

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

Lab ID
Patient ID PAT-100009
Ext ID 25304-0076

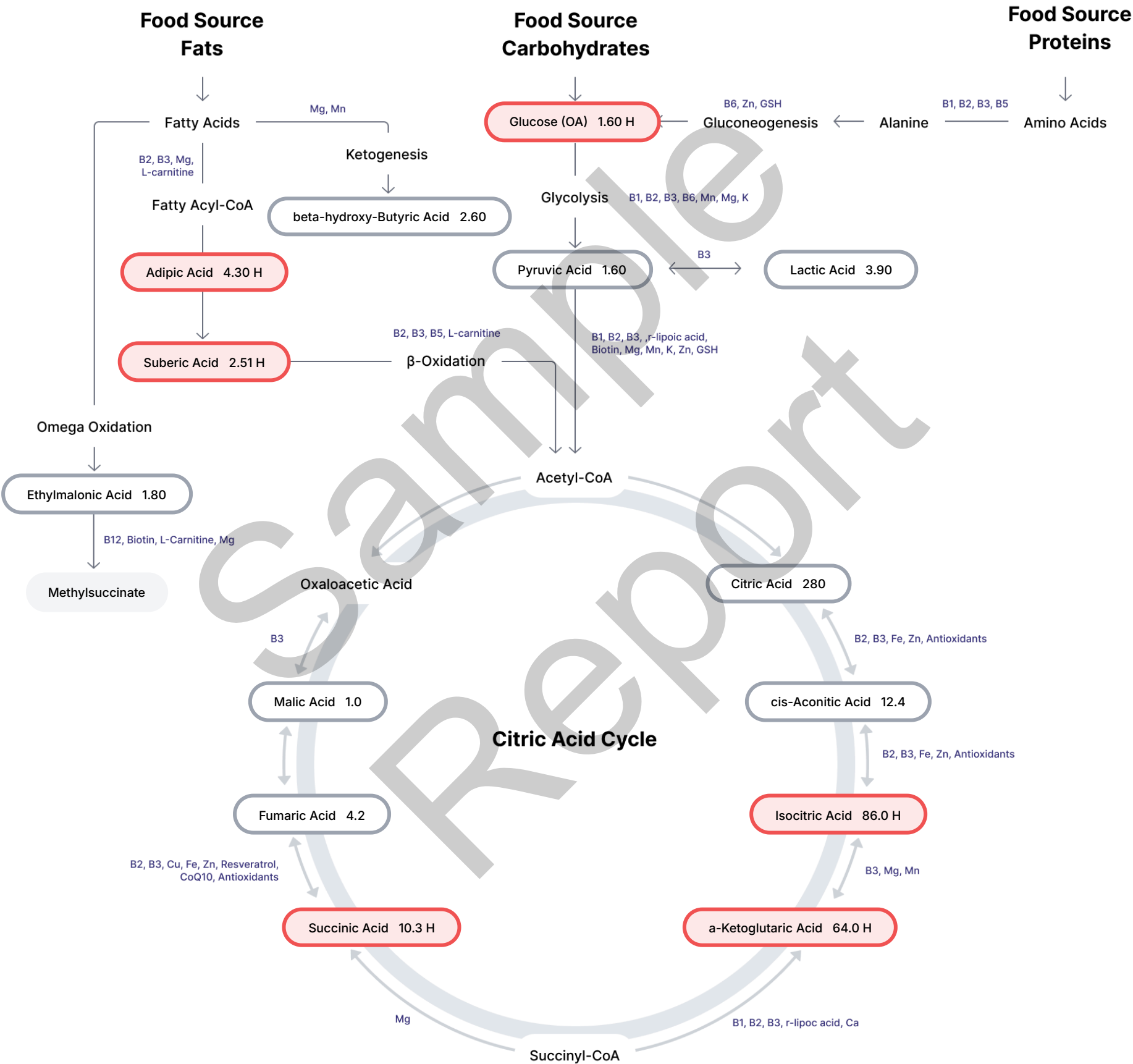
Test Patient

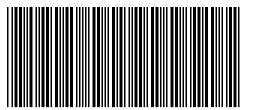
Sex: Female • 45yrs • 01-Jan-80

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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) | 1.60 | H | (0.10-1.10) | ug/mgCR |

KETONE/FATTY ACIDS METABOLISM

(Carnitine & B2)

[illegible]

B-COMPLEX VITAMINS/AMINO ACID MARKERS

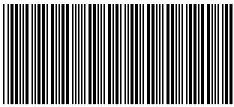
(B1, B2, B3, B5, B6, B12, Folate, Biotin)

| 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 | 1.1 | | (<2.0) | mmol/molCR |
| 14 Xanthurenic Acid | 3.30 | H | (<0.96) | mmol/molCR |
| 15 beta-Hydroxyisovaleric Acid | 6.7 | | (<29.0) | mmol/molCR |
| 16 Methylmalonic Acid | 3.7 | H | (<1.9) | mmol/molCR |
| 17 Formiminoglutamic Acid | 1.9 | 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 | | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (40-507) | mmol/molCR |
| 19 | cis-Aconitic Acid | 12.4 | | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (3.5-36.0) | mmol/molCR |
| 20 | Isocitric Acid | 86.0 | H | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (5.0-65.0) | mmol/molCR |
| 21 | a-Ketoglutaric Acid | 64.0 | H | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (4.0-52.0) | mmol/molCR |
| 22 | Succinic Acid | 10.3 | H | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (1.0-9.7) | mmol/molCR |
| 23 | Fumaric Acid | 4.2 | | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (<8.6) | mmol/molCR |
| 24 | Malic Acid | 1.0 | | <div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div> | (<1.8) | mmol/molCR |



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| TEST | RESULT | H/L | REFERENCE | UNITS |
|--------------------------|--------|-----|-----------|------------|
| 25 3-Methylglutaric Acid | 3.2 | | (<8.5) | mmol/molCR |

NEUROTRANSMITTER METABOLISM

(Tyrosine, Tryptophan, B6, Antioxidants)

| TEST | RESULT | H/L | REFERENCE | UNITS |
|---------------------------------------|--------|-----|------------|------------|
| 26 Homovanillic Acid (HVA) | 2.7 | | (0.1-5.3) | mmol/molCR |
| 27 Vanillylmandelic Acid (VMA) | 3.1 | | (0.4-3.6) | mmol/molCR |
| 28 5-Hydroxyindoleacetic Acid (5HIAA) | 2.9 | | (<4.3) | mmol/molCR |
| 29 Kynurenic Acid | 2.9 | H | (<2.2) | mmol/molCR |
| 30 Quinolinic Acid | 8.2 | | (<9.1) | mmol/molCR |
| 31 Picolinic Acid | 3.2 | | (<10.3) | mmol/molCR |
| 32 Cortisol (OA) | 48.0 | | (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 |

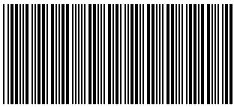
DETOXIFICATION INDICATORS

(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 | 15.70 | | (4.50-33.00) | mmol/molCR |

BACTERIAL DYSBIOSIS MARKERS

| TEST | RESULT | H/L | REFERENCE | UNITS |
|-------------------------------|--------|-----|--------------|------------|
| 39 Benzoic Acid | 7.70 | | (<9.30) | mmol/molCR |
| 40 Hippuric Acid | 231.0 | | (<603.0) | mmol/molCR |
| 41 Phenylacetic Acid | 2.10 | | (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 | 6.90 | | (<11.00) | mmol/molCR |
| 46 Tricarballic Acid | 0.34 | | (<0.44) | mmol/molCR |



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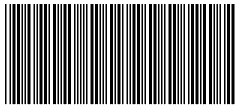
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NUTRITIONAL GUIDE

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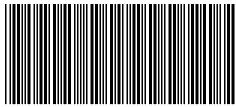
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| TEST | RESULT | UNITS | Clinical Notes |
|---------------|--------|-------|----------------|
| Phenylalanine | 0.0 | mg | |
| Vitamin-C | 400.0 | mg | |

Sample Report



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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:

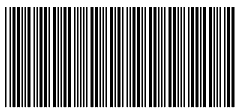
Xanthurenate is a metabolite in the kynurenine pathway of tryptophan degradation.

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

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.

DHPPA ELEVATED:

Unbalanced microbial growth patterns are indicative of dysbiosis, which may be influenced by dietary changes, fasting, or the use of probiotics, prebiotics, and antibiotics. Elevated levels may necessitate a microbiome assessment to evaluate microbial overgrowth and guide appropriate interventions

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.

Methodology

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