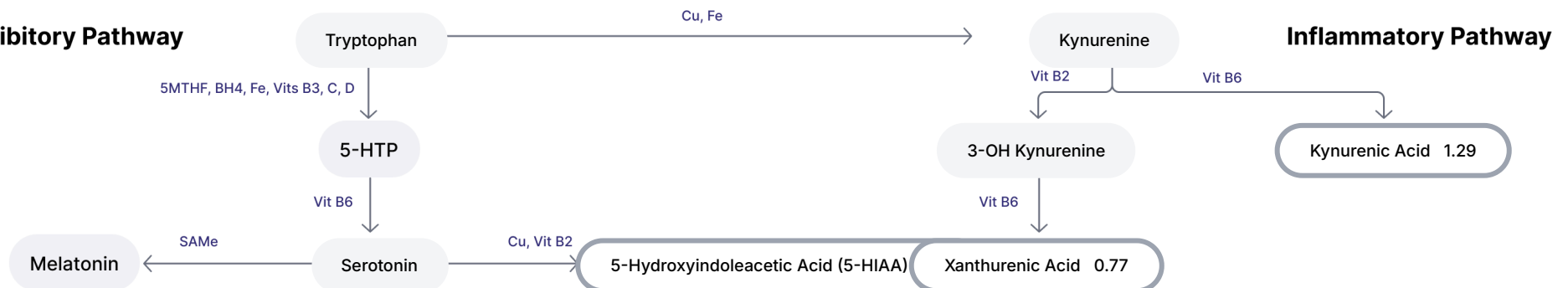
Out of Range

L = Low, LL = Critically Low H = High, HH = Critically High

Regulator

Enzyme

Inhibitory Pathway



Inflammatory Pathway



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DETOXIFICATION & GLUTATHIONE FUNCTION

(Arg, NAC, Meth, Mg, Antioxidants)

TEST		RESULT	H/L		REFERENCE	UNITS
Ammonia Metabolism						
116	Orotic Acid	2.08			(<3.15)	mmol/molCR
Glutathione Metabolism						
117	Pyroglutamic Acid *	19.70			(4.50-25.80)	mmol/molCR
118	N-Acetylcysteine (NAC)	0.91	H		(0.02-0.28)	mmol/molCR
119	Glucaric Acid	1.87			(<4.06)	mmol/molCR
Phase I / Xenobiotic Markers						
120	2-Hydroxyhippuric Acid	0.89			(<1.38)	mmol/molCR
121	5-Hydroxymethyl-2-furoic Acid	5.50			(<12.30)	mmol/molCR
122	Furan-2,5-dicarboxylic Acid	6.87			(<9.61)	mmol/molCR

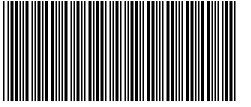
OXIDATIVE STRESS & INFLAMMATION

(Vitamin C, Other Antioxidants)

TEST		RESULT	H/L	REFERENCE	UNITS
123	8-hydroxy-deoxyguanosine	1.65		(<2.39)	umol/molCR
124	Leukotriene E4	4.98		(<10.00)	pg/mgCR
125	Quinolinic Acid	3.40		(<3.74)	mmol/molCR
126	Pyroglutamic Acid *	19.70		(4.50-25.80)	mmol/molCR
127	Ascorbic Acid (Vit C)	30.60		(0.50-200.00)	mmol/molCR
128	Quercetin	1.12		(0.01-2.00)	mmol/molCR

OXALATE METABOLISM

[illegible]



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ENVIRONMENTAL / XENOBIOTIC EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
Toluene Exposure				
132 Hippuric Acid	331.0		(<603.0)	mmol/molCR
133 Benzoic Acid	4.50		(<9.30)	mmol/molCR
Paraben Exposure				
134 4-Hydroxybenzoic Acid (4-HBA)	0.65	H	(<0.57)	mmol/molCR
Styrene Exposure				
135 Mandelic Acid	145.0		(<267.0)	ug/gCR
136 Phenylglyoxylic Acid	112.7		(<287.0)	ug/gCR
137 Mandelic Acid + Phenylglyoxylic Acid	257.7		(<610.0)	ug/gCR
Benzene Exposure				
138 t,t-Muconic Acid	0.02		(<0.12)	mmol/molCR
Phthalate Exposure				
139 Phthalic Acid	50.31		(<111.00)	ug/gCR
140 Monoethyl Phthalate	1.00		(<167.00)	ug/gCR
141 Quinolinic Acid	3.40		(<3.74)	mmol/molCR
MTBE Exposure				
142 2-Hydroxylisobutyric Acid	1.00		(<2.98)	mmol/molCR
Xylene Exposure				
143 2-Methylhippuric Acid	0.01		(<0.10)	mmol/molCR
144 3-Methylhippuric Acid	0.03		(<0.11)	mmol/molCR
145 4-Methylhippuric Acid	1.00		(<1.74)	mmol/molCR
Trimethylbenzene Exposure				
146 3,4-Dimethylhippuric Acid	0.00		(<0.01)	mmol/molCR
147 4-Hydroxyhippuric Acid	1.00		(<13.10)	mmol/molCR
Nucleotide Turnover/Methylation				
148 5-Methylcytosine	1.00	L	(10.00-56.50)	mmol/molCR
149 Uracil	2.37		(<8.09)	mmol/molCR
150 Thymine	0.18		(<0.47)	mmol/molCR
TEST	RESULT	H/L	REFERENCE	UNITS
151 Creatinine, Urine	6.70		(2.47-19.20)	mmol/L



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NUTRITION GUIDE			
SERVICE	Nutritional Need	DOSE	UNITS

Vitamins

Vitamin-B1	Moderate	90.0	mg
Vitamin-B2	Moderate	80.0	mg
Vitamin-B3	Adequate	0.0	mg
Vitamin-B5	Mild	60.0	mg
Vitamin-B6	Moderate	20.0	mg
Biotin	Adequate	0.0	ug
Vitamin B12	Adequate	0.0	ug
Vitamin-C	Moderate	660.0	mg
Vitamin-E	Adequate	0.0	U

Minerals

● Chromium	Adequate	0.0	ug
● Iron *	Adequate	0.0	mg

* Nutritional need for Iron should be confirmed with serum Iron Studies test.

 Magnesium	Adequate	0.0	mg
 Manganese	Moderate	6.0	mg
 Vanadium	Mild	20.0	ug

Antioxidants/Cofactors

alpha-Lipoic Acid	Adequate	0.0	mg
Calcium-D-glucarate	Adequate	0.0	mg
Coenzyme Q10	Adequate	0.0	mg
Glutathione	Adequate	0.0	mg
N-Acetylcysteine	Adequate	0.0	mg

NUTRITION GUIDE			
SERVICE	Nutritional Need	DOSE	UNITS

Amino Acids

5-HTP	HIGH	80.0	mg
Acetyl-L-Carnitine	Adequate	0.0	mg
L-Arginine	Adequate	0.0	mg
Aspartic Acid	Adequate	0.0	mg
Glutamine	Adequate	0.0	mg
Glycine	Adequate	0.0	mg
Lysine	Adequate	0.0	mg
Methionine	Adequate	0.0	mg
Ornithine	Adequate	0.0	mg
Phenylalanine	Adequate	0.0	mg
Serine	Adequate	0.0	mg
Taurine	Adequate	0.0	mg
Tryptophan	Adequate	0.0	mg
Tyrosine	Adequate	0.0	mg

Probiotics

● D-Lactate-free probiotics	Mild	20.0	billion CFU
● Lactobacillus	HIGH	40.0	billion CFU
● Probiotics (Multistrain)	Mild	20.0	billion CFU

Other

● Malic Acid	Adequate	0.0	mg
● EPA/DHA	Adequate	0.0	mg
● Folinic Acid	Adequate	0.0	ug



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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



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Bacterial Dysbiosis Comment

4-HYDROXYBENZOIC ACID ELEVATED (URINE):

Elevated urinary 4-hydroxybenzoic acid suggests increased exposure to parabens or altered metabolism of aromatic compounds. It may also arise from gut microbial metabolism of dietary polyphenols.

Clinically, elevated levels may be associated with non-specific symptoms such as headaches, fatigue, or chemical sensitivity.

From an organic acid pattern perspective, elevated 4-hydroxybenzoic acid may be observed alongside other aromatic metabolites, reflecting increased aromatic compound load or altered gut microbial activity.

From a functional medicine perspective, this finding should be interpreted in the context of environmental exposure, dietary polyphenol intake, and gut microbiome balance.

Consider: Treatment for dysbiosis and diet changes, mucosal support, pre and probiotics.

3-INDOLEACETIC ACID ELEVATED (URINE):

Elevated urinary 3-indoleacetic acid suggests increased microbial metabolism of tryptophan within the gut. This metabolite reflects indole production and host-microbial interaction.

Clinically, elevated 3-indoleacetic acid may be associated with gastrointestinal symptoms, altered bowel habits, or systemic symptoms related to gut-derived metabolites.

From an organic acid pattern perspective, elevation may be observed alongside other tryptophan-derived markers, indicating increased microbial fermentation or dysbiosis.

From a functional medicine perspective, elevated 3-indoleacetic acid should be interpreted in the context of gut barrier function, microbiome balance, and dietary tryptophan intake.

Yeast Dysbiosis Comment

CITRAMALIC ACID ELEVATED (URINE):

Citramalic acid is a microbial-derived metabolite commonly associated with dysbiosis, particularly overgrowth of certain bacterial species.

Clinically, elevations may be associated with bloating, altered bowel habits, abdominal discomfort, or fatigue. Results should be interpreted alongside bowel habits, dietary intake, medications, and the broader clinical context.

From a functional medicine perspective, management focuses on targeted gut microbiome support, dietary modification, and evaluation for small intestinal or colonic dysbiosis, addressing upstream gastrointestinal and metabolic contributors rather than the marker in isolation.

Consider: Yeast free diet, antifungal or antimicrobial therapy, multi strain probiotics - a microbiome assessment for the determination of fungal overgrowth

Mitochondrial/Energy Metabolism Comment

ISOCITRIC ACID ELEVATED (URINE):

Elevated urinary isocitric acid suggests altered downstream TCA cycle efficiency or compensatory metabolic flux.

Clinically, symptoms are non-specific.

From an organic acid pattern perspective, interpretation alongside alpha-ketoglutaric acid assists in determining whether downstream enzymatic congestion is present.

From a functional medicine perspective, this finding should be interpreted as part of an overall mitochondrial pattern.

A high level is suggestive of inhibition to the enzyme by Aluminum.

Supplementation Recommendations: Cofactors needed to increase the breakdown of isocitrate to alpha-ketoglutarate are: Vit B3, (NAD), Mg, Mn.

MALIC ACID ELEVATED (URINE):



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Malic acid plays a central role in the malate-aspartate shuttle and cellular energy production. Elevations may reflect altered mitochondrial redox balance or metabolic compensation.

Clinically, elevations may be associated with fatigue, muscle soreness, or reduced endurance. Interpretation should consider dietary intake, medications, and the broader metabolic context.

From a functional medicine perspective, management focuses on supporting mitochondrial redox balance, magnesium status, and overall metabolic efficiency, addressing underlying contributors rather than isolated suppression of the marker.

Consider: Supplementation with niacin and CoQ10

ACETOACETIC ACID ELEVATED:

Acetoacetic acid (AcAc) is a ketone body produced in the liver during fatty acid β -oxidation and represents one of the primary intermediates of ketogenesis. It is generated when acetyl-CoA accumulates and is diverted into ketone body production, particularly under conditions of reduced carbohydrate availability.

Elevated urinary acetoacetic acid reflects increased ketone body production (ketosis), which may occur in the context of fasting, low carbohydrate or ketogenic diets, prolonged exercise, or increased metabolic demand. In addition, elevations may be observed in uncontrolled diabetes mellitus, where impaired glucose utilisation leads to increased fatty acid oxidation and ketone production.

As a marker of metabolic state, acetoacetic acid provides insight into fuel utilisation and energy metabolism, and should be interpreted in conjunction with clinical context and other ketone markers (e.g. β -hydroxybutyrate).

Suggested Treatment Considerations:

Consider correlation with dietary patterns, fasting status, and metabolic context. In cases where ketosis is expected (e.g. ketogenic diet), this finding may be physiological. Where clinically indicated, assess for underlying metabolic disturbances such as impaired glucose regulation or diabetes. Management should be guided by the overall clinical context and associated laboratory findings.

2-METHYLGLUTARIC ACID ELEVATED:

2-Methylglutaric acid is an organic acid associated with amino acid metabolism, particularly lysine and tryptophan catabolism, and is also linked to mitochondrial energy metabolism.

Elevated urinary 2-methylglutaric acid may reflect impaired mitochondrial function or altered intermediary metabolism, leading to accumulation of organic acid intermediates. This pattern may be observed in the context of mitochondrial dysfunction, increased metabolic demand, or catabolic states, where enhanced amino acid breakdown contributes to increased metabolite production.

In some cases, elevations may be associated with disturbances in energy metabolism, including patterns seen alongside other markers such as lactate, although this finding is non-specific and should be interpreted in conjunction with related metabolites.

This marker is best assessed alongside other organic acids involved in mitochondrial and amino acid metabolism to determine pathway involvement and clinical relevance.

Suggested Treatment Considerations:

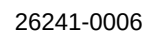
Consider correlation with other markers of mitochondrial function and metabolic stress. Review nutritional status and factors contributing to increased catabolism where clinically indicated. In cases of persistent or significant elevation, further evaluation of mitochondrial function and intermediary metabolism may be warranted. Management should be guided by the overall clinical context and associated laboratory findings.

2-HYDROXYGLUTARIC ACID ELEVATED:

α -Hydroxyglutaric acid (2-hydroxyglutaric acid) is an organic acid derived from α -ketoglutarate within the tricarboxylic acid (TCA) cycle, and is influenced by cellular redox balance, particularly the ratio of NADH to NAD⁺.

Elevated urinary α -hydroxyglutaric acid may reflect alterations in mitochondrial energy metabolism and redox state, with increased conversion of α -ketoglutarate to α -hydroxyglutarate occurring under conditions of relative NADH excess or impaired oxidative metabolism. This pattern may be observed in the context of mitochondrial dysfunction, metabolic stress, or hypoxic states.

In rare cases, marked or persistent elevations may be associated with 2-hydroxyglutaric acidurias, a group of inborn errors of metabolism characterised by abnormal accumulation of this metabolite. However, mild elevations are typically non-specific and should be interpreted in conjunction with other markers of mitochondrial function and TCA cycle activity.



Patient ID P000060
Ext ID 26241-0006

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

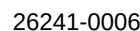
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Consider correlation with other markers of mitochondrial function and metabolic stress. Assessment of factors influencing cellular energy metabolism and redox balance may be appropriate where clinically indicated. In cases of significant or persistent elevation, further evaluation for underlying metabolic or mitochondrial disorders may be warranted. Management should be guided by the overall clinical context and associated laboratory findings.

Urgent referral to metabolic specialist if GA-I suspected. Dietary lysine restriction and L-carnitine supplementation are mainstays of GA-I management. Assess riboflavin status and supplement if deficient. Support mitochondrial function with CoQ10, riboflavin, and carnitine.

Elevated urinary 3-MGC is a meaningful indicator of mitochondrial dysfunction and warrants assessment of the broader mitochondrial marker pattern. Isolated mild elevation in a clinically well adult most likely reflects functional mitochondrial stress, cofactor depletion, or elevated oxidative burden rather than a primary genetic disorder. Elevation is most significant when found alongside globally reduced TCA cycle intermediates (low citric acid, isocitric acid, 2-oxoglutaric acid), indicating reduced mitochondrial throughput rather than an isolated enzyme defect. Clinically, elevation is associated with chronic fatigue and post-exertional malaise, exercise intolerance, reduced stamina, cognitive impairment, and in more severe presentations — cardiomyopathy and skeletal myopathy. Barth syndrome should be considered in males with elevated 3-MGC and cardiomyopathy. Marked elevation (greater than 10× the upper reference limit) accompanied by neurological symptoms, cardiomyopathy, myopathy, or significant neurodevelopmental concerns warrants referral for metabolic genetics evaluation to exclude primary mitochondrial disease.

From a functional medicine perspective, management focuses on supporting mitochondrial beta-oxidation with carnitine, riboflavin (B2), niacin (B3), magnesium, CoQ10, optimising glycaemic control, and reducing excess dietary fat load, addressing underlying contributors



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

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Elevated urinary 4-hydroxybenzoic acid suggests increased exposure to parabens or altered metabolism of aromatic compounds. Parabens are commonly used as preservatives in cosmetics, personal care products, and some pharmaceuticals.

Clinically, elevated 4-hydroxybenzoic acid may be associated with non-specific symptoms such as fatigue, headaches, or endocrine-related concerns, although many individuals remain asymptomatic.

From an organic acid pattern perspective, elevated 4-hydroxybenzoic acid may be seen alongside other aromatic or phenolic metabolites, reflecting cumulative preservative or polyphenol exposure.

From a functional medicine perspective, this finding should be interpreted in the context of environmental and personal care exposures, hepatic conjugation capacity, and cumulative endocrine-disrupting burden, with emphasis on reducing ongoing exposure.

Treatment: Treatments focus on improving gut health through dietary changes like increasing plant-based foods, fermented foods, and prebiotics while reducing artificial sweeteners and potentially eliminating paraben-containing products.

Methodology

Enzyme-Linked Immunosorbent Assay (ELISA), Liquid Chromatography-Mass Spectrometry (LC-MS/MS/MS), Automated Chemistry/Immunochemistry, Gas Chromatography-MS (GC/MS)