Diagnostic Solutions laboratory

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Patient: Ima Sample
Collected: 11/5/2021
DOB: 7/14/1977
Sex: Male

Accession: OMXTest07
Received: 2/15/2022
Completed: 5/10/2022
Ordered by: Diane Farhi

OMX ORGANIC METABOLOMICS

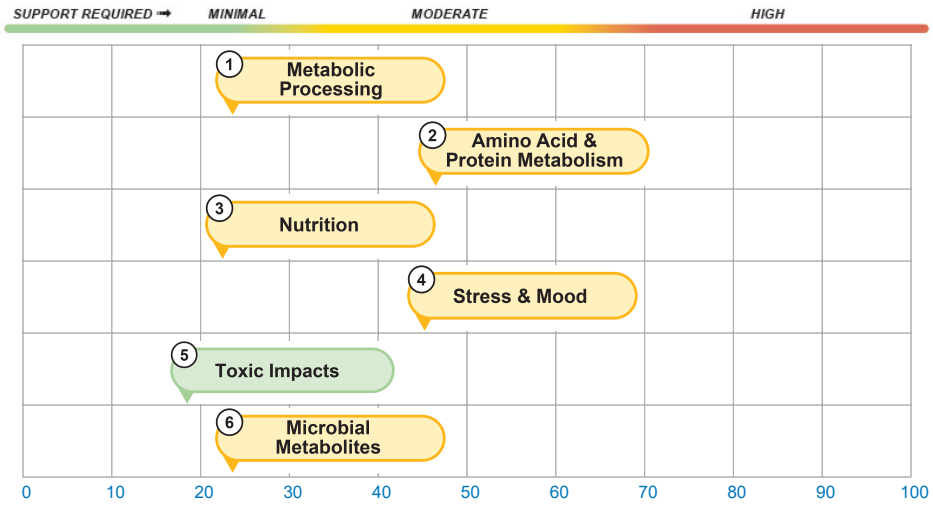
METHODOLOGY: LC-MS/MS - OMX Urine + Plasma

YOUR PERSONALIZED REPORT

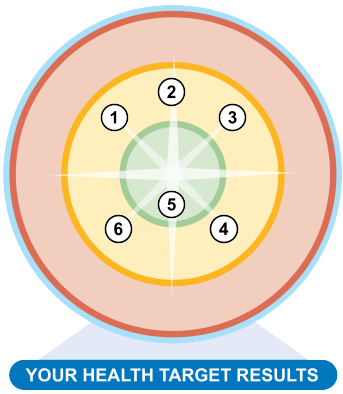
The charts on this page are designed to give you a bird's-eye-view of your current metabolic signature and help you get a general preview of the detailed report found on the following pages.

METABOLOMIC SIGNATURE

Identifying Impact of Functional Categories



PERCENT OF MARKERS BEYOND THE REFERENCE RANGE



YOUR HEALTH TARGET RESULTS

Findings show that 5 of 6 Functional Categories have markers beyond the reference range.

Subcategories are identified below.

Identifying Impact of Subcategories

NOTE: Below is a list of the Functional Categories and the included subcategories. It lists the percentage of markers that are beyond the reference range so clinicians can better target areas of concern.

PERCENT OF MARKERS BEYOND THE REFERENCE RANGE

0-20%	21-60%	61-100%
MINIMAL	MODERATE	HIGH

1 Metabolic Processing — 23 %

Subcategory
Glycolysis
Krebs Cycle
Fatty Acid Oxidation
Ketones

2 Amino Acid & Protein Metabolism — 43 %

Subcategory
Phenylalanine Metabolism
Branched-Chain Amino Acids
Tryptophan Metabolism
Methionine Metabolism
Histidine Metabolism
Threonine/Glycine/Serine
Lysine Metabolism
Glutamate & Aspartate
Collagen Catabolism

3 Nutrition — 21 %

Subcategory
B-Complex (B1, B2, B3, B5, LA)
Vitamin B-12
Folate
Vitamin B6
Biotin
Plant Components
Meat intake
Sugar Intake

4 Stress & Mood — 43 %

Subcategory
Neurotransmitter
Catecholamine Turnover
Serotonin Turnover
Steroid Hormone

5 Toxic Impacts — 20 %

Subcategory
Oxidative Damage
Toxins
Urea Cycle
Kidney Impacts

6 Microbial Metabolites — 22 %

Subcategory
Amino Acid Microbial Metabolites
Polyphenols Microbial Metabolites
Isoflavone Microbial Metabolite
Fungal Assessment

Patient: Ima Sample **Accession: OMXTest07**

ORGANIC METABOLOMICS

1 - Metabolic Processing

Glycolysis	Result	20% 40% 60% 80%	Reference
Glucose *Glucokinase*	8.0		< 15.2 mg/dL
Pyruvic Acid *Pyruvate dehydrogenase + B1, B2, B3, B5 LA*	53.4 H		< 47.2 nmol/mg Creatinine
Lactic Acid *Lactate dehydrogenase + B3*	>739.9		23.1 - 722.6 nmol/mg Creatinine
D-Lactic Acid *D-Lactate dehydrogenase*	>34.93		< 20.00 nmol/mg Creatinine
(P) **Alanine** *Alanine transaminase + B6*	1526.4 H		271.5 - 730.0 nmol/mL

Krebs Cycle	Result	20% 40% 60% 80%	Reference
Citric Acid *Citrate synthase*	694.1		> 356.2 nmol/mg Creatinine
***cis*-Aconitic Acid** *Aconitase*	192.6		91.3 - 363.1 nmol/mg Creatinine
Isocitric Acid *Isocitrate dehydrogenase + B3*	245.2		< 415.6 nmol/mg Creatinine
α-Ketoglutaric Acid *alpha-Ketoglutarate dehydrogenase + B1, B2, B3, B5, LA*	19.5		< 157.2 nmol/mg Creatinine
Succinic Acid *Succinic dehydrogenase + B2*	254.2 H		4.8 - 224.1 nmol/mg Creatinine
Fumaric Acid *Fumarase*	840.8		320.2 - 3375.5 nmol/mg Creatinine
Malic Acid *Malate dehydrogenase + B3*	4.2		< 21.5 nmol/mg Creatinine

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1 - Metabolic Processing

Fatty Acid Oxidation	Result	20% 40% 60% 80%	Reference
Adipic Acid *Saturated dicarboxylic acid*	**4.9**		2.0 - 15.1 nmol/mg Creatinine
Sebacic Acid *Fatty acid oxidation + Carnitine*	**<DL**		< 3.7 nmol/mg Creatinine
Suberic Acid *Fatty acid oxidation + Carnitine*	**11.0**		3.0 - 29.4 nmol/mg Creatinine
Pimelic Acid *Saturated dicarboxylic acids*	**17.9**		5.9 - 31.8 nmol/mg Creatinine
Hexanoylglycine *Medium-chain acyl glycines*	**0.5**		< 2.6 nmol/mg Creatinine
Suberylglycine *Medium-chain acyl glycines*	**0.7**		< 2.3 nmol/mg Creatinine
3-Phenylpropionylglycine *Medium-chain acyl glycines*	**<DL**		< 1.3 nmol/mg Creatinine
Ethylmalonic Acid *Dicarboxylic acid*	**14.2**		5.0 - 43.3 nmol/mg Creatinine
2-Methylsuccinic Acid *Dicarboxylic acid*	**5.1**		3.2 - 21.1 nmol/mg Creatinine

Ketones	Result	20% 40% 60% 80%	Reference
β-Hydroxybutyric Acid *beta-Hydroxybutyrate dehydrogenase + B3*	**2.1**		< 60.5 nmol/mg Creatinine

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ORGANIC METABOLOMICS

2 - Amino Acid & Protein Metabolism

Phenylalanine Metabolism	Result	20% 40% 60% 80%	Reference
(P) **Phenylalanine** *Phenylalanine hydroxylase + BH4*	111.4 H		31.7 - 71.0 nmol/mL
Phenylacetic Acid *Aldehyde dehydrogenase*	0.9		0.5 - 19.1 nmol/mg Creatinine
(P) **Tyrosine** *Tyrosine hydroxylase + BH4*	113.7 H		27.8 - 84.5 nmol/mL
Homovanillic Acid *COMT + Magnesium & Monoamine oxidase + B2*	2.8		< 10.3 nmol/mg Creatinine
Vannilylmandelic Acid *Monoamine oxidase + B2*	32.5 H		4.8 - 21.4 nmol/mg Creatinine
4-Hydroxyphenylpyruvic Acid *Tyrosine aminotransferase + B6*	183.3		35.5 - 1116.3 nmol/mg Creatinine
Homogentisic Acid *4-Hydroxyphenylpyruvate dioxygenase + Iron*	60.8		7.9 - 336.4 nmol/mg Creatinine

Branched-Chain Amino Acids	Result	20% 40% 60% 80%	Reference
(P) **Total Branched Chain Amino Acids** *Branched-chain amino acid transaminase + B6*	725.7 H		211.9 - 577.3 nmol/mL
(P) **Valine** *Branched-chain amino acid transaminase + B6*	343.9 H		109.3 - 283.0 nmol/mL
α-Ketoisovaleric Acid *Branched-chain keto acid dehydrogenase + B1, B2, B3, B5, LA*	<DL		< 11.9 nmol/mg Creatinine
(P) **Isoleucine/allo-Isoleucine** *Branched-chain amino acid transaminase + B6*	128.8 H		35.5 - 112.4 nmol/mL
α-Keto-β-methylvaleric Acid *Branched-chain keto acid dehydrogenase + B1, B2, B3, B5, LA*	0.9		< 11.9 nmol/mg Creatinine
(P) **Leucine** *Branched-chain amino acid transaminase + B6*	253.0 H		57.1 - 187.5 nmol/mL
α-Ketoisocaproic Acid *Branched-chain keto acid dehydrogenase + B1, B2, B3, B5, LA*	12.6		< 17.0 nmol/mg Creatinine

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2 - Amino Acid & Protein Metabolism

Tryptophan Metabolism	Result	20% 40% 60% 80%	Reference
(P) **Tryptophan** *Tryptophan hydroxylase + BH4*	17.6 L		36.9 - 87.1 nmol/mL
5-Hydroxyindoleacetic Acid *Aldehyde dehydrogenase + B3*	4.6 L		6.3 - 28.7 nmol/mg Creatinine
(P) **Kynurenine** *Kynurenine mono-oxygenase (KMO) + B2*	6.5 H		< 4.4 nmol/mL
(P) **KT Ratio** *Kynurenine / Tryptophan*	0.368 H		0.018 - 0.101
Hydroxykynurenine *Kynureninase + B6*	18.8 H		< 12.1 nmol/mg Creatinine
Xanthurenic Acid *Kynurenine transaminase + B6*	10.9 H		< 9.5 nmol/mg Creatinine
Anthranilic Acid *Kynureninase + B6*	<DL		< 11.8 nmol/mg Creatinine
Picolinic Acid *Non-enzymatic conversion*	<DL		< 4.0 nmol/mg Creatinine
Kynurenic Acid *Kynurenine transaminase + B6*	15.7		2.1 - 18.5 nmol/mg Creatinine
Quinolinic Acid *Non-enzymatic conversion*	56.0		9.0 - 105.7 nmol/mg Creatinine

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2 - Amino Acid & Protein Metabolism

Methionine Metabolism	Result	20% 40% 60% 80%	Reference
(P) **Methionine** *Methionine adenosyltransferase*	25.9		12.1 - 38.5 nmol/mL
(P) **Homocystine** *Methionine synthase + B12*	<DL		< 2.2 nmol/mL
(P) **Cystathionine** *Cystathionine gamm-lyase + B6*	15.3 H		< 0.3 nmol/mL
(P) **Sulfocysteine** *Sulfite oxidase (SOX) + Mo*	<DL		< 1.4 nmol/mL
(P) **Taurine** *Hypotaurine dehydrogenase*	51.5		25.9 - 107.2 nmol/mL
(P) **Cystine** *Oxidation*	59.1 H		13.4 - 51.9 nmol/mL
α-Hydroxybutyric Acid *Dehydrogenase + B3*	72.5 H		10.6 - 62.6 nmol/mg Creatinine
α-Ketobutyric Acid *Lactate dehydrogenase + B3*	<DL		< 7.2 nmol/mg Creatinine
Pyroglutamic Acid *5-Oxoprolinase*	88.9 H		< 72.7 nmol/mg Creatinine

Histidine Metabolism	Result	20% 40% 60% 80%	Reference
(P) **Histidine** *Histidine decarboxylase + B6*	80.1		61.2 - 104.7 nmol/mL
(P) **3-Methylhistidine** *Myofibrillar Breakdown*	14.6		< 26.9 nmol/mL
(P) **β-Alanine** *Carnosine synthase*	<DL		< 0.7 nmol/mL

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2 - Amino Acid & Protein Metabolism

Threonine/Glycine/Serine	Result	20% 40% 60% 80%	Reference
(P) **Threonine** *Glycine C-acetyltransferase + B6*	29.9 L		51.4 - 184.9 nmol/mL
(P) **Glycine** *Glutathione synthetase*	119.8 L		154.2 - 582.7 nmol/mL
(P) **Serine** *Cystathionine beta-synthase + B6, Iron*	39.0 L		54.2 - 207.4 nmol/mL
(P) **Sarcosine** *Sarcosine dehydrogenase + B2*	<DL		< 10.4 nmol/mL
(P) **Ethanolamine** *Ethanolamine kinase*	8.2		< 16.9 nmol/mL
(P) **Phosphoethanolamine** *Phosphoethanolamine cytidylyltransferase*	<DL		< 6.3 nmol/mL

Lysine Metabolism	Result	20% 40% 60% 80%	Reference
(P) **Lysine** *alpha-Aminoadipic semialdehyde synthase*	277.2		210.6 - 498.2 nmol/mL
(P) **α-Aminoadipic Acid** *Aminotransferase + B6*	<DL		< 4.8 nmol/mL
Glutaric Acid *Glutaryl-CoA dehydrogenase + B2*	0.8		< 4.5 nmol/mg Creatinine

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2 - Amino Acid & Protein Metabolism

Glutamate & Aspartate	Result	Reference
(P) **Glutamine** *Glutaminase*	227.2 L	352.4 - 1017.1 nmol/mL
(P) **Glutamic Acid** *Glutamate cysteine ligase*	286.9 H	38.3 - 251.2 nmol/mL
(P) **Glutamine / Glutamate Ratio** *Glutaminase*	0.8 L	2.1 - 21.7
(P) **Asparagine** *Asparaginase*	33.0	15.6 - 62.7 nmol/mL
(P) **Aspartic Acid** *Asparagine synthase*	11.4	5.4 - 21.5 nmol/mL

Collagen Catabolism	Result	Reference
(P) **Proline** *Prolyl hydroxylase + Vitamin C*	223.4	117.2 - 411.9 nmol/mL
(P) **Hydroxyproline** *4-Hydroxyproline oxidase*	9.3	< 30.6 nmol/mL
(P) **Glycylproline** *Dipeptide of Glycine + Proline*	<DL	< 2.6 nmol/mL

3 - Nutrition

B-Complex (B1, B2, B3, B5, LA)	Result	Reference
Branched Chain Alpha-Keto Organic Acids *Branched-chain keto acid dehydrogenase + B1, B2, B3, B5, LA*	13.5	< 28.3 nmol/mg Creatinine
α-Ketoglutaric Acid *alpha-Ketoglutarate dehydrogenase + B1, B2, B3, B5, LA*	19.5	< 157.2 nmol/mg Creatinine
Pyruvic Acid *Pyruvate dehydrogenase + B1, B2, B3, B5, LA*	53.4 H	< 47.2 nmol/mg Creatinine

Vitamin B-12	Result	Reference
Methylmalonic Acid *Methylmalonyl-CoA mutase + B12*	14.4	2.7 - 25.9 nmol/mg Creatinine

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ORGANIC METABOLOMICS

3 - Nutrition

	Result	20% 40% 60% 80%	Reference
Folate			
Formiminoglutamic Acid *Glutamate formimino-transferase + Folate*	0.05		< 0.4 nmol/mg Creatinine
Vitamin B6			
Pyridoxic Acid *Aldehyde oxidase*	<DL		< 111.9 nmol/mg Creatinine
Xanthurenic Acid *Kynurenine transaminase + B6*	10.9 H		< 9.5 nmol/mg Creatinine
Biotin			
β-Hydroxyisovaleric Acid *Methylcrotonyl-CoA carboxylase + Biotin*	78.5		25.1 - 223.4 nmol/mg Creatinine
Plant Components			
Quercetin *Polyphenol: Flavonoid*	5.3		> 2.7 nmol/mg Creatinine
Tartaric Acid *Plant component*	5.0		> 1.8 nmol/mg Creatinine
Meat intake			
(P) **1-Methylhistidine** *Dietary meat & fish*	<DL		< 16.0 nmol/mL
(P) **Carnosine** *Carnosinase*	2.7		< 2.7 nmol/mL
(P) **Anserine** *Anserinase*	<DL		< 18.4 nmol/mL
Sugar Intake			
Fructose *Fructokinase*	5.4 H		< 4.7 nmol/mg Creatinine

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ORGANIC METABOLOMICS

4 - Stress & Mood

Neurotransmitter	Result	20% 40% 60% 80%	Reference
(P) **γ-Aminobutyric Acid** *gamma-Aminobutyric acid aminotransferase + B6*	<DL		< 1.5 nmol/mL

Catecholamine Turnover	Result	20% 40% 60% 80%	Reference
Homovanillic Acid *COMT + magnesium & monoamine oxidase + B2*	2.8		< 10.3 nmol/mg Creatinine
Vannilylmandelic Acid *Monoamine oxidase + B2*	32.5 H		4.8 - 21.4 nmol/mg Creatinine

Serotonin Turnover	Result	20% 40% 60% 80%	Reference
5-Hydroxyindoleacetic Acid *Aldehyde dehydrogenase + B3*	4.6 L		6.3 - 28.7 nmol/mg Creatinine

Steroid Hormone	Result	20% 40% 60% 80%	Reference
Cortisol *11-beta-Hydroxysteroid dehydrogenase + B3*	90.7 H		< 82.0 mcg/g Creatinine
Cortisone *11-beta-Hydroxysteroid dehydrogenase + B3*	92.9		< 665.0 mcg/g Creatinine
Aldosterone *Steroid 5-beta reductase*	<DL		< 2.5 mcg/g Creatinine

5 - Toxic Impacts

Oxidative Damage	Result	20% 40% 60% 80%	Reference
8-Hydroxy-2'-deoxyguanosine *DNA oxidation*	14.8 H		< 8.4 nmol/mg Creatinine

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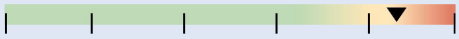
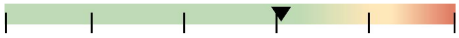
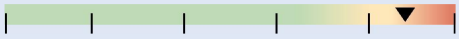
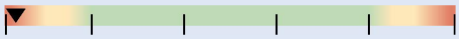
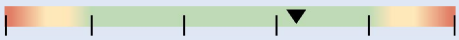
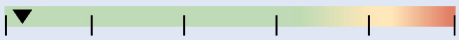
5 - Toxic Impacts

Toxins	Result	20% 40% 60% 80%	Reference
2-Methylhippuric Acid *Xylene exposure*	1.2		< 2.1 nmol/mg Creatinine
Mandelic Acid *Styrene exposure*	1.3		< 4.6 nmol/mg Creatinine
Benzoylform *Styrene exposure*	2.9		< 4.3 nmol/mg Creatinine
Glucaric Acid *Glucuronic Acid Pathway*	7.7		3.6 - 25.8 nmol/mg Creatinine

Urea Cycle	Result	20% 40% 60% 80%	Reference
(P) **Arginine** *Arginase & Nitric oxide synthase*	24.9 L		36.9 - 112.2 nmol/mL
(P) **Citrulline** *Argininosuccinate synthase*	16.2		13.8 - 59.7 nmol/mL
(P) **Ornithine** *Ornithine transcarbamylase*	82.3		39.0 - 132.1 nmol/mL
(P) **Homocitrulline** *Argininosuccinate synthase*	<DL		< 3.4 nmol/mL
(P) **Arginosuccinic Acid** *Argininosuccinate lyase*	<DL		< 14.2 nmol/mL

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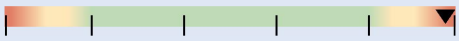
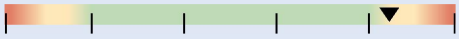
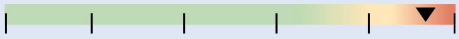
5 - Toxic Impacts

Kidney Impacts	Result	20% 40% 60% 80%	Reference
Orotic Acid *Uridine monophosphate synthase*	**7.0 H**		0.7 - 6.0 nmol/mg Creatinine
Microalbumin *Blood protein*	**<DL**		< 130.4 mcg/g Creatinine
Phosphate *Charged particle (ion)*	**145.0**		11.2 - 192.4 mg/dL
Creatinine *Creatine breakdown*	**150.0**		29.3 - 296.8 mg/dL
Oxalic Acid *Divalent metallic cations*	**533.3**		< 1532.5 nmol/mg Creatinine

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6 - Microbial Metabolites

Amino Acid Microbial Metabolites	Result	20% 40% 60% 80%	Reference
4-Hydroxyphenylacetic Acid *Disordered tyrosine metabolism*	175.5		85.8 - 902.3 nmol/mg Creatinine
Indoleacetic Acid *Disordered tryptophan metabolism*	1.3		< 13.7 nmol/mg Creatinine

Polyphenols Microbial Metabolites	Result	20% 40% 60% 80%	Reference
3,4-Dihydroxyhydrocinnamic Acid *Polyphenol metabolite*	<DL		< 1490.3 nmol/mg Creatinine
3,5-Dihydroxybenzoic Acid *Microbial metabolite*	299.8 H		< 277.1 nmol/mg Creatinine
4-Hydroxybenzoic Acid *Hydroxybenzoic acid derivative*	2.6		< 14.9 nmol/mg Creatinine
Benzoic Acid *Glycine N-benzoyltransferase*	<DL		< 488.0 nmol/mg Creatinine
Hippuric Acid *Glycine conjugate of benzoate*	184.9		< 291.9 nmol/mg Creatinine

Isoflavone Microbial Metabolite	Result	20% 40% 60% 80%	Reference
Equol *Isoflavone metabolite*	17.3 H		< 12.8 nmol/mg Creatinine

Fungal Assessment	Result	20% 40% 60% 80%	Reference
Arabinitol *Dehydrogenase*	2.8		< 9.0 nmol/mg Creatinine

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PERSONALIZED METABOLOMIC RECOMMENDATIONS

Note: Nutrient supplementation is up to the treating clinician's discretion with full understanding of the patient's medical history and current clinical condition.

MICRONUTRIENTS	*Support Required*	Recommendations	Food Sources
B-Complex	None	No Additional Support	Mixed diet
Thiamin (B1)	None	1.2 mg*	Rice, wheat germ, lentils, peas, pork, whole wheat bread, spinach
Riboflavin (B2)	None	1.3 mg*	Milk, almonds, eggs, salmon, chicken, broccoli, spinach
Niacin (B3)	None	16 mg*	Chicken, tuna, turkey, cereal, peanuts, lentils, coffee
Cobalamine (B12)	None	2.4 mcg*	Clams, mussels, mackerel, crab, beef, salmon, milk, eggs
Folate (B9)	None	400 mcg DFE*	Lentils, garbanzo beans, spinach, asparagus, lima beans, orange juice
Biotin (B7)	None	30 mcg*	Eggs, liver, salmon, avocado, raspberries, cauliflower, bread
CoQ10	Moderate	60+ mg	Beef, herring, chicken, canola oil, Rainbow trout, peanuts, pistachio nuts, brocolli
Magnesium	None	420 mg*	Beef, pork, milk, cod, chicken, avocado
Carnitine	None	10+ mg	Beef, pork, milk, cod, chicken, avocado
Copper	None	0.9 mcg	Eastern oysters, crab meat, clams, cashews, sunflowers, hazelnuts, almonds

** DV or Daily Values, are the recommended amounts of nutrients per day for a healthy, non-deficient adult.*

PROTEIN	*Findings*	Suggested Recommendation
Phenylalanine	High	Assess protein intake; evaluate inflamation, risk of diabetes, mood disorders (schizophrenia), hyperactivity
Isoleucine/allo-Isoleucine	High	Assess protein intake; consider metabolic conditions and BMI; check B6 level and alpha-ketoglutaric acid levels
Leucine	High	Assess protein intake; evaluate metabolic conditions; check B6 and alpha-ketoglutaric acid
Valine	High	Assess protein intake; consider metabolic conditions and BMI; check B6 level and alpha-ketoglutaric acid levels
Tryptophan	Low	Assess calorie and protein intake; evaluate digestion; check inflammation, kidney function and mood disorders; check pathways (kynurenine, serotonin, indoles)
Methionine	Adequate	No Additional Support
Threonine	Low	Assess calorie and protein intake; evaluate gut bacteria, glycine status (benzoate and hippurate).
Lysine	Adequate	No Additional Support
Histidine	Adequate	No Additional Support
Arginine	Low	Assess protien intake; evaluate digestions, glycine, ornitine, citruline status; consider glucose, hypertension, eGFR, renal or small intestine dysfunction
Glycine	Low	Evaluate toxin exposoure, IBD; check glutathione and B6 level; add glycine and lipoic acid
Taurine	Adequate	No Additional Support

ADDITIONAL SUPPORT	*Support Required*	Suggested Recommendation
Glutathione Need	None	No Additional Support
Inflammation	None	No Additional Support
Liver Parameters	None	No Additional Support
Kidney Parameters	None	No Additional Support