

This document contains the list of biomarkers evaluated in order to calculate nutritional recommendations.

Antioxidant Needs

Vitamin A



Biomarkers Evaluated

β-Alanine	Taurine
Cysteine	8-OHdG
Cystine	Lipid Peroxides
Glycine	

Vitamin C



Biomarkers Evaluated

Cysteine	Glutathione
Cystine	8-OHdG

Vitamin E / Tocopherols



Biomarkers Evaluated

β-Alanine	Taurine
Cysteine	8-OHdG
Cystine	Lipid Peroxides
Glycine	

α-Lipoic Acid



Biomarkers Evaluated

Glutathione	Taurine
Pyroglutamic Acid	8-OHdG
Methionine	Lipid Peroxides

CoQ10



Biomarkers Evaluated

β-OH-β-Methylglutaric Acid	Lactic Acid
CoQ10	Succinic Acid

Glutathione



Biomarkers Evaluated

8-OHdG	Glutathione
Citric Acid	Lipid Peroxides
Cis-Aconitic Acid	Pyroglutamic Acid

Plant-based Antioxidants



Biomarkers Evaluated

8-OHdG	Cystine
Cis-Aconitic Acid	Glutathione
Citric Acid	Taurine
Cysteine	Lipid Peroxides

B-Vitamin Needs

Thiamin - B1



Biomarkers Evaluated

- | | |
|-----------------------------|---------------|
| 5-OH-Indoleacetic Acid | Histidine |
| Lactic Acid | Isoleucine |
| Pyruvic Acid | Leucine |
| α-Keto-β-Methylvaleric Acid | Lysine |
| α-Ketoglutaric Acid | Ornithine |
| α-Ketoisocaproic Acid | Phenylalanine |
| α-Ketoisovaleric Acid | Proline |
| α-Ketoadipic Acid | Serine |
| Alanine | Taurine |
| Citrulline | Tyrosine |
| Glutamic Acid | Valine |
| Glutamine | |

Pyridoxine - B6



Biomarkers Evaluated

- | | |
|------------------------|---------------|
| Homovanillic Acid | Glycine |
| 5-OH-Indoleacetic Acid | Histidine |
| Kynurenic Acid | Isoleucine |
| Quinolinic Acid | Leucine |
| Xanthurenic Acid | Methionine |
| Alanine | Ornithine |
| α-Amino adipic Acid | Phosphoserine |
| α-Amino-N-butyric Acid | Serine |
| Arginine | Taurine |
| β-Alanine | Threonine |
| β-Aminoisobutyric Acid | Tryptophan |
| Cystathionine | Tyrosine |
| Cysteine | Urea |
| γ-Aminobutyric Acid | Valine |
| Glutamic Acid | |

Riboflavin - B2



Biomarkers Evaluated

- | | |
|-----------------------------|-----------------------|
| Succinic Acid | α-Ketoisovaleric Acid |
| Pyruvic Acid | Kynurenic Acid |
| Adipic Acid | Glutaric Acid |
| Suberic Acid | α-Amino adipic Acid |
| α-Keto-β-Methylvaleric Acid | Histidine |
| α-Ketoglutaric Acid | Sarcosine |
| α-Ketoisocaproic Acid | |

Biotin - B7



Biomarkers Evaluated

- | | |
|--------------------------|---------------|
| 3-Hydroxyisovaleric Acid | Alanine |
| 3-Hydroxypropionic Acid | Glycine |
| Pyruvic Acid | Phenylalanine |

Folate - B9



Biomarkers Evaluated

- | | |
|----------------------------|---------------|
| 3-Methyl-4-OH-phenylglycol | Glycine |
| 5-OH-Indoleacetic Acid | Histidine |
| Forminoglutamic Acid | Methionine |
| Methylmalonic Acid | Phenylalanine |
| α-Amino adipic Acid | Sarcosine |
| β-Aminoisobutyric Acid | Serine |
| Cystathionine | Valine |

Niacin - B3



Biomarkers Evaluated

- | | |
|-----------------------------|---------------|
| 5-OH-Indoleacetic Acid | Alanine |
| Pyruvic Acid | Glutamic Acid |
| Isocitric Acid | Isoleucine |
| α-Ketoglutaric Acid | Leucine |
| Malic Acid | Lysine |
| α-Keto-β-Methylvaleric Acid | Methionine |
| α-Ketoisocaproic Acid | Phenylalanine |
| α-Ketoisovaleric Acid | Threonine |
| Kynurenic Acid | Tryptophan |
| Quinolinic Acid | Tyrosine |
| Xanthurenic Acid | Valine |

Cobalamin - B12



Biomarkers Evaluated

- | | |
|------------------------|---------------|
| Succinic Acid | Glycine |
| 5-OH-Indoleacetic Acid | Cysteine |
| Lactic Acid | Histidine |
| Leucine | Isoleucine |
| Formiminoglutamic Acid | Methionine |
| Methylmalonic Acid | Phenylalanine |
| α-Amino adipic Acid | Sarcosine |
| Cystathionine | Valine |

Mineral Needs

Magnesium



Biomarkers Evaluated

5-OH-Indoleacetic Acid	Ornithine
Citric Acid	Phenylalanine
Ethanolamine	Phosphoethanolamine
Isocitric Acid	Taurine
Lactic Acid	Urea
Magnesium	

Manganese



Biomarkers Evaluated

5-OH-Indoleacetic Acid	γ-Aminobutyric Acid
Homovanillic Acid	Glutamic Acid
Vanilmandelic Acid	Manganese
Arginine	

Molybdenum



Biomarkers Evaluated

Cysteine	Methionine
Histidine	Taurine

Zinc



Biomarkers Evaluated

Lactic Acid	Leucine
Anserine	Valine
Carnosine	Phosphoethanolamine
Isoleucine	Zinc

Essential Fatty Acid Needs

Need for Omega-3s



Biomarkers Evaluated

Omega 3 Index (DHA+EPA)	Omega 6 GLA
Omega 3 DHA	Omega 6 DGLA
Omega 3 EPA	Omega 6 LA
Omega 3 ALA	Omega 3/6 Ratio
Omega 6 AA	

Microbiome & Digestive Support

Microbiome Support/Probiotics



Biomarkers Evaluated

3-Hydroxyphenylacetic Acid	γ-Aminobutyric Acid
4-Hydroxyphenylacetic Acid	Hippuric Acid
Benzoic Acid	Indoleacetic Acid
β-Alanine	Phenylacetic Acid
Citramalic Acid	Phosphoethanolamine
Dihydroxyphenylpropionic Acid	Succinic Acid
Ethanolamine	

Digestive Support/Enzymes



Biomarkers Evaluated

1-Methylhistidine	Phenylacetic Acid
Dihydroxyphenylpropionic Acid	Phenylalanine
Histidine	Succinic Acid
Indoleacetic Acid	Threonine
Isoleucine	Tryptophan
Leucine	Tyrosine
Lysine	Valine
Methionine	

Functional Imbalances

Mitochondrial Dysfunction



Biomarkers Evaluated

Adipic Acid	Lactic Acid
α-Ketoglutaric Acid	Magnesium
Cis-Aconitic Acid	Malic Acid
Citric Acid	Manganese
CoQ10	Methylmalonic Acid
Formiminoglutamic Acid	Pyruvic Acid
Glutaric Acid	Suberic Acid
Glutathione	Succinic Acid
Isocitric Acid	

Need for Methylation



Biomarkers Evaluated

Arginine	Methionine
Creatinine	Methylmalonic Acid
Formiminoglutamic Acid	Sarcosine
Glutathione	Serine
Glycine	Vanilmandelic Acid

Toxic Exposure



Biomarkers Evaluated

Mercury	Glutaric Acid
Lead	Isocitric Acid
Antimony	Orotic Acid
Cadmium	α-Ketophenylacetic Acid
Arsenic	α-Hydroxyisobutyric Acid
Cis-Aconitic Acid	Pyroglutamic Acid
Citric Acid	