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Clinical Laboratory Improvement Amendments

**Practitioner Name**

**Order ID**
**Lab ID**
**Patient ID**
**Ext ID**
**Alt ID**

# SAMPLE REPORT

Sex: Female • 20yrs • 18-Nov-05

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23-May-26

**Clinical Notes** 3000000000

## NutriSTAT:

| | Collected |
|---|---|
| Specimen type - Blood-Serum | 15-Jun-26 11:45am |
| Specimen type - Blood-Na Citrate | 15-Jun-26 11:45am |
| Specimen type - Blood-K2EDTA | 15-Jun-26 11:45am |
| Specimen type - Blood-Red Cell | 15-Jun-26 11:45am |
| Specimen type - Blood-Whole | 15-Jun-26 11:45am |
| Specimen type - Blood-EDTA | 15-Jun-26 11:45am |
| Specimen type - Urine, Spot | 15-Jun-26 11:45am |

## ROUTINE BIOCHEMISTRY

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Renal Function Test (UEC)** | | | | |
| Sodium: | 142 | | (136-145) | mmol/L |
| Potassium: | 4.5 | | (3.5-5.2) | mmol/L |
| Chloride: | 105 | | (97-108) | mmol/L |
| Bicarbonate: | 23 | | (19-28) | mmol/L |
| Anion Gap: | 19 | H | (8-16) | mmol/L |
| Urea Nitrogen (BUN): | 20 | | (7-25) | mg/dl |
| Creatinine: | 1.2 | H | (0.6-1.0) | mg/dl |
| Estimated GFR: | 67 | | (>60) | mL/min/1.73m^2 |
| **Liver Function Test (LFT)** | | | | |
| Bilirubin, Total: | 0.2 | | (0.2-1.2) | mg/dl |
| Alkaline Phosphatase (ALP): | 43 | | (35-140) | U/L |
| GGT: | 17 | | (5-36) | U/L |
| ALT: | 28 | | (7-35) | U/L |
| AST: | 22 | | (5-30) | U/L |
| Protein, Total: | 7.5 | | (6.3-8.2) | g/dL |
| Albumin: | 5.1 | | (3.6-5.1) | g/dL |
| Albumin/Globulin Ratio: | 2.04 | | (1.20-2.20) | ratio |

## CVD INFLAMMATORY MARKERS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Glucose: | 83 | | (70-99) | mg/dl |
| Homocysteine: | 11.8 | | (5.0-15.0) | umol/L |
| High Sensitivity C-Reactive Protein: | 0.6 | | (<5.0) | mg/L |
| Fibrinogen: | 260 | | (206-478) | mg/dl |



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## SPECIFIC LIPOPROTEINS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Apolipoprotein-A1: | 176 | | (110-205) | mg/dl |
| Apolipoprotein-B: | 92 | | (60-130) | mg/dl |
| Apolipoprotein B/A Ratio: | 0.50 | | (0.35-1.15) | ratio |
| Lipoprotein (a): | 9 | | (<30) | mg/dl |

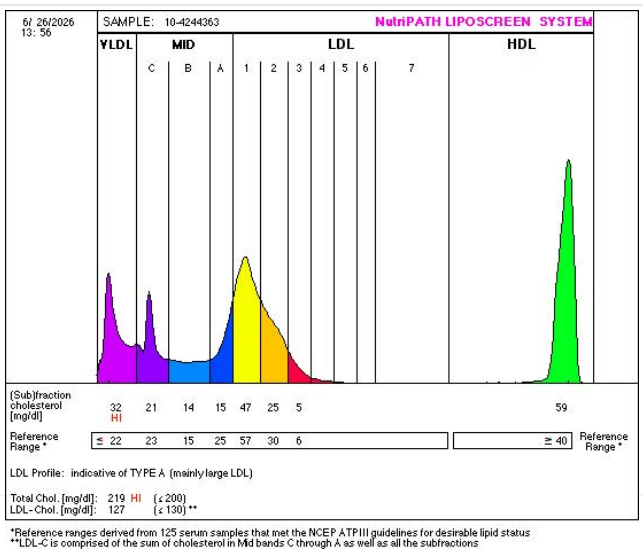
## LIPOSCREEN - LDL SUBFRACTIONS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Cholesterol: | 219 | H | (<200) | mg/dl |
| Triglycerides: | 91 | | (<150) | mg/dl |
| HDL Cholesterol: | 80 | | (>50) | mg/dl |
| Non-HDL Cholesterol: | 138 | H | (<130) | mg/dl |
| LDL Cholesterol: | 121 | H | (<100) | mg/dl |
| LDL/HDL Ratio: | 1.50 | | (<3.20) | ratio |

**LDL-Subfractions**

| | | | |
|---|---|---|---|
| Very Low Density Lipoprotein (VLDL): | 32.0 | (5.0-40.0) | mg/dl |
| Mid Density Lipoprotein (IDL-1): | 21.0 | (<23.0) | mg/dl |
| Mid Density Lipoprotein (IDL-2): | 14.0 | (<15.0) | mg/dl |
| Mid Density Lipoprotein (IDL-3): | 15.0 | (<25.0) | mg/dl |
| Low Density Lipoprotein (LDL-1): | 47.0 | (<57.0) | mg/dl |
| Low Density Lipoprotein (LDL-2): | 25.0 | (<30.0) | mg/dl |
| Low Density Lipoprotein (LDL-3): | 5.0 | (<6.0) | mg/dl |
| Low Density Lipoprotein (LDL-4): | <DL | (<0.1) | mg/dl |
| Low Density Lipoprotein (LDL-5): | <DL | (<0.1) | mg/dl |
| Low Density Lipoprotein (LDL-6): | <DL | (<0.1) | mg/dl |
| Low Density Lipoprotein (LDL-7): | <DL | (<0.1) | mg/dl |
| Mean Particle Size | 270 | (>268) | Angstrom |

**LDL Phenotype Pattern** — **Type A - Normal**



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## IRON STUDIES

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Iron: | 51 | | (28-168) | ug/dL |
| Transferrin: | 261 | | (180-350) | mg/dl |
| Transferrin Saturation: | 14 | L | (15-45) | % |
| Ferritin: | 56 | | (30-150) | ng/mL |

### IRON STUDIES INTERPRETATION TABLE

| CONDITION/SYMPTOM | IRON | TRANSFERRIN SATURATION | FERRITIN | TRIAL OF ORAL IRON |
|---|---|---|---|---|
| Iron Deficiency | Decreased | Decreased | Decreased | Hemoglobin Normalises |
| Iron Deficiency & Acute Phase Response | Decreased | Normal or Decreased | "Normal" < 100 ng/ml | Partial Response |
| Acuite Phase Response | Decreased | Decreased | Increased | No Response |
| Iron Overload | Increased | Increased | Increased | Not Appropriate |

## KEY VITAMIN MARKERS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Active B12: | 203 | | (51-254) | pg/ml |
| Folate: | 4.2 | | (3.0-16.0) | ng/mL |
| 25-OH Vitamin D: | 39 | | (30-100) | ng/mL |
| **Copper / Zinc Balance** | | | | |
| Copper: | 90 | | (80-155) | ug/dL |
| Zinc: | 79 | | (56-134) | ug/dL |
| Copper/Zinc Ratio: | 1.20 | | (0.70-1.20) | ratio |
| Ceruloplasmin: | 19.4 | | (19.0-39.0) | mg/dl |
| % Free Copper: | 31.9 | H | (<20.0) | % |



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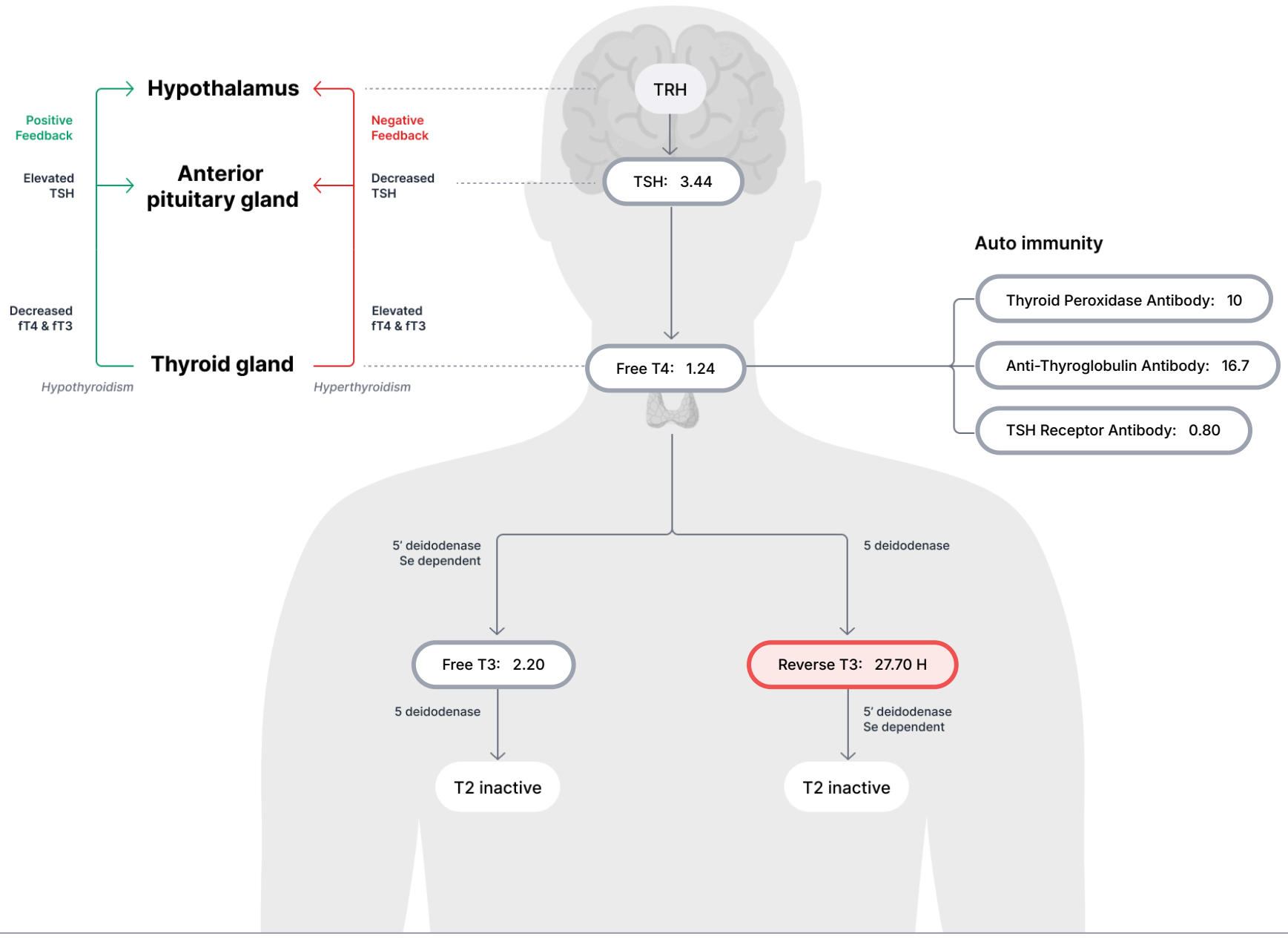
**Legend** Not Tested | Within Range | Out of Range | L = Low, LL = Critically Low | H = High, HH = Critically High | Regulator | *Enzyme*

## Thyroid System




## THYROID FUNCTION

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| TSH: | 3.44 | | (0.40-4.50) | mIU/L |
| Free T4: | 1.24 | | (0.82-1.77) | ng/dl |
| Free T3: | 2.20 | | (2.00-4.40) | pg/ml |
| Reverse T3: | 27.70 | H | (9.20-24.10) | ng/dl |
| FT3/RT3 Ratio: | 7.94 | L | (>20.00) | ratio |
| Anti-Thyroglobulin Antibody: | 16.7 | | (<60.0) | IU/mL |
| Thyroid Peroxidase Antibody: | 10 | | (<35) | IU/mL |
| TSH Receptor Antibody: | 0.80 | | (<1.80) | IU/L |



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## HORMONE HEALTH

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Progesterone:** | **0.4** | | | ng/mL |
| **Estradiol (E2):** | **42** | | | pg/ml |
| **DHEAS:** | **258** | | (99-340) | ug/dL |
| **Sex Hormone Binding Globulin (SHBG):** | **64** | | (25-122) | nmol/L |
| **Testosterone, Total:** | **43** | | (10-55) | ng/dl |
| **Free Testosterone (Vermeulen):** | **4.70** | | (0.30-9.80) | pg/ml |

### HORMONE REFERENCE RANGES

| Phase/Cycle | PROGESTERONE (ng/ml) | ESTRADIOL (pg/ml) |
|---|---|---|
| Follicular Phase | 0.10 - 0.90 | 12.4 - 233 |
| Ovulation Phase | 0.055 - 4.15 | 41.0 - 398 |
| Luteal Phase | 1.80 - 23.9 | 22.3 - 341 |
| Post-menopause | 0.00 - 0.20 | 6.0 - 54.7 |
| Pregnant - 1st Trimester | 11.0 - 44.3 | 153 - 3237 |
| Pregnant - 2nd Trimester | 25.4 - 83.3 | 1558 - 21243 |
| Pregnant - 3rd Trimester | 58.8 - 214 | 8510 - 29947 |
| Male | 0.20 - 1.40 | 11.2 - 43.2 |



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## RED CELL MINERALS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Chromium | 1.60 | | (1.00-2.00) | ug/L |
| Cobalt | 0.29 | | (0.13-1.70) | ug/L |
| Copper | 0.8 | | (0.5-0.8) | ug/L |
| Iodine | 51.30 | | (20.00-160.00) | ug/L |
| Magnesium | 56.80 | | (39.00-58.00) | mg/L |
| Manganese | 10.98 | | (9.00-33.00) | ug/L |
| Molybdenum | 0.95 | | (0.60-2.00) | ug/L |
| Selenium | 341.69 | | (190.00-500.00) | ug/L |
| Vanadium | 0.16 | | (0.10-0.50) | ug/L |
| Zinc | 13.6 | | (8.6-14.5) | ug/L |

## WHOLE BLOOD METALS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Aluminium | 3.72 | | (<30.00) | ug/L |
| Antimony | 2.05 | | (<5.00) | ug/L |
| Arsenic | <DL | | (<12.00) | ug/L |
| Beryllium | 0.05 | | (<4.00) | ug/L |
| Bismuth | 0.00 | | (<1.00) | ug/L |
| Cadmium | < 0.50 | | (<1.00) | ug/L |
| Lead | 5.70 | | (<50.00) | ug/L |
| Mercury | <DL | | (<10.1) | ug/L |
| Nickel | < 1.25 | | (<2.00) | ug/L |
| Platinum | 0.07 | | (<0.40) | ug/L |
| Silver | 0.16 | | (<2.00) | ug/L |
| Thallium | < 0.13 | | (<1.00) | ug/L |
| Tin | < 0.50 | | (<1.30) | ug/L |
| Uranium | < 0.07 | | (<0.10) | ug/L |
| Zirconium | < 0.66 | | (<1.32) | ug/L |



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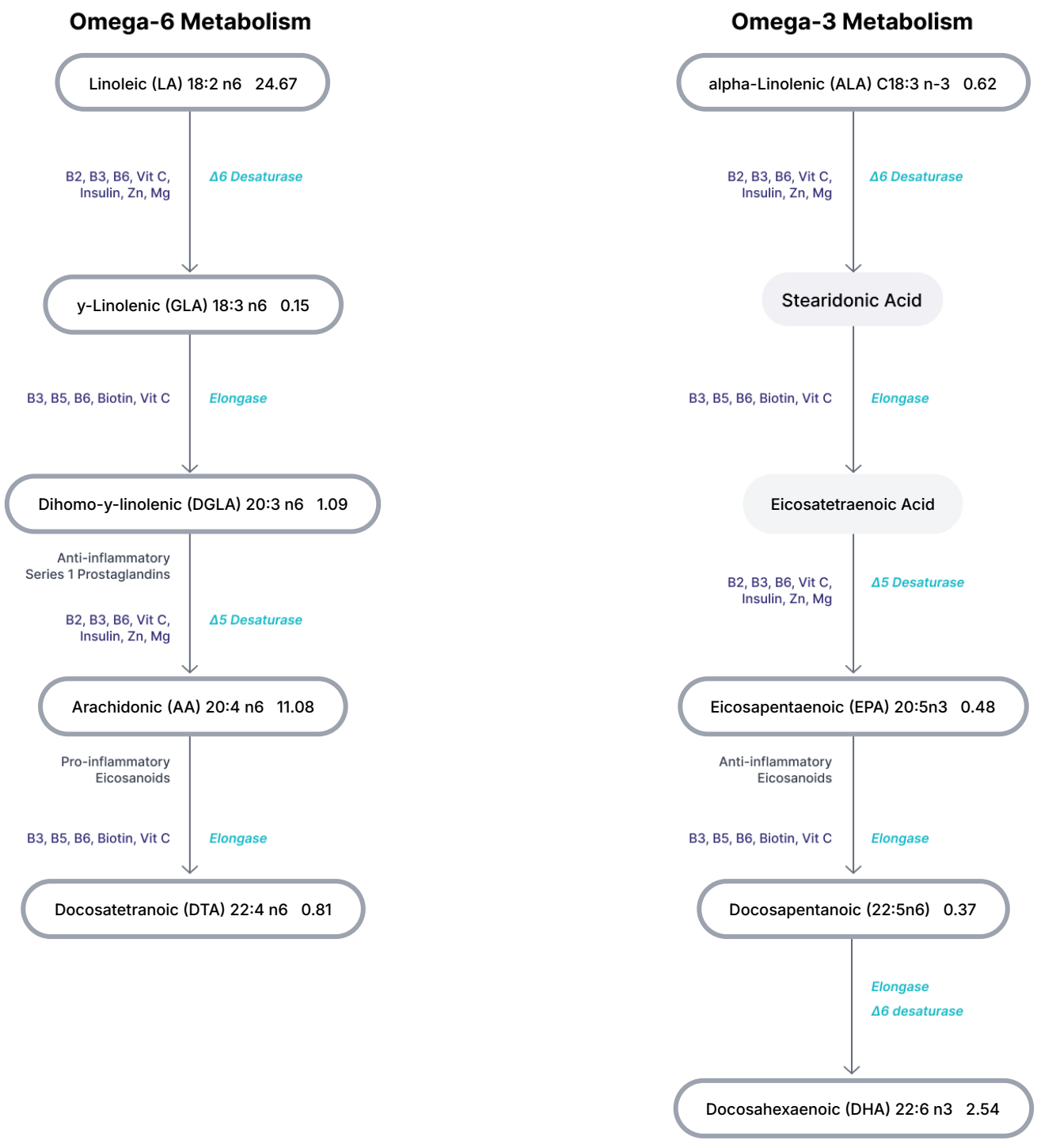
## Essential Fatty Acids Pathway




**Analysed essential fatty acids, with molecular structure**

| Analyte with molecular structure shorthand | Analyte with molecular structure shorthand |
|---|---|
| Linoleic acid (18:2 n-6) | α-Linolenic acid (18:3 n-3) |
| γ-Linolenic acid (18:3 n-6) | Eicosatetraenoic acid (20:4 n-3) |
| Dihomo-γ-linolenic acid (20:3 n-6) | Eicosapentaenoic acid (20:5 n-3) |
| Arachidonic acid (20:4 n-6) | Docosapentaenoic acid (22:5 n-3) |
| Docosatetraenoic acid (22:4 n-6) | Docosahexaenoic acid (22:6 n-3) |



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## RED CELL FATTY ACIDS SUMMARY

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Saturated Fats, Total | 34.59 | | (29.89-42.10) | % |
| Monounsaturated Fats, Total | 21.66 | | (15.65-31.82) | % |
| Omega 3 Fatty Acids, Total | 4.74 | | (2.57-15.15) | % |
| Omega 6 Fatty Acids, Total | 38.36 | | (24.85-44.15) | % |
| Omega 3/Omega 6 Ratio | 0.12 | | (0.07-5.30) | ratio |
| AA/EPA Ratio | 23.08 | | (1.10-30.00) | ratio |
| Omega 3 Index | 4.03 | | (>4.00) | % |
| Delta 6 Desaturase Activity (LA/DGLA) | 22.63 | | (6.00-25.00) | ratio |

## OMEGA 3 FATTY ACIDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| alpha-Linolenic (ALA) C18:3 n-3 | 0.62 | | (0.10-1.90) | % |
| Eicosapentaenoic (EPA) 20:5n3 | 0.48 | | (0.14-6.92) | % |
| Docosapentaenoic (DPA) 22:5 n3 | 1.10 | | (0.53-2.81) | % |
| Docosahexaenoic (DHA) 22:6 n3 | 2.54 | | (1.00-6.50) | % |
| Total Omega 3 Fatty Acids | 4.74 | | (2.57-15.15) | % |

## OMEGA 6 FATTY ACIDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Linoleic (LA) 18:2 n6 | 24.67 | | (14.00-31.30) | % |
| y-Linolenic (GLA) 18:3 n6 | 0.15 | | (0.05-0.72) | % |
| Eicosadienoic 20:2 n6 | 0.19 | | (0.10-0.43) | % |
| Dihomo-y-linolenic (DGLA) 20:3 n6 | 1.09 | | (0.50-2.50) | % |
| Arachidonic (AA) 20:4 n6 | 11.08 | | (5.00-14.80) | % |
| Docosatetranoic (DTA) 22:4 n6 | 0.81 | | (0.30-2.50) | % |
| Docosapentanoic (22:5n6) | 0.37 | | (0.08-0.83) | % |
| Total Omega 6 Fatty Acids | 38.36 | | (24.85-44.15) | % |

## MONOUNSATURATED FATTY ACIDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Palmitoleic 16:1 n7 | 0.93 | | (0.13-2.90) | % |
| Vaccenic 18:1 n7 | 0.86 | | (0.00-1.50) | % |
| Oleic 18:1 n9 | 18.18 | | (14.20-29.50) | % |
| Gondoic 20:1 n9 | 0.21 | | (0.10-0.77) | % |
| Nervonic 24:1 n9 | 1.48 | | (0.50-3.00) | % |
| Total Monounsaturated Fatty Acids | 21.66 | | (15.65-31.82) | % |



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| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Total Omega 9 Fatty Acids | 19.87 | | (16.00-27.00) | % |

## SATURATED FATTY ACIDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Myristic C14:0 | 0.56 | | (0.10-2.45) | % |
| Pentadecylic C15:0 | 0.17 | | (0.05-0.30) | % |
| Palmitic C16:0 | 19.62 | | (17.50-27.10) | % |
| Margaric C17:0 | 0.35 | | (0.14-0.45) | % |
| Stearic C18:0 | 12.43 | | (8.40-15.00) | % |
| Arachidic C20:0 | 0.17 | | (0.10-0.53) | % |
| Behenic C22:0 | 0.53 | | (0.20-1.59) | % |
| Lignoceric C24:0 | 0.76 | | (0.20-1.92) | % |
| Total Saturated Fatty Acids | 34.59 | | (29.89-42.10) | % |

## TRANS FATTY ACIDS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| Trans Palmitoleic 16:1 n-7t | 0.11 | | (0.02-0.55) | % |
| Trans Oleic 18:1t | 0.23 | | (0.00-0.51) | % |
| Trans Linoleic 18:2n6t | 0.31 | | (0.07-0.92) | % |
| Trans Fatty Acids, Total | 0.65 | | (0.30-2.02) | % |
| Trans Fat Index | 0.54 | | (0.22-1.99) | % |



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## ESSENTIAL AMINO ACIDS

| SERVICE | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 1 | Histidine | 55.4 | | (39.0-123.0) | nmol/ml |
| 2 | Isoleucine | 63.7 | | (36.0-107.0) | nmol/ml |
| 3 | Leucine | 132.0 | | (68.0-254.0) | nmol/ml |
| 4 | Lysine | 145.0 | | (71.0-434.0) | nmol/ml |
| 5 | Methionine | 22.4 | | (4.0-44.0) | nmol/ml |
| 6 | Phenylalanine | 36.4 | | (35.0-80.0) | nmol/ml |
| 7 | Threonine | 93.2 | | (59.0-231.0) | nmol/ml |
| 8 | Tryptophan | 45.9 | | (29.0-77.0) | nmol/ml |
| 9 | Valine | 252.0 | | (119.0-336.0) | nmol/ml |
| 10 | Total Branched Chain AAs | 448 | | (223-697) | nmol/ml |

## CONDITIONALLY ESSENTIAL AMINO ACIDS

| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 11 | Arginine | 21.7 | | (1.9-55.3) | nmol/ml |
| 12 | Cysteine | 1.3 | | (0.8-95.0) | nmol/ml |
| 13 | Glutamine | 370.0 | | (289.0-876.0) | nmol/ml |
| 14 | Glycine | 165.0 | | (120.0-440.0) | nmol/ml |
| 15 | Proline | 187 | | (97-368) | nmol/ml |
| 16 | Taurine | 34.5 | | (29.0-300.8) | nmol/ml |
| 17 | Tyrosine | 36.4 | | (31.0-90.0) | nmol/ml |

## NON-ESSENTIAL AMINO ACIDS

| SERVICE | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 18 | Alanine | 359 | | (200-756) | nmol/ml |
| 19 | Asparagine | 23.9 | L | (29.0-90.0) | nmol/ml |
| 20 | Aspartate | 3.1 | | (0.0-12.6) | nmol/ml |
| 21 | Glutamate | 66.9 | | (13.0-237.2) | nmol/ml |
| 22 | Serine | 74.4 | | (43.8-187.0) | nmol/ml |
| 23 | Large Neutral Amino Acids (LNAA) | 521 | | (289-867) | nmol/ml |



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## INTERMEDIARY & FUNCTIONAL METABOLITES

*(Functional markers of B-Vitamin status, Urea Cycle, & one-carbon metabolism)*

| | SERVICE | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 24 | alpha-Aminoadipic Acid | 0.5 | | (0.0-1.5) | nmol/ml |
| 25 | alpha-Aminobutyric Acid | 16.0 | | (9.0-37.0) | nmol/ml |
| 26 | beta-Aminoisobutyric Acid | 1.3 | | (0.0-3.2) | nmol/ml |
| 27 | Cystathionine | 0.10 | | (0.02-0.60) | nmol/ml |
| 28 | Citrulline | 21.90 | | (17.00-57.00) | nmol/ml |
| 29 | GABA | 0.60 | | (0.03-2.00) | nmol/ml |
| 30 | Ornithine | 49.4 | | (30.0-130.0) | nmol/ml |
| 31 | Phosphoserine | 0.1 | | (0.0-0.8) | nmol/ml |
| 32 | Sarcosine | 8.5 | | (0.0-19.5) | nmol/ml |

## DIETARY PEPTIDE RELATED MARKERS

| | SERVICE | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 33 | 1-Methyl Histidine | 6.20 | | (0.00-28.00) | nmol/ml |
| 34 | 3-Methyl Histidine | 30.5 | | (1.7-47.1) | nmol/ml |
| 35 | beta-Alanine | 2.0 | | (0.0-5.0) | nmol/ml |
| 36 | Anserine | 31.6 | | (0.0-43.0) | nmol/ml |
| 37 | Hydroxyproline | 7.4 | | (3.0-29.0) | nmol/ml |
| 38 | Hydroxylysine | 1.0 | | (0.5-3.2) | nmol/ml |
| 39 | Carnosine | 0.10 | | (0.00-1.00) | nmol/ml |

## AMINO ACID FUNCTIONAL RATIOS

| | SERVICE | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 40 | Phenylalanine/Tyrosine | 1.0 | | (0.0-2.0) | ratio |
| 41 | Glutamate/Glutamine | 0.18 | | (0.10-0.40) | ratio |
| 42 | Hydroxyproline/Proline | 0.0 | | (0.0-0.3) | ratio |
| 43 | a-Aminobutyrate/Leucine | 0.1 | | (0.0-0.6) | ratio |
| 44 | Tryptophan/LNAAs | 0.09 | | (0.08-0.40) | ratio |



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## Amino Acids Comment

ASPARAGINE LOW:

Description: Asparagine is a non-essential amino acid involved in protein synthesis, nervous system function, and the synthesis of glycoproteins.

Clinical Significance: Low plasma asparagine is uncommonly significant in isolation but may reflect reduced transamination capacity or low overall amino acid availability. It can be seen in states of protein depletion or nitrogen wasting.

Suggested Treatment: Ensure adequate dietary protein intake from varied sources. Address any underlying protein malabsorption or catabolic conditions. Reassess in conjunction with other amino acid findings.



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## MICROBIAL OVERGROWTH

3,4-Dihydroxybenzoic Acid (3,4-DHBA)
4-Hydroxybenzoic Acid (4-HBA)
Benzoic Acid

## YEAST/FUNGAL METABOLITES

N/A

## ENVIRONMENTAL EXPOSURES

4-Hydroxybenzoic Acid (4-HBA)
Benzoic Acid

## MITOCHONDRIA/ENERGY

2-Oxoglutaric Acid

## FATTY ACID / KETONE METABOLISM

N/A

## CARBOHYDRATE / GLYCAEMIC METABOLISM

N/A

## NEUROTRANSMITTER METABOLISM

Picolinic Acid
Xanthurenic Acid

## AMINO ACIDS METABOLISM

N/A

## VITAMINS / NUTRITIONAL MARKERS

N-Acetylcysteine (NAC)
Pantothenic Acid (Vit B5)
Picolinic Acid
Xanthurenic Acid

## 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 tricarballylic acid, which may interfere with mitochondrial function and nutrient absorption.

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

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

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

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

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

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

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

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

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

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



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## MICROBIAL OVERGROWTH

| | TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 1 | Benzoic Acid | 50.00 | H | (<9.30) | mmol/molCR |
| 2 | Hippuric Acid | 0.4 | | (<603.0) | mmol/molCR |
| 3 | 4-Hydroxybenzoic Acid (4-HBA) | 1.89 | H | (<0.57) | mmol/molCR |
| 4 | 3,4-Dihydroxybenzoic Acid (3,4-DHBA) | 225.00 | H | (<45.00) | mmol/molCR |
| 5 | 3-Hydroxyphenylacetic Acid (3-HPAA) | 4.68 | | (<10.00) | mmol/molCR |
| 6 | 3,4-Dihydroxyphenylpropionic Acid (DHPPA) | 0.42 | | (<5.30) | mmol/molCR |
| 7 | Furancarbonylglycine | 0.03 | | (<2.00) | mmol/molCR |
| | **Amino Acid Metabolism** | | | | |
| 8 | Phenylacetic Acid (PAA) | 0.53 | | (<3.90) | mmol/molCR |
| 9 | Phenylpropionic Acid | 0.00 | | (<0.10) | mmol/molCR |
| 10 | 3-Phenyllactic Acid (3-PLA) | 0.56 | | (<2.00) | mmol/molCR |
| 11 | 2-Hydroxyphenylacetic Acid (2-HPAA) | 0.45 | | (0.05-0.70) | mmol/molCR |
| 12 | 4-Hydroxyphenyllactic Acid (4-HPLA) | 3.02 | | (<3.90) | mmol/molCR |
| | **SCFA Metabolism** | | | | |
| 13 | 3-Hydroxypropionic Acid (3-HPA) | 1.07 | | (<17.00) | mmol/molCR |
| | **Clostridial Markers** | | | | |
| 14 | 4-Cresol | 1.10 | | (<3.00) | ug/mgCR |
| 15 | 4-Hydroxyphenylacetic Acid (4-HPAA) | 6.44 | | (<14.60) | mmol/molCR |
| 16 | Indoleacetic Acid (IAA) | 4.36 | | (<11.00) | mmol/molCR |
| 17 | 3-(3-Hydroxyphenyl)-3-hydroxypropionic Acid (HPHPA) | 11.40 | | (<120.00) | mmol/molCR |

## YEASTS & FUNGAL METABOLITES

| | TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 18 | Arabinitol | 24.6 | | (<36.0) | mmol/molCR |
| 19 | Arabinose | 2.56 | | (<32.00) | mmol/molCR |
| 20 | Citramalic Acid | 1.71 | | (<3.60) | mmol/molCR |
| 21 | 3-Oxoglutaric Acid | 0.12 | | (<0.50) | mmol/molCR |
| | **Aspergillus Markers** | | | | |
| 22 | 5-Hydroxymethyl-2-furoic Acid | 1.24 | | (<10.00) | mmol/molCR |
| 23 | Furan-2,5-dicarboxylic Acid | 1.47 | | (<15.00) | mmol/molCR |
| 24 | Tartaric Acid | 0.22 | | (<15.00) | mmol/molCR |
| | **Fusarium** | | | | |



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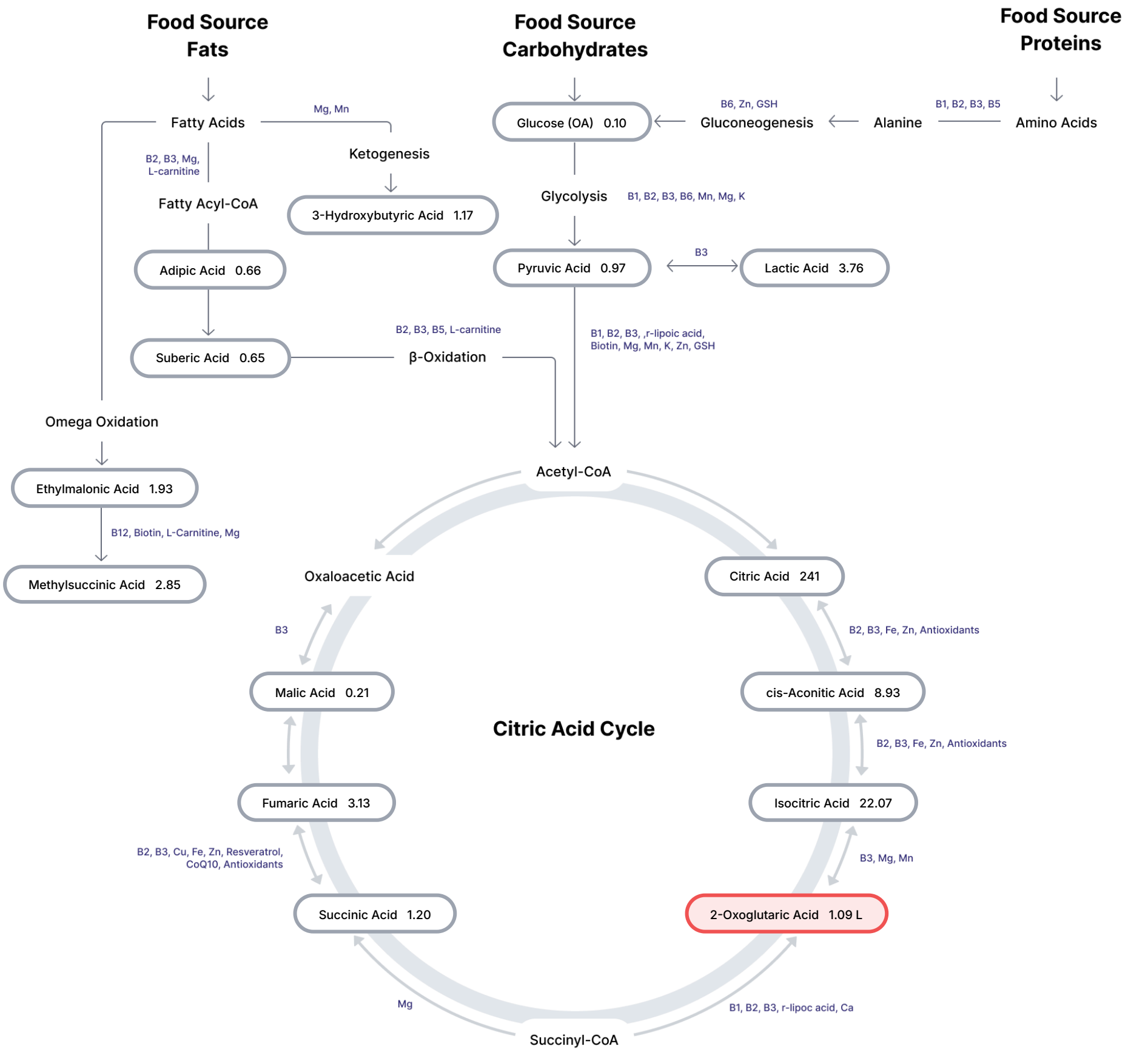
| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 25 | Tricarballylic Acid | 0.31 | | (<0.44) | mmol/molCR |

**Legend** Not Tested | Within Range | Out of Range

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

## Organic Acids Pathway



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## MITOCHONDRIAL & ENERGY METABOLISM

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

| | TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| | **Carbohydrate & Glycaemic Metabolism** | | | | |
| 26 | Glucose (OA) | 0.10 | | (<1.10) | ug/mgCR |
| 27 | Pyruvic Acid | 0.97 | | (0.50-8.70) | mmol/molCR |
| 28 | Lactic Acid | 3.76 | | (<48.00) | mmol/molCR |
| 29 | 2-Hydroxybutyric Acid | 2.53 | | (<6.90) | mmol/molCR |
| | **Citric Acid Cycle** | | | | |
| 30 | Citric Acid | 241 | | (40-507) | mmol/molCR |
| 31 | cis-Aconitic Acid | 8.93 | | (3.50-36.00) | mmol/molCR |
| 32 | Isocitric Acid | 22.07 | | (5.00-65.00) | mmol/molCR |
| 33 | 2-Oxoglutaric Acid | 1.09 | L | (2.00-45.00) | mmol/molCR |
| 34 | Succinic Acid | 1.20 | | (1.00-15.00) | mmol/molCR |
| 35 | Fumaric Acid | 3.13 | | (<8.60) | mmol/molCR |
| 36 | Malic Acid | 0.21 | | (<1.80) | mmol/molCR |
| | **Ketone/Energy Intermediates** | | | | |
| 37 | Acetoacetic Acid | 5.17 | | (<10.00) | mmol/molCR |
| 38 | 3-Hydroxybutyric Acid | 1.17 | | (<3.10) | mmol/molCR |
| 39 | 2-Hydroxybutyric Acid | 2.53 | | (<6.90) | mmol/molCR |
| | **Mitochondrial Markers** | | | | |
| 40 | Methylsuccinic Acid | 2.85 | | (<10.80) | mmol/molCR |
| 41 | 2-Methylglutaric Acid | 0.16 | | (<0.76) | mmol/molCR |
| 42 | 3-Methylglutaric Acid | 1.26 | | (<8.50) | mmol/molCR |
| 43 | 2-Hydroxyglutaric Acid | 4.33 | | (<15.00) | mmol/molCR |
| 44 | 3-Hydroxyglutaric Acid | 0.96 | | (<5.50) | mmol/molCR |
| 45 | Malonic Acid | 0.59 | | (<9.70) | mmol/molCR |
| 46 | Mevalonolactone | 0.09 | | (<2.00) | mmol/molCR |
| 47 | 2,4-Dihydroxybutanoic Acid | 6.79 | | (<10.00) | mmol/molCR |
| 48 | N-Acetylaspartic Acid | 6.39 | | (<15.00) | mmol/molCR |
| 49 | 3-Methylglutaconic Acid | 2.86 | | (<5.50) | mmol/molCR |



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## FATTY ACID OXIDATION & KETONE METABOLISM

| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 50 | Adipic Acid | 0.66 | | (<3.80) | mmol/molCR |
| 51 | Pimelic Acid | 2.07 | | (<4.00) | mmol/molCR |
| 52 | Suberic Acid | 0.65 | | (<2.20) | mmol/molCR |
| 53 | Azelaic Acid | 1.49 | | (<10.00) | mmol/molCR |
| 54 | Sebacic Acid | 0.13 | | (<0.24) | mmol/molCR |
| 55 | Ethylmalonic Acid | 1.93 | | (<5.80) | mmol/molCR |
| 56 | Propionylglycine | 0.13 | | (<2.00) | mmol/molCR |
| 57 | N-Butyrylglycine | 0.42 | | (<3.00) | mmol/molCR |
| 58 | Isovalerylglycine | 0.33 | | (<4.50) | mmol/molCR |
| 59 | N-(2-Methylbutyryl)glycine | 0.45 | | (<2.00) | mmol/molCR |
| 60 | 3-Methylcrotonylglycine | 0.00 | | (<10.00) | mmol/molCR |
| 61 | Tiglylglycine | 0.06 | | (<10.00) | mmol/molCR |
| 62 | Hexanoylglycine | 1.14 | | (<10.00) | mmol/molCR |
| 63 | Suberylglycine | 0.13 | | (<3.00) | mmol/molCR |

## VITAMIN & NUTRITIONAL COFACTOR MARKERS

| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| **B-Vitamin Functional Markers** | | | | | |
| 64 | Methylmalonic Acid (MMA) | 0.74 | | (<1.90) | mmol/molCR |
| 65 | Formiminoglutamic Acid (FIGLU) | 0.26 | | (<1.50) | mmol/molCR |
| 66 | Xanthurenic Acid | 1.54 | H | (<0.96) | mmol/molCR |
| 67 | Kynurenic Acid | 1.75 | | (<2.20) | mmol/molCR |
| 68 | Quinolinic Acid | 1.26 | | (<9.10) | mmol/molCR |
| 69 | Picolinic Acid | 50.00 | H | (<10.28) | mmol/molCR |
| 70 | 3-Hydroxyisovaleric Acid | 17.63 | | (<29.00) | mmol/molCR |
| **Vitamin-specific/Antioxidant Markers** | | | | | |
| 71 | Pyroglutamic Acid | 23.44 | | (4.50-33.00) | mmol/molCR |
| 72 | N-Acetylcysteine (NAC) | 0.42 | H | (0.02-0.28) | mmol/molCR |
| 73 | Glutaric Acid (Vit B2) | 0.06 | | (0.02-0.36) | mmol/molCR |
| 74 | Pantothenic Acid (Vit B5) | 0.03 | L | (0.10-10.00) | mmol/molCR |
| 75 | Pyridoxic Acid (Vit B6) | 4.71 | | (0.68-34.00) | mmol/molCR |
| 76 | Ascorbic Acid (Vit C) | 2.93 | | (0.50-200.00) | mmol/molCR |
| 77 | Methylcitric Acid (Biotin/Vitamin H) | 3.79 | | (0.10-15.00) | mmol/molCR |
| 78 | 3-Hydroxy-3-methylglutaric Acid (CoQ10) | 1.92 | | (0.10-5.00) | mmol/molCR |



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## PYRIMIDINE METABOLITES - Folate Metabolism

| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| 79 | Thymine | 0.34 | | (<0.60) | mmol/molCR |
| 80 | Uracil | 2.26 | | (<9.00) | mmol/molCR |

## AMINO ACID & BRANCHED-CHAIN METABOLISM

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

| TEST | | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|---|
| **Branched-Chain Ketoacids** | | | | | |
| 81 | 2-Oxoisovaleric Acid | 0.04 | | (<4.10) | mmol/molCR |
| 82 | 2-Oxoisocaproic Acid | 0.09 | | (<0.65) | mmol/molCR |
| 83 | 3-Methyl-2-oxovaleric Acid | 0.09 | | (<2.00) | mmol/molCR |
| 84 | 3-Methylglutaric Acid | 1.26 | | (<8.50) | mmol/molCR |
| 85 | Succinylacetone | 0.13 | | (<0.50) | mmol/molCR |
| **Downstream Metabolites** | | | | | |
| 86 | 2-Hydroxyisovaleric Acid | 0.38 | | (<4.10) | mmol/molCR |
| 87 | 2-Hydroxyisocaproic Acid | 0.06 | | (<1.50) | mmol/molCR |
| 88 | 2-Oxobutyric Acid | 0.04 | | (<7.00) | mmol/molCR |
| 89 | 2-Oxo-4-methiolbutyric Acid (KMBA) | 0.01 | | (<1.50) | mmol/molCR |
| **Amino Acid Metabolism** | | | | | |
| 90 | Phenylpyruvic Acid | 0.71 | | (<2.00) | mmol/molCR |
| 91 | Homogentisic Acid | 0.05 | | (<1.00) | mmol/molCR |
| 92 | N-Acetylphenylalanine | 0.89 | | (<5.00) | mmol/molCR |
| 93 | Mandelic Acid | 222.7 | | (<340.0) | ug/gCR |
| 94 | Malonic Acid | 0.59 | | (<9.70) | mmol/molCR |
| 95 | 4-Hydroxyphenyllactic Acid (4-HPLA) | 3.02 | | (<3.90) | mmol/molCR |
| 96 | 2-Oxoadipic Acid | 0.65 | | (<2.00) | mmol/molCR |
| 97 | Guanidinoacetic Acid | 2.23 | | (0.50-3.00) | mmol/molCR |
| 98 | Guanidinobutyric Acid | 0.42 | | (0.10-1.00) | mmol/molCR |
| 99 | 3-Methylglutaric Acid | 1.26 | | (<8.50) | mmol/molCR |
| 100 | N-Acetylglycine | 0.39 | | (<5.00) | mmol/molCR |



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## NEUROTRANSMITTER METABOLITES

*(Phenylalanine, Tyrosine)*

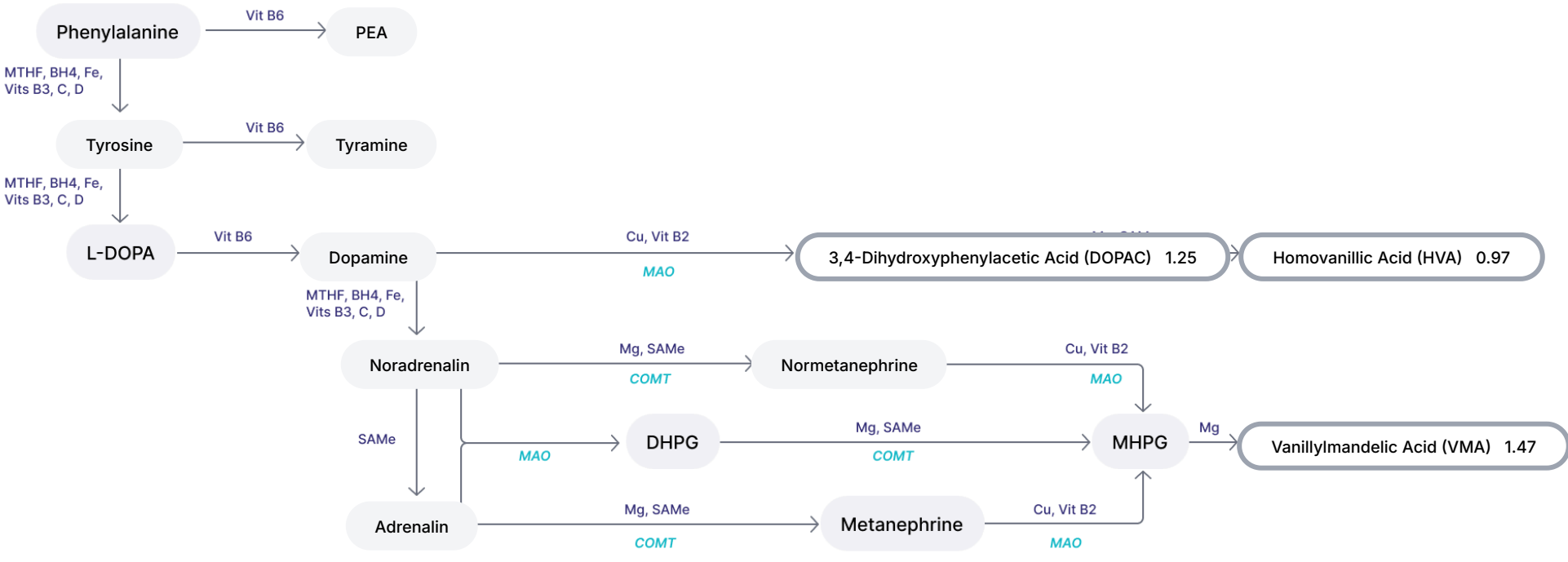
| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Inhibitory (Serotonin)** | | | | |
| 101 5-Hydroxyindoleacetic Acid (5-HIAA) | 3.82 | | (<4.30) | mmol/molCR |
| **Excitatory (Dopamine)** | | | | |
| 102 3,4-Dihydroxyphenylacetic Acid (DOPAC) | 1.25 | | (0.08-3.50) | mmol/molCR |
| 103 3-Methyl-4-hydroxyphenylglycol (MHPG) | 0.17 | | (0.05-0.50) | mmol/molCR |
| 104 Homovanillic Acid (HVA) | 0.97 | | (0.10-5.30) | mmol/molCR |
| 105 Vanillylmandelic Acid (VMA) | 1.47 | | (0.40-3.60) | mmol/molCR |
| 106 HVA/DOPAC Ratio | 0.8 | | (<10.0) | ratio |
| 107 HVA/VMA Ratio | 0.7 | | (<2.0) | ratio |

## ADRENAL STRESS (Overnight)

| SERVICE | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 108 Cortisol (OA) | 21.7 | | (1.0-63.8) | ug/gCR |

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

### Excitatory Pathway



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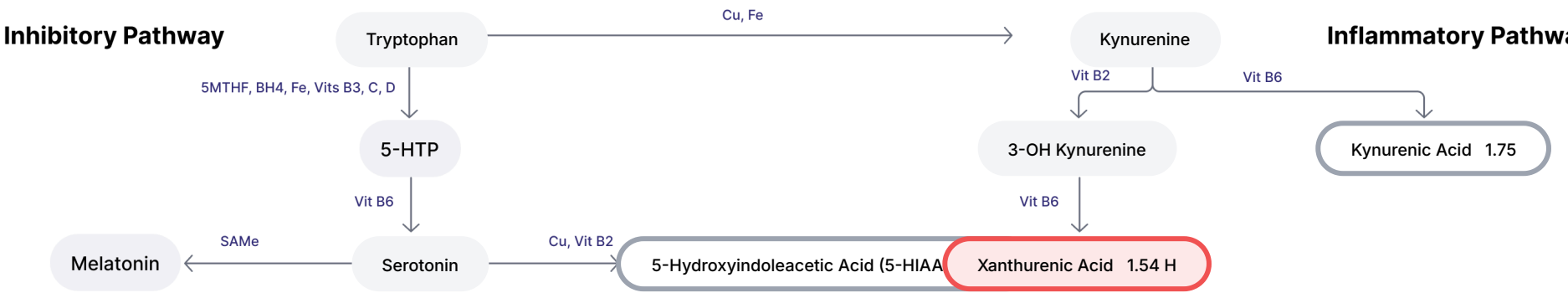
## TRYPTOPHAN/KYNURENINE PATHWAY

*(Tryptophan, B6, Antioxidants)*

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Inhibitory** | | | | |
| 109 5-Hydroxyindoleacetic Acid (5-HIAA) | 3.82 | | (<4.30) | mmol/molCR |
| **Inflammatory** | | | | |
| 110 Kynurenic Acid | 1.75 | | (<2.20) | mmol/molCR |
| 111 Quinolinic Acid | 1.26 | | (<9.10) | mmol/molCR |
| 112 Picolinic Acid | 50.00 | H | (<10.28) | mmol/molCR |
| 113 Xanthurenic Acid | 1.54 | H | (<0.96) | mmol/molCR |
| 114 Kynurenic/Quinolinic Ratio | 1.4 | | (<2.0) | ratio |
| 115 Quinolinic Acid/5-HIAA Ratio | 0.3 | | (<5.0) | ratio |

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



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## DETOXIFICATION & GLUTATHIONE FUNCTION

*(Arg, NAC, Meth, Mg, Antioxidants)*

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Ammonia Metabolism** | | | | |
| 116 Orotic Acid | 1.14 | | (<3.20) | mmol/molCR |
| **Glutathione Metabolism** | | | | |
| 117 Pyroglutamic Acid | 23.44 | | (4.50-33.00) | mmol/molCR |
| 118 N-Acetylcysteine (NAC) | 0.42 | H | (0.02-0.28) | mmol/molCR |
| 119 Glucaric Acid | 0.11 | | (<11.00) | mmol/molCR |
| **Phase I / Xenobiotic Markers** | | | | |
| 120 2-Hydroxyhippuric Acid | 0.01 | | (<1.50) | mmol/molCR |
| 121 5-Hydroxymethyl-2-furoic Acid | 1.24 | | (<10.00) | mmol/molCR |
| 122 Furan-2,5-dicarboxylic Acid | 1.47 | | (<15.00) | mmol/molCR |

## OXIDATIVE STRESS & INFLAMMATION

*(Vitamin C, Other Antioxidants)*

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 123 8-hydroxy-deoxyguanosine | 2.35 | | (<2.70) | umol/molCR |
| 124 Leukotriene E4 | 0.45 | | (<100.00) | pg/mgCR |
| 125 Quinolinic Acid | 1.26 | | (<9.10) | mmol/molCR |
| 126 Pyroglutamic Acid | 23.44 | | (4.50-33.00) | mmol/molCR |
| 127 Ascorbic Acid (Vit C) | 2.93 | | (0.50-200.00) | mmol/molCR |
| 128 Quercetin | 0.20 | | (0.01-2.00) | mmol/molCR |

## OXALATE METABOLISM

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 129 Glycolic Acid | 14.79 | | (<67.00) | mmol/molCR |
| 130 Glyceric Acid | 0.20 | | (<6.00) | mmol/molCR |
| 131 Oxalic Acid | 5.78 | | (<78.00) | mmol/molCR |



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## ENVIRONMENTAL / XENOBIOTIC EXPOSURE

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| **Toluene Exposure** | | | | |
| 132 Hippuric Acid | 0.4 | | (<603.0) | mmol/molCR |
| 133 Benzoic Acid | 50.00 | H | (<9.30) | mmol/molCR |
| **Paraben Exposure** | | | | |
| 134 4-Hydroxybenzoic Acid (4-HBA) | 1.89 | H | (<0.57) | mmol/molCR |
| **Styrene Exposure** | | | | |
| 135 Mandelic Acid | 222.7 | | (<340.0) | ug/gCR |
| 136 Phenylglyoxylic Acid | 147.5 | | (<300.0) | ug/gCR |
| 137 Mandelic Acid + Phenylglyoxylic Acid | 370.2 | | (<610.0) | ug/gCR |
| **Benzene Exposure** | | | | |
| 138 t,t-Muconic Acid | 0.03 | | (<0.12) | mmol/molCR |
| **Phthalate Exposure** | | | | |
| 139 Phthalic Acid | 44.48 | | (<170.00) | ug/gCR |
| 140 Monoethyl Phthalate | 38.14 | | (<100.00) | ug/gCR |
| 141 Quinolinic Acid | 1.26 | | (<9.10) | mmol/molCR |
| **METB Exposure** | | | | |
| 142 2-Hydroxylsobutyric Acid | 1.50 | | (<6.90) | mmol/molCR |
| **Xylene Exposure** | | | | |
| 143 2-Methylhippuric Acid | 0.01 | | (<0.04) | mmol/molCR |
| 144 3-Methylhippuric Acid | < 0.01 | | (<0.11) | mmol/molCR |
| 145 4-Methylhippuric Acid | < 0.05 | | (<1.80) | mmol/molCR |
| **Trimethylbenzene Exposure** | | | | |
| 146 3,4-Dimethylhippuric Acid | < 0.01 | | (<0.01) | mmol/molCR |
| 147 4-Hydroxyhippuric Acid | < 0.50 | | (<16.50) | mmol/molCR |
| **Nucleotide Turnover/Methylation** | | | | |
| 148 5-Methylcytosine | 27.11 | | (10.00-50.00) | mmol/molCR |
| 149 Uracil | 2.26 | | (<9.00) | mmol/molCR |
| 150 Thymine | 0.34 | | (<0.60) | mmol/molCR |

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---|---|---|---|---|
| 151 Creatinine, Urine | 2.90 | | (2.47-19.20) | mmol/L |



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## NUTRITION GUIDE

| SERVICE | Nutritional Need | DOSE | UNITS |
|---|---|---|---|
| **Vitamins** | | | |
| Vitamin-B1 | Adequate | 0.0 | mg |
| Vitamin-B2 | Adequate | 0.0 | mg |
| Vitamin-B3 | Adequate | 0.0 | mg |
| Vitamin-B5 | Moderate | 100.0 | mg |
| Vitamin-B6 | HIGH | 25.0 | mg |
| Biotin | Mild | 100.0 | ug |
| Vitamin B12 | Mild | 500.0 | ug |
| Vitamin-C | Moderate | 750.0 | mg |
| Vitamin-E | HIGH | 500.0 | U |
| **Minerals** | | | |
| Chromium | Adequate | 0.0 | ug |
| Iron | Adequate | 15.0 | mg |
| Magnesium | Adequate | 100.0 | mg |
| Manganese | Adequate | 0.0 | mg |
| Vanadium | Mild | 25.0 | ug |
| **Antioxidants/Cofactors** | | | |
| alpha-Lipoic Acid | Moderate | 200.0 | mg |
| Calcium-D-glucarate | Adequate | 0.0 | mg |
| Coenzyme Q10 | Mild | 150.0 | mg |
| Glutathione | Moderate | 300.0 | mg |
| N-Acetylcysteine | Moderate | 300.0 | mg |

## NUTRITION GUIDE

| SERVICE | Nutritional Need | DOSE | UNITS |
|---|---|---|---|
| **Amino Acids** | | | |
| 5-HTP | Moderate | 50.0 | mg |
| Acetyl-L-Carnitine | Adequate | 0.0 | mg |
| L-Arginine | Adequate | 1000.0 | mg |
| Aspartic Acid | Adequate | 500.0 | mg |
| Glutamine | Moderate | 1000.0 | mg |
| Glycine | Adequate | 0.0 | mg |
| Lysine | Mild | 500.0 | mg |
| Methionine | Mild | 200.0 | mg |
| Ornithine | Moderate | 1000.0 | mg |
| Phenylalanine | Mild | 250.0 | mg |
| Serine | Adequate | 0.0 | mg |
| Taurine | Mild | 500.0 | mg |
| Tryptophan | Moderate | 600.0 | mg |
| Tyrosine | Moderate | 1000.0 | mg |
| **Probiotics** | | | |
| D-Lactate-free probiotics | Adequate | 0.0 | billion CFU |
| Lactobacillus | Adequate | 0.0 | billion CFU |
| Probiotics (Multistrain) | Mild | 20.0 | billion CFU |
| **Other** | | | |
| Malic Acid | Adequate | 0.0 | mg |
| EPA/DHA | Mild | 1500.0 | mg |
| Folinic Acid | HIGH | 400.0 | 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

## Bacterial Dysbiosis Comment

BENZOIC ACID ELEVATED (URINE):

Elevated urinary benzoic acid suggests increased exposure to benzoate-containing foods, preservatives, or altered gut microbial metabolism. Benzoic acid is detoxified primarily through glycine conjugation to form hippuric acid.

Clinically, elevated benzoic acid may be associated with headaches, fatigue, gastrointestinal discomfort, or chemical sensitivity, although symptoms are often non-specific.

From an organic acid pattern perspective, elevated benzoic acid may be observed alongside elevated hippuric acid, indicating increased benzoate load or increased demand on glycine-dependent conjugation pathways.

From a functional medicine perspective, elevated benzoic acid should be interpreted in the context of dietary intake, glycine availability, gut microbial activity, and overall detoxification capacity rather than as an isolated finding.

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

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.



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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.

3,4-DIHYDROXYBENZOIC ACID ELEVATED:

Description:

Elevated 3,4-dihydroxybenzoic acid reflects increased catecholamine metabolism, enhanced polyphenol biotransformation by gut microbiota, or oxidative degradation of dopamine.

Clinical Significance:

Persistent elevation may indicate excessive catecholamine turnover, increased oxidative stress, or heightened gut microbial phenolic metabolism. Associated with inflammatory states and dysbiosis patterns.

Suggested Treatment:

Evaluate catecholamine pathway function and oxidative stress markers. Support antioxidant status with N-acetylcysteine, glutathione precursors, and vitamin C. Address gut dysbiosis if implicated.



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## Mitochondrial/Energy Metabolism Comment

2-OXOGLUTARIC ACID LOW (URINE):

Low urinary alpha-ketoglutaric acid suggests reduced TCA cycle activity and reduced amino-acid flux into energy pathways.

Clinically, this may be associated with low energy and reduced metabolic drive.

From an organic acid pattern perspective, this finding may accompany globally reduced TCA intermediates.

From a functional medicine perspective, this pattern reflects reduced mitochondrial throughput rather than isolated dysfunction.

## B-Vitamins/Amino Acids Comment

XANTHURENIC ACID ELEVATED (URINE):

Elevated urinary xanthurenic acid suggests altered tryptophan metabolism, most commonly reflecting reduced vitamin B6-dependent enzymatic activity.

Clinically, elevated xanthurenic acid may be associated with fatigue, mood disturbance, and impaired stress tolerance.

From an organic acid pattern perspective, elevations often occur alongside kynurenic and quinolinic acid, indicating inflammatory diversion of tryptophan metabolism.

From a functional medicine perspective, this finding should be interpreted in the context of vitamin B6 status and inflammatory burden.

## Nutritional Markers

VITAMIN B5 (PANTOTHENIC ACID) LOW (URINE):

Low urinary pantothenic acid reflects reduced vitamin B5 availability. Vitamin B5 is required for coenzyme A (CoA) synthesis, which is essential for mitochondrial energy production, fatty acid oxidation, and adrenal steroid biosynthesis.

Clinically, low vitamin B5 may present with fatigue, reduced stress resilience, low energy, and impaired exercise tolerance.

From an organic acid pattern perspective, low B5 may contribute to elevations in fatty-acid–derived dicarboxylic acids such as adipic, suberic, or pimelic acids, reflecting impaired acetyl-CoA formation and reduced efficiency of beta-oxidation. Secondary effects may also be seen in TCA cycle intermediates (e.g. citric, succinic acids).

From a functional medicine perspective, supporting pantothenic acid intake alongside broader B-vitamin repletion and stress modulation may help restore efficient mitochondrial throughput.

Consider: Supplementation with B6.

N-ACETYLCYSTEINE (NAC) ELEVATED (URINE):

Elevated urinary N-acetylcysteine reflects increased cysteine availability, commonly due to supplementation or increased glutathione turnover. NAC is a key precursor for glutathione synthesis and detoxification capacity.

Clinically, elevated NAC is generally well tolerated, though excessive intake may occasionally be associated with gastrointestinal upset.

From an organic acid pattern perspective, elevated NAC availability may be associated with reduction in pyroglutamic acid and lower oxidative stress markers such as 8-OHdG, indicating improved glutathione recycling and antioxidant capacity.

From a functional medicine perspective, NAC status should be evaluated alongside oxidative and detoxification markers to ensure intake is appropriately supporting redox balance.

## Neurotransmitter Metabolism Comment

PICOLINIC ACID ELEVATED (URINE):

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



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

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

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

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

## Environmental/Xenobiotic Exposure Comment:

ENVIRONMENTAL POLLUTANTS PROFILE:

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

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

BENZOIC ACID ELEVATED (URINE):

Elevated urinary benzoic acid suggests increased exposure to benzoate-containing foods, preservatives, or altered gut microbial metabolism. Benzoic acid is detoxified primarily through glycine conjugation to form hippuric acid.

Clinically, elevated benzoic acid may be associated with headaches, fatigue, gastrointestinal discomfort, or chemical sensitivity, although symptoms are often non-specific.

From an organic acid pattern perspective, elevated benzoic acid may be observed alongside elevated hippuric acid, indicating increased benzoate load or increased demand on glycine-dependent conjugation pathways.

From a functional medicine perspective, elevated benzoic acid should be interpreted in the context of dietary intake, glycine availability, gut microbial activity, and overall detoxification capacity rather than as an isolated finding.

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

4-HYDROXYBENZOIC ACID ELEVATED (URINE):

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

Gel Electrophoresis, Liquid Chromatography-Mass Spectrometry (LC-MS/MS/MS), Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Gas Chromatography-MS (GC/MS), Automated Chemistry/Immunochemistry



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