US BioTek LABORATORIES · **PATIENT REPORT**
16020 Linden Av N Shoreline WA, 98133 • cservice@usbiotek.com • +1 206 365 1256

Clinical Laboratory Improvement Amendments

25304-0077

*** US BioTek** US BioTek. 16020 Linden Av N, Shoreline WA 98133

Lab ID
Patient ID PAT-100009
Ext ID 25304-0077

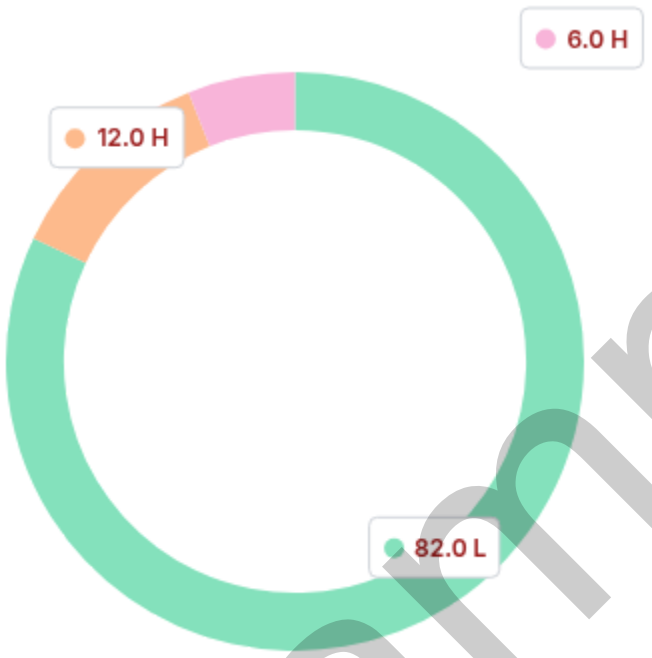
Test Patient
Sex: Female • 45yrs • 01-Jan-80

RECEIVED
31-Oct-25

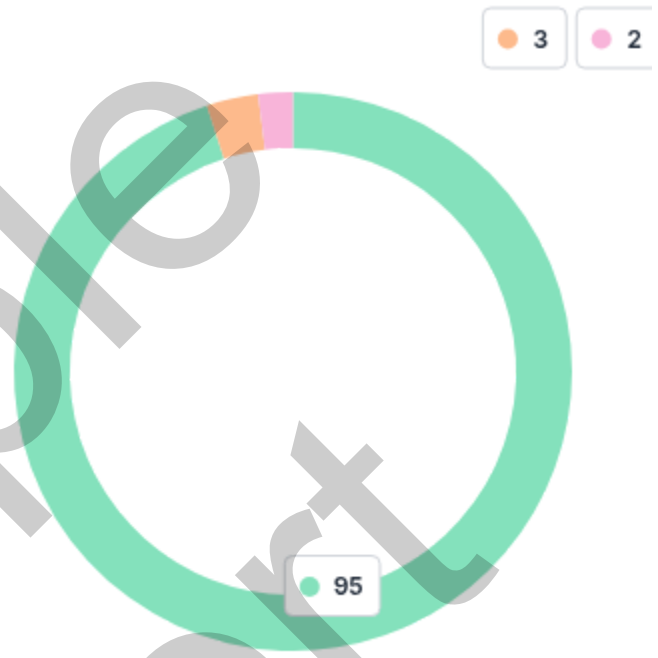
MOE-Tox COMPLETE PROFILE
Specimen type - Urine, Spot

Collected
20-Oct-25 11.00am

TOTAL BURDEN INDEX



HEALTHY INDEX



Low Toxic Burden Moderate Toxic Burden High Toxic Burden

Toxic Burden Comment

Interpretation:

Markedly elevated results suggest significant or chronic toxicant accumulation that may carry clinical relevance. Such elevations warrant investigation of occupational, dietary, or environmental exposures and assessment of detoxification efficiency, mitochondrial status, and organ function. A structured detoxification protocol under clinical supervision is recommended, including source removal, targeted antioxidant and mitochondrial support, and medically guided use of binders or glutathione supplementation. Re-evaluation after intervention is advised to ensure toxin clearance and metabolic recovery.

Mineral Imbalance/Mitochondrial Dysfunction	HIGH Priority	Moderate Priority
Iodine	Arsenic	Lead
	Glyphosate	Bisphenol A (BPA)
	Aflatoxin Group	Perfluorooctanoic Acid (PFOA)
	Ochratoxin A	Butylparaben
		Mono-n-Butyl phthalate (mBP)

Lab Director: Jillian Harrington, PhD, HCLD (ABB). CLIA#99D2282774

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OCHRATOXINS GROUP

Ochratoxin A

TEST	RESULT	H/L	INTERPRETATION	REFERENCE	UNITS
Ochratoxin A	8.390	H	PRESENT	(<1.800)	ppb

AFLATOXINS GROUP

Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2

TEST	RESULT	H/L	INTERPRETATION	REFERENCE	UNITS
Aflatoxin Group	0.966	H	EQUIVOCAL	(<0.800)	ppb

TRICOTHECENES GROUP

Roridin A, Roridin E, Roridin H, Roridin L-2, Verrucarin A, Verrucarin J, Satratoxin G, Satratoxin H, Isosatratoxin F

TEST	RESULT	H/L	INTERPRETATION	REFERENCE	UNITS
Tricothecenes Group	0.014		Not Present	(<0.070)	ppb

GLIOTOXINS GROUP

Gliotoxin Derivative

TEST	RESULT	H/L	INTERPRETATION	REFERENCE	UNITS
Gliotoxin Derivative	0.830	H	EQUIVOCAL	(<0.500)	ppb

ZEARALENONE GROUP

Zearalenone

TEST	RESULT	H/L	INTERPRETATION	REFERENCE	UNITS
Zearalenone	0.360		Not Present	(<0.500)	ppb

Reference Ranges Interpretation

MYCOTOXIN GROUP	Not Present	EQUIVOCAL	PRESENT
Ochratoxin Group	< 1.80 ppb	1.80 - 2.00 ppb	> 2.00 ppb
Aflatoxin Group	< 0.80 ppb	0.80 - 1.00 ppb	> 1.00 ppb
Tricothecenes Group	< 0.04 ppb	0.04 - 0.08 ppb	> 0.08 ppb
Gliotoxins Group	< 0.50 ppb	0.50 - 1.00 ppb	> 1.00 ppb
Zearalenone Group	< 0.50 ppb	0.50 - 0.70 ppb	> 0.70 ppb

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MYCOTOXINS COMMENT

Mycotoxins are low molecular weight secondary metabolites produced by moulds that;

1. Are not essential in maintaining the lifecycle of the mold
2. But give the mold a competitive advantage over other organisms (bacteria and molds)

Mycotoxins are more commonly known to be present through ingestion of food but airborne contamination (inhaling mouldy air in damp indoor areas) is being recognized as a cause as well.

Mycotoxins,

1. bind to DNA and RNA and alter regular protein synthesis and function,
2. cause oxidative stress through antioxidant depletion,
3. alter cell membrane function and transport.

The following are the key mycotoxins and the organisms that produce them;

KEY MYCOTOXIN ORGANISM/S and EFFECTS

Aflatoxin Causing Organism/s (*Aspergillus flavus, parasiticus, oryzae, fumigatus)*

- Produce Aflatoxin Groups B1, B2, G1, G2
- Inhibit Protein synthesis, cause immune suppression,
- Primary target liver but also found in lung and brain

Ochratoxin A Causing Organism/s (*Aspergillus ochraceus, niger, Penicillium species)*

- Produce Ochratoxin A
- Inhibits phenylalanine tRNA synthetase and mitochondrial ATP production, stimulates lipid peroxidation, suppresses antibody production and globulin synthesis
- Found in grains, coffee beans and some wines
- Primary target is kidney (Nephrotoxic)
- Associated with UTIs and bladder cancer

Macrocyclic Trichothecenes Causing Organism/s (*Stachybotrys chartarum (black mould)*

- Produce Toxins Roridins (A, E, H, L-2), Satratoxins (G, H), Verrucarins (A, J), Isosatratoxin F.
- Inhibits protein synthesis, peptidyl synthesis, causes lymphoid, necrosis and dysregulation of IgA production
- Immunosuppression (weakened immune system), nausea, vomiting, weight loss

Gliotoxin Causing Organism/s (*Aspergillus fumigatus, terreus, niger, flavus)*

_ Produce Gliotoxin
- Inhibits macrophage phagocytosis, induces macrophage apoptosis, blocks T and B cell Activation
- Immunosuppression, in-vivo displays anti-inflammatory activity

Zearalenone Causing Organism/s (*Fusarium species)*

- Produce Zearalenone
- Has strong affinity to Estrogen Receptor, increasing activation of this receptor and leading to numerous endocrinology disorders. (Low sperm count, abnormal levels of Progesterone, disruption of ovulation)
- Reduces integrity of gut lining leading to intestinal hyperpermeability.
- Reduces gut microbiota diversity.
- Down regulates expression of tumour suppression genes leading to higher risk of GIT cancer.

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PHYSIOLOGICAL MINERALS

TEST	RESULT	H/L	REFERENCE	UNITS
Calcium	48.00		(<450.00)	mg/gCR
Iron	2.9		(<200.0)	ug/gCR
Magnesium	32.00		(<290.00)	mg/gCR
Zinc	110.00		(<900.00)	mg/gCR

TRACE MINERALS

TEST	RESULT	H/L	REFERENCE	UNITS
Boron	854.00		(<5500)	ug/gCR
Chromium	2.80		(<4.60)	ug/gCR
Cobalt	0.94		(<1.60)	ug/gCR
Copper	69.0	H	(<55.0)	ug/gCR
Germanium	0.30		(<1.50)	ug/gCR
Iodine	88.00	L	(>100.00)	ug/L
Lithium	45.00		(<55.00)	ug/gCR
Manganese	1.09		(<1.50)	ug/gCR
Molybdenum	9.10		(<65.00)	ug/gCR
Nickel	0.81		(<2.00)	ug/gCR
Rubidium	<DL		(<3000)	ug/gCR
Selenium	12.00		(<63.00)	ug/gCR
Strontium	82.00		(<310.00)	ug/gCR
Vanadium	3.88		(<8.00)	ug/gCR

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TOXIC METALS

TEST	RESULT	H/L	REFERENCE	UNITS
Aluminium	25.00		(<40.00)	ug/gCR
Antimony	<DL		(<1.00)	ug/gCR
Arsenic	38.00	H	(<35.00)	ug/gCR
Barium	0.93		(<5.70)	ug/gCR
Beryllium	<DL		(<0.60)	ug/gCR
Bismuth	<DL		(<1.00)	ug/gCR
Bromine	940.00		(<4800)	ug/gCR
Cadmium	0.22		(<0.60)	ug/gCR
Cesium	2.11		(<10.30)	ug/gCR
Gadolinium	<DL		(<0.23)	ug/gCR
Gallium	<DL		(<0.10)	ug/gCR
Lead	19.00	H	(<8.00)	ug/gCR
Mercury	5.9		(<3.0)	ug/gCR
Palladium	0.01		(<15.00)	ug/gCR
Platinum	0.10		(<1.00)	ug/gCR
Silver	0.22	H	(<0.10)	ug/gCR
Tellurium	<DL		(<0.80)	ug/gCR
Thallium	<DL		(<1.50)	ug/gCR
Tin	0.65	H	(<0.50)	ug/gCR
Titanium	0.05		(<50.00)	ug/gCR
Tungsten	0.01		(<0.50)	ug/gCR
Uranium	0.01		(<0.10)	ug/gCR
Zirconium	0.16		(<5.00)	ug/gCR

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Nutrient Mineral Comment

LOW URINARY CALCIUM:

Urine is not the specimen of choice to detect nutritional deficiencies; however, when urine levels are low before, and especially after chelation therapy, it can be safely assumed that the calcium availability was low. This may be a reflection of an adequate dietary intake.

Calcium essential for bone and teeth growth, muscular and neuronal functions; it influences hormonal secretion and is involved in immune/oxidant responses. Deficiency symptoms are muscle cramps, musculoskeletal pain, menstrual cramps, periodontal disease, and osteoporosis. The RDA is 800-1800 mg/day, depending on age and condition. The ability of the body to absorb calcium decreases with age, due to hormonal changes, reduced gastric ability and decreased activity levels.

SOURCES: Dairy products, green leafy vegetables, citrus fruits, molasses and fish with edible bones.

THERAPEUTIC CONSIDERATION: Vitamin D, the amino acid lysine and digestive enzymes, containing hydrochloric acid and pepsin assist calcium absorption. Lactobacillus acidophilus assists intestinal absorption.

COPPER ELEVATED:

Elevated urine copper excretion may be due to Wilsons disease. Elevated levels may also occur with copper toxicity, chronic active liver disease and in contaminated specimens. Please correlate clinically and repeat with follow up testing if necessary.

IODINE COMMENT: Urinary iodine reflects dietary iodine intake, more than 90% of dietary iodine is excreted in the urine. WHO Guidelines: >100 ug/gCR Not Iodine deficient 50 - 100 ug/gCR Mild Iodine deficiency 20 - 49 ug/gCR Moderate Iodine deficiency < 20 ug/gCR Severe Iodine deficiency Low levels of iodine may lead to hypothyroidism and goitre and in severe cases, intellectual disability.

Toxic Metals Comment

ARSENIC (As) ELEVATED:

Description: A toxic metalloid found in contaminated water, rice, seafood (organic arsenic), pesticides, and pressure-treated wood.

Symptoms: Fatigue, neuropathy, skin changes, cardiovascular disease, increased cancer risk.

Treatment: Distinguish between organic and inorganic forms; support methylation (folate, B12, SAMe), and use chelation agents like DMSA or NAC if applicable.

LEAD (Pb) ELEVATED:

Description: A potent neurotoxin found in old paint, plumbing, industrial emissions, and contaminated soil or dust.

Symptoms: Cognitive decline, developmental delay (children), anemia, hypertension, mood disorders.

Treatment: Chelation therapy (e.g., DMSA, EDTA), zinc and iron repletion, vitamin C and antioxidant support.

SILVER (Ag) ELEVATED:

Description: Elevated levels indicate recent absorption of silver into the body, often from medical treatments like silver-containing wound creams (SSD cream) or occupational exposure to silver particles.

Symptoms: Symptoms of silver toxicity can include argyria (a blue-gray skin discoloration), as well as potential kidney issues and other systemic effects.

Treatment: Identify and eliminate the source of silver exposure; possible treatment with laser therapy.

TIN (Sn) ELEVATED:

Description: Used in food cans, PVC plastics, and industrial alloys. Organotin compounds (e.g., tributyltin) are more toxic than elemental tin.

Symptoms: Hormonal disruption, fatigue, immune dysregulation.

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Treatment: Eliminate exposure, support liver detoxification, and use antioxidants (e.g., vitamin E, selenium).

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CYSTEINE DERIVATIVES

TEST	RESULT	H/L	REFERENCE	UNITS
N-Acetyl (3,4-Dihydroxybutyl) cysteine (NADB)	44.00		(<250.00)	ug/gCR
N-Acetyl (carbomoylethyl) cysteine	123.00		(<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	5.50	H	(<3.00)	ug/gCR
Bisphenol A (BPA)	7.21	H	(<4.00)	ug/gCR
Triclosan (TCS)	4.30		(<50.00)	ug/gCR

HERBICIDES (Synthetic Auxins)

TEST	RESULT	H/L	REFERENCE	UNITS
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.06		(<1.00)	ug/gCR

HERBICIDES (Photosynthetic Inhibitors)

TEST	RESULT	H/L	REFERENCE	UNITS
Atrazine	0.33		(<0.50)	ug/gCR
Atrazine mercapturate	0.66	H	(<0.50)	ug/gCR

HERBICIDES (EPSP Inhibitors)

TEST	RESULT	H/L	REFERENCE	UNITS
Aminomethylphosphonic Acid (AMPA)	0.95		(<2.00)	ug/gCR
Glyphosate	55.0	H	(<40.0)	ppb

METHYLTERT-BUTYL ETHER (MTBE) EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
alpha-HydroxyIsoButyrate	4.66		(<6.35)	ug/mgCR

MITOCHONDRIAL MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
Tiglylglycine	3.30		(<10.00)	ug/gCR

PARABENS

TEST	RESULT	H/L	REFERENCE	UNITS
Benzylparaben	4.09	H	(<2.00)	ug/gCR
Butylparaben	1.67	H	(<1.00)	ug/gCR
Ethylparaben	<DL		(<7.00)	ug/gCR

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TEST	RESULT	H/L	REFERENCE	UNITS
Methylparaben	<DL		(<120.00)	ug/gCR
ParahydroxyBenzoic Acid	0.00		(<0.57)	mmol/molCR
Propylparaben	<DL		(<35.00)	ug/gCR

PESTICIDES

TEST	RESULT	H/L	REFERENCE	UNITS
3-Phenoxybenzoic Acid (3PBA)	1.55		(<3.00)	ug/gCR
Diethyl Phosphate (DEP)	9.90	H	(<9.00)	ug/gCR
Diethyldithiophosphate (DEDTP)	<DL		(<0.20)	ug/gCR
Diphenyl phosphate (DPP)	<DL		(<2.50)	ug/gCR
Diethylthiophosphate (DETP)	<DL		(<1.00)	ug/gCR

PFA's

TEST	RESULT	H/L	REFERENCE	UNITS
Perfluorobutanoic acid (PFBA)	0.43		(<1.20)	ug/gCR
Perfluorooctanoic Acid (PFOA)	0.22	H	(<0.10)	ug/gCR
Perfluorooctane Sulphonic Acid (PFOS)	0.26		(<0.60)	ug/gCR

PHTHALATES

TEST	RESULT	H/L	REFERENCE	UNITS
Butyl Benzyl phthalate (BBP)	0.50		(<1.00)	ug/gCR
Mono-Benzyl phthalate (mBzP)	0.60		(<3.00)	ug/gCR
Mono-n-Butyl phthalate (mBP)	65.00	H	(<55.00)	ug/gCR
Mono (3-carboxypropyl) phthalate (mCPP)	<DL		(<31.00)	ug/gCR
Mono-ethyl phthalate (MEtP)	125.00	H	(<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	55.00		(<170.00)	ug/gCR
Quinolinic Acid	7.4		(<9.1)	mmol/molCR

VOLATILE ORGANIC COMPOUNDS

TEST	RESULT	H/L	REFERENCE	UNITS
2-hydroxyethyl-mercapturic acid (HEMA)	<DL		(<5.00)	ug/gCR
Mandelic Acid	27.00		(<340.0)	ug/gCR
Phenylglyoxylic Acid	58.00		(<300.0)	ug/gCR
Mandelic Acid + Phenylglyoxylic Acid	85.00		(<610.0)	ug/gCR

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BENZENES EXPOSURE

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

TOLUENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
Benzoic Acid	29.00	H	(<9.30)	mmol/molCR
Hippuric Acid	330.0		(<603.0)	mmol/molCR

XYLENES EXPOSURE

TEST	RESULT	H/L	REFERENCE	UNITS
2-Methylhippuric Acid	0.02		(<0.04)	mmol/molCR
3-Methylhippuric Acid	0.01		(<0.11)	mmol/molCR

TEST	RESULT	H/L	REFERENCE	UNITS
Creatinine, Urine	8.00		(2.47-19.20)	mmol/L

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Environmental Phenols Comment

ATRAZINE MERCAPTURATE ELEVATED:

Atrazine mercapturate is a primary urinary metabolite of atrazine and serves as a biomarker of recent exposure. Elevated levels reflect recent or ongoing atrazine exposure.

Health implications: Reflects burden of atrazine-associated toxicity, including estrogen receptor disruption, adrenal stress, and neurodevelopmental risk in children.

Symptoms: Similar to atrazine -fatigue, endocrine disruption, altered stress response.

Treatment considerations: Similar to atrazine- emphasize toxin avoidance and hepatic detoxification pathways (Phase I/II liver support), including NAC, glycine, and cruciferous vegetables.

4-NONYLPHENOL ELEVATED:

4-Nonylphenol is a degradation product of nonylphenol ethoxylates, used widely in industrial detergents, plastics, paints, and personal care products. It is classified as an endocrine-disrupting chemical due to its estrogenic activity and affinity for estrogen receptors.

Health implications: Chronic exposure may disrupt hormonal balance, impair reproductive development, and contribute to thyroid and metabolic dysregulation.

Symptoms: Hormonal irregularities, early puberty, reproductive issues, fatigue, and cognitive disturbances.

Treatment considerations: Minimize exposure to industrial and consumer products containing nonylphenol derivatives. Support detoxification pathways with antioxidant-rich nutrition (e.g., sulforaphane, glutathione), liver support, and hydration.

BISPHENOL A (BPA) ELEVATED:

Bisphenol A (BPA) is a synthetic chemical used in the production of certain plastics and resins, such as polycarbonate plastic.

Health implications: High BPA in urine is linked to various adverse health outcomes, including increased risks of heart disease, diabetes, obesity, and certain cancers. It may also be associated with impaired reproductive, liver, kidney, and thyroid function, as well as developmental issues in children.

Symptoms: General fatigue, less of concentration, behavioural changes in children.

Treatment considerations: Treatment focuses on reducing exposure by avoiding BPA-containing plastics and supporting the body's natural detoxification with antioxidants.

Herbicides Comment

GLYPHOSATE ELEVATED:

Glyphosate is a widely used herbicide that poses health risks, especially from large or long-term exposure, .

Health implications: Some health authorities classify glyphosate as a probable carcinogen.

Symptoms: Short-term exposure to products can cause eye, skin, and respiratory irritation, along with nausea and vomiting if swallowed.

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

Parabens Comment

BUTYLPARABEN ELEVATED:

Butylparaben is a longer-chain paraben used as a preservative in cosmetics, personal care products, and pharmaceuticals. It is more lipophilic than other parabens, allowing it to accumulate in fatty tissues.

Health implications: Butylparaben is an endocrine disruptor that mimics estrogen and may interfere with reproductive hormone signaling, particularly in males. It also has potential links to breast cancer risk and oxidative stress.

Symptoms: Hormonal imbalances, reduced sperm quality, menstrual irregularities, and possible allergic reactions.

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Treatment considerations: Eliminate paraben-containing products. Support liver detoxification pathways and hormone metabolism (e.g., DIM, calcium-D-glucarate, cruciferous vegetables). Monitor hormonal status if symptomatic.

BENZYLPARABEN ELEVATED:

Benzylparaben is a less common paraben, but still used in some cosmetic and pharmaceutical formulations.

Health implications: It exhibits estrogenic properties and may compound the hormonal burden when combined with other parabens. Research is more limited but suggests potential for endocrine disruption and dermal sensitization.

Symptoms: Hormonal imbalances, skin irritation, unexplained fatigue.

Treatment considerations: Minimize exposure to synthetic preservatives. Support detoxification and antioxidant systems. Evaluate total endocrine-disrupting chemical (EDC) burden if multiple parabens are elevated.

PFAS Comment

PERFLUOROOCTANOIC ACID (PFOA) ELEVATED:

Elevated PFOA in urine is primarily from exposure and can be linked to potential health effects on the kidneys, hyperuricemia (high uric acid), cancer, endocrine, reproductive.

There is no medically approved treatment to remove PFOA from the body, but exposure can be reduced by avoiding certain foods and products, and some medical interventions may help lower levels.

Phthalates Comment

MONO-N-BUTYL PHTHALATE (mBP) ELEVATED:

mBP is a metabolite of dibutyl phthalate (DBP), used in nail polish, cosmetics, and certain medications.

Health implications: DBP is an anti-androgenic compound, potentially lowering testosterone and affecting reproductive organ development.

Symptoms: Reduced libido, fertility issues, testicular dysgenesis, fatigue, thyroid dysfunction.

Treatment considerations: Avoid DBP-containing products. Use glutathione, selenium, and zinc to support detoxification and hormone metabolism. Consider endocrine evaluation.

MONO-ETHYL PHTHALATE (MEtP) ELEVATED:

MEtP is a urinary metabolite of diethyl phthalate (DEP), commonly used in cosmetics, perfumes, and personal care products to fix scent and texture.

Health implications: MEtP is linked to estrogenic activity, increased oxidative stress, and potential thyroid hormone interference.

Symptoms: Hormonal symptoms (e.g., PMS, gynecomastia, irregular cycles), skin sensitivity, fatigue.

Treatment considerations: Switch to phthalate-free personal care products. Support liver Phase II detox with amino acids (glycine, glutamine), fiber, and methylation nutrients. Consider endocrine and oxidative stress evaluation.

Environmental Toxins 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.

BENZOIC ACID ELEVATED:

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Benzoic acid is a compound which is primarily found in urine in its metabolized form (Hippuric acid); and is a normal metabolic product. However, higher levels of benzoic acid in urine can indicate various health issues, such as gut microbial imbalance (dysbiosis), abnormal liver function, or occupational toluene exposure. Dietary intake of benzoic acid or polyphenols, as well as coffee consumption, can also influence these levels.

Symptoms: Symptoms due to occupational exposure are similar to hippuric acid i.e. headache, dizziness, nausea and muscle spams.

Treatment: Limiting exposure to toluene. Supportive supplements such as glycine and N-acetyl cysteine can support natural detoxification.

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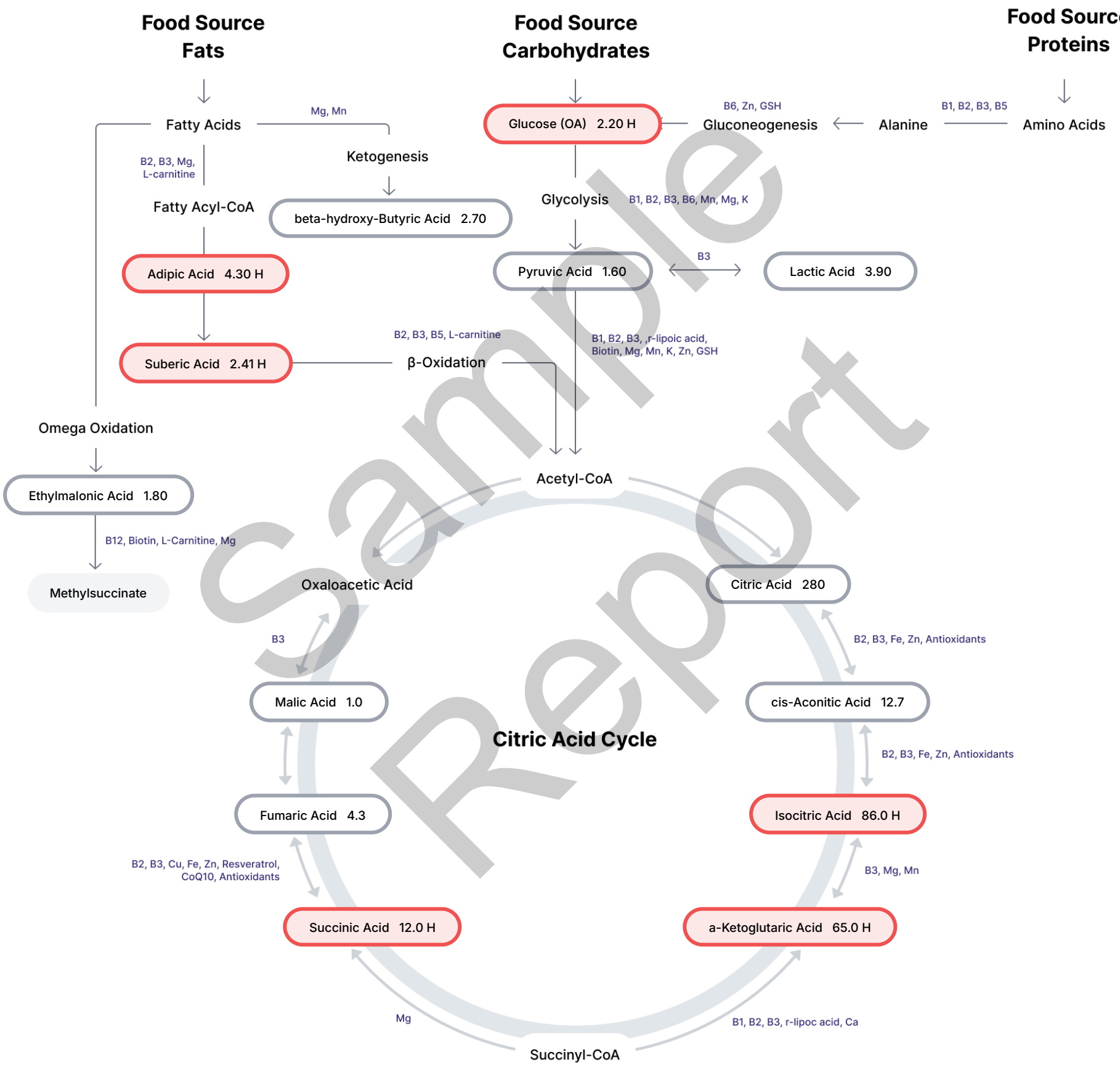
Legend Not Tested | Within Range | Out of Range | L = Low, LL = Critically Low | H = High, HH = Critically High | Regulator

Organic Acids Pathway



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CARBOHYDRATES METABOLISM/Glycolysis

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

TEST		RESULT	H/L	REFERENCE	UNITS
1	Pyruvic Acid	1.60		(0.50-8.70)	mmol/molCR
2	Lactic Acid	3.90		(<48.00)	mmol/molCR
3	Glucose (OA)	2.20	H	(0.10-1.10)	ug/mgCR

KETONE/FATTY ACIDS METABOLISM

(Carnitine & B2)

TEST		RESULT	H/L	REFERENCE	UNITS
4	Adipic Acid	4.30	H	(<3.80)	mmol/molCR
5	Suberic Acid	2.41	H	(<2.20)	mmol/molCR
6	Ethylmalonic Acid	1.80		(<5.80)	mmol/molCR
7	Methyl-Succinic Acid	1.60		(<10.80)	mmol/molCR
8	Pimelic Acid	2.30		(<4.00)	mmol/molCR
9	alpha-hydroxy-Butyric Acid	2.80		(<6.90)	mmol/molCR
10	beta-hydroxy-Butyric Acid	2.70		(<3.10)	mmol/molCR

B-COMPLEX VITAMINS/AMINO ACID MARKERS

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

TEST		RESULT	H/L	REFERENCE	UNITS
11	alpha-Ketoisovaleric Acid	2.3		(<4.1)	mmol/molCR
12	alpha-Ketoisocaproic Acid	0.4		(<0.7)	mmol/molCR
13	alpha-keto-beta-Methylvaleric Acid	0.8		(<2.0)	mmol/molCR
14	Xanthurenic Acid	3.30	H	(<0.96)	mmol/molCR
15	beta-Hydroxyisovaleric Acid	7.2		(<29.0)	mmol/molCR
16	Methylmalonic Acid	3.9	H	(<1.9)	mmol/molCR
17	Formiminoglutamic Acid	1.7	H	(<1.5)	mmol/molCR

CITRIC ACID CYCLE METABOLISM

(B Comp, CoQ10, Amino Acids, Mg)

TEST		RESULT	H/L	REFERENCE	UNITS
18	Citric Acid	280		(40-507)	mmol/molCR
19	cis-Aconitic Acid	12.7		(3.5-36.0)	mmol/molCR
20	Isocitric Acid	86.0	H	(5.0-65.0)	mmol/molCR
21	a-Ketoglutaric Acid	65.0	H	(4.0-52.0)	mmol/molCR
22	Succinic Acid	12.0	H	(1.0-9.7)	mmol/molCR
23	Fumaric Acid	4.3		(<8.6)	mmol/molCR
24	Malic Acid	1.0		(<1.8)	mmol/molCR

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TEST	RESULT	H/L	REFERENCE	UNITS
25 3-Methylglutaric Acid	3.6		(<8.5)	mmol/molCR

NEUROTRANSMITTER METABOLISM

(Tyrosine, Tryptophan, B6, Antioxidants)

TEST	RESULT	H/L	REFERENCE	UNITS
26 Homovanillic Acid (HVA)	2.9		(0.1-5.3)	mmol/molCR
27 Vanillylmandelic Acid (VMA)	3.7	H	(0.4-3.6)	mmol/molCR
28 5-Hydroxyindoleacetic Acid (5HIAA)	3.0		(<4.3)	mmol/molCR
29 Kynurenic Acid	2.7	H	(<2.2)	mmol/molCR
30 Quinolinic Acid	7.4		(<9.1)	mmol/molCR
31 Picolinic Acid	3.5		(<10.3)	mmol/molCR
32 Cortisol (OA)	44.0		(5.0-65.0)	ug/mgCR

OXIDATIVE DAMAGE/ANTIOXIDANT MARKERS

(Vitamin C, Other Antioxidants)

TEST	RESULT	H/L	REFERENCE	UNITS
33 Parahydroxyphenyllactic Acid	4.60	H	(<3.90)	mmol/molCR
34 8-hydroxy-deoxyguanosine	2.90	H	(<2.70)	mmol/molCR

DETOXIFICATION INDICATORS

(Arg, NAC, Meth, Mg, Antioxidants)

TEST	RESULT	H/L	REFERENCE	UNITS
35 2-Methylhippuric Acid	0.02		(<0.04)	mmol/molCR
36 Orotic Acid	2.55		(0.00-3.20)	mmol/molCR
37 Glucaric Acid	4.60		(<11.00)	mmol/molCR
38 Pyroglutamic Acid	15.90		(4.50-33.00)	mmol/molCR

BACTERIAL DYSBIOSIS MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
39 Benzoic Acid	29.00	H	(<9.30)	mmol/molCR
40 Hippuric Acid	330.0		(<603.0)	mmol/molCR
41 Phenylacetic Acid	2.40		(0.00-4.16)	mmol/molCR
42 Phenylpropionic Acid	0.60	H	(0.00-0.40)	mmol/molCR
43 ParahydroxyBenzoic Acid	0.00		(<0.57)	mmol/molCR
44 p-HydroxyPhenylacetic Acid	3.90		(0.00-14.60)	mmol/molCR
45 Indoleacetic Acid	6.80		(<11.00)	mmol/molCR
46 Tricarballylic Acid	0.38		(<0.44)	mmol/molCR

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CLOSTRIDIAL SPECIES

TEST	RESULT	H/L	REFERENCE	UNITS
47 DiHydroxyPhenylPropionic Acid	2.98		(<5.30)	mmol/molCR
48 4-Cresol	0.55		(0.00-1.70)	ug/mgCR
49 3-hydroxy-Propionic Acid	3.98		(<17.00)	mmol/molCR

YEAST/FUNGAL DYSBIOSIS MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
50 Arabinitol	33.0		(<36.0)	mmol/molCR
51 Citramalic Acid	3.1		(<3.6)	mmol/molCR
52 Tartaric Acid	4.9		(<15.0)	mmol/molCR

OXALATE METABOLITES

TEST	RESULT	H/L	REFERENCE	UNITS
53 Oxalic Acid	13.8		(<78.0)	mmol/molCR
54 Glyceric Acid	4.1		(<6.0)	mmol/molCR
55 Glycolic Acid	20.3		(<67.0)	mmol/molCR

NUTRITIONAL MARKERS

TEST	RESULT	H/L	REFERENCE	UNITS
56 Pyridoxic Acid (Vit B6)	5.7		(0.7-34.0)	mmol/molCR
57 Pantothenic Acid (Vit B5)	0.8		(0.1-10.0)	mmol/molCR
58 Glutaric Acid (Vit B2)	0.13		(0.02-0.36)	mmol/molCR
59 Ascorbic Acid (Vit C)	28.00		(0.50-200.00)	mmol/molCR
60 CoEnzyme Q10 (CoQ10)	1.10		(0.10-5.00)	mmol/molCR
61 N-Acetylcysteine (NAC)	0.08		(0.02-0.28)	mmol/molCR
62 Biotin (Vit H)	2.20		(0.10-15.00)	mmol/molCR

TEST	RESULT	H/L	REFERENCE	UNITS
Creatinine, Urine	8.00		(2.47-19.20)	mmol/L

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NUTRITIONAL GUIDE

TEST	RESULT	UNITS	Clinical Notes
Vitamin-E	200.0	U	
Vitamin-B1	15.0	mg	
Vitamin-B2	17.0	mg	
Vitamin-B3	13.0	mg	
Vitamin-B5	10.0	mg	
Vitamin-B6	5.0	mg	
Glycine	5.0	mg	
Glutamine	0.0	mg	
Glutathione	50.0	mg	
Taurine	6.0	mg	
Tyrosine	0.0	mg	
Tryptophan	8.0	mg	
L-Arginine	0.0	mg	
Aspartic Acid	0.0	mg	
Acetyl-L-Carnitine	20.0	mg	
Biotin	0.0	ug	
Chromium	3.0	ug	
Coenzyme Q10	400.0	mg	
Calcium-D-glucurate	0.0	mg	
EPA/DHA	0.0	mg	
Iron	0.0	mg	
Folinic Acid	0.0	ug	
D-Lactate-free probiotics	1.0	billion CFU	
Magnesium	140.0	mg	
Manganese	0.0	mg	
Malic Acid	0.0	ug	
Methionine	6.0	mg	
N-Acetylcysteine	100.0	mg	
Ornithine	10.0	mg	
Vanadium	0.0	ug	
alpha-Lipoic Acid	200.0	mg	
Lysine	0.0	mg	
Lactobacillus	1.0	billion CFU	
5-hydroxy-Tryptophan (5-HTP)	0.0	mg	
Serine	5.0	mg	
Probiotics (Multistrain)	100.0	billion CFU	

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TEST	RESULT	UNITS	Clinical Notes
Phenylalanine	**0.0**	mg	
Vitamin-C	**400.0**	mg	

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Carbohydrate Metabolism Comment

GLUCOSE ELEVATED:

Oxidation of glucose is the major source of cellular energy in the body. Glucose derived from dietary sources is converted to glycogen for storage in the liver or to fatty acids for storage in adipose tissue. Glucose measurement in urine is used as a diabetes screening procedure and to aid in the evaluation of glycosuria, to detect renal tubular defects, and in the management of diabetes mellitus. Elevated levels should be confirmed with a fasting glucose blood test.

Supplementation Recommendations: Chromium, Vanadium, Insulin, Diabetic medication.

Citric Acid Cycle Comment

ISOCITRATE HIGH:

Isocitrate is the precursor to alpha-ketoglutarate in the Krebs Cycle. 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.

a-KETOGLUTARIC ACID ELEVATED:

a-Ketoglutarate is a key molecule in the TCA cycle, playing a fundamental role in determining the overall rate of this important metabolic process. In the TCA cycle, a-Ketoglutarate is decarboxylated to succinyl-CoA and carbon dioxide by a-Ketoglutarate dehydrogenase, which functions as a key control point of the TCA cycle. a-Ketoglutaric acid changes in direct proportion to urinary pH suggesting it may be a marker of pH imbalance.

Elevations can be seen with nutrient cofactor deficiencies needed for the enzymatic conversion of α ketoglutarate such as vitamin B3, zinc, magnesium, manganese.

SUCCINIC ACID ELEVATED:

Succinate has multiple biological roles including roles as a metabolic intermediate and roles as a cell signalling molecule. It links cellular metabolism, especially ATP formation, to the regulation of cellular function, and can be broken down or metabolized into fumarate by the enzyme succinate dehydrogenase, which is part of the electron transport chain involved in making ATP.

Elevated succinate may indicate a deficiency of Riboflavin and CoQ10. Succinate has also recently been identified as a possible endogenous, cancer causing metabolite at higher levels.

B-Complex Vitamins/Amino Acids Comment

XANTHURENIC ACID ELEVATED:

Xanthurenate is a metabolite in the kynurenine pathway of tryptophan degradation.

Elevations in urinary xanthurenate are seen with increased intake of tryptophan, and in high estrogen states. Pregnancy, oral contraceptive use and possibly diabetes, renal failure - are associated with elevated levels of urinary xanthurenic acid where a functional nutrient need for B-vitamins is pronounced.

Consider: Supplementation with B6.

Methylation Cofactors Comment

METHYLMALONIC ACID (MMA) ELEVATED:

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Methylmalonate is formed from propionyl-CoA via methylmalonyl-CoA. Major dietary sources of propionyl-CoA include valine, isoleucine, methionine, threonine, and odd chain fatty acids. methylmalonyl-CoA is converted into succinate via a B12 dependent enzyme Methylmalonyl-Co-A mutase.

Chronically high levels of methylmalonate are associated with at least 5 inborn errors of metabolism; but the most common cause is a B12 deficiency.

Consider: Supplementation with B12.

FORMIMINOGLUTAMIC ACID (FIGLU) ELEVATED:

Formiminoglutamate is an intermediate in the deamination of amino acid, histidine.Folate is the cofactor required to convert for formiminoglutamate to glutamate.

A deficiency of Folate can lead to

inhibition of DNA synthesis, impaired methylation, cell division and alterations in protein synthesis. Elevations in urine have been used to measure folate deficiency for many years.

Oxidative Damage/Detoxification Comment

p-HYDROXYPHENYL-LACTATE (PHPA) ELEVATED:

4-Hydroxyphenyllactate is a tyrosine metabolite. Microbial hydroxyphenyllactate is likely derived from phenolic or polyphenolic compounds in the diet. Bifidobacteria and lactobacilli produce considerable amounts of phenyllactic and p-hydroxyphenyllactic acids. 4-hydroxyphenyllactic acid is often used to help diagnose rare genetic metabolic disorders.

4-Hydroxyphenyllactic acid can sometimes be also slightly elevated in other conditions or due to intake of tyrosine-rich foods.

Bacterial Dysbiosis Comment

BENZOATE ELEVATED:

Benzoate was one of the compounds first found to be elevated in urine from patients with intestinal bacterial overgrowth and a metabolic product of free intestinal phenylalanine. Benzoates are found in jams and foods containing paraben preservatives.

Imbalanced gut flora may increase levels, as well as a high dietary intake of polyphenols or food preservatives.

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

PHENYLPROPIONATE ELEVATED:

Mild elevations in phenylpropionate, parahydroxybenzoate, and p-hydroxyphenylacetate may serve as indicators of potential microbial overgrowth. Consider implementing treatment for dysbiosis, dietary modifications, mucosal support, and the use of prebiotics and probiotics.

Nutritional Markers Comment

8-HYDROXY-2-DEOXYGUANOSINE (8OHdG) ELEVATED:

8-Hydroxy-2-deoxyguanosine is a marker of oxidative damage to guanine of DNA.8-Hydroxy-2-deoxyguanosine is associated with increased oxidative stress and may indicate a strong need for antioxidants.

Higher levels of 8-hydroxy-2-deoxyguanosine could idicate possible oxidative damage.

Consider: Supplementation with antioxidants such as vitamin C, E, N-acetyl cysteine, lipoate.

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Methodology

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