

**In-Common Laboratories**

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Bennett, Emily, ND
Bennett, Emily, ND
464 King St W
Hamilton, ON L8P 1B7
Canada

Patient Name

**Tigchelaar,
Alex**

Sex

M

Date of Birth (mm/dd/yyyy)

04/01/1982

Client's File No.

Order ID

36016279

Health Number

ICL Login Date (mm/dd/yyyy)

10/05/2016 11:11AM

Authorized Requester

Bennett, Emily, ND

Report Printed

11/11/2016 10:57AM

Organic Acids

Sample ID: ICL161005026

Final - Approved 10/24/2016 6:10PM

Collection Date (mm/dd/yyyy)
10/03/2016 9:00AM

Order Choice Testing Site: The Great Plains Laboratory, 11813 W 77th St, Lenexa KS 66214
Comments:

TEST	RESULT	FLAG	NORMAL/THERAPEUTIC RANGE	UNITS	TEST SITE
Attached	Attachment				ICL1

Reporting Laboratories:

(1) ICL1, Non-Interfaced Test Site,

Patient Complete Name:
Tigchelaar, Alex

Order ID: 36016279

Current Page Number: 1

Total Pages Count: 1



The Great Plains Laboratory, Inc.

William Shaw, Ph.D., Director

11813 West 77th Street, Lenexa, KS 66214

(913) 341-8949

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Requisition #: 463629

Physician: IN COMMON LABORATORIES

Patient Name: Alex Tigchelaar 36016279

Date of Collection: 10/3/2016

Patient Age: 34

Time of Collection: 09:00 AM

Patient Sex: M

Print Date: 10/20/2016



Organic Acids Test - Nutritional and Metabolic Profile

Metabolic Markers in Urine

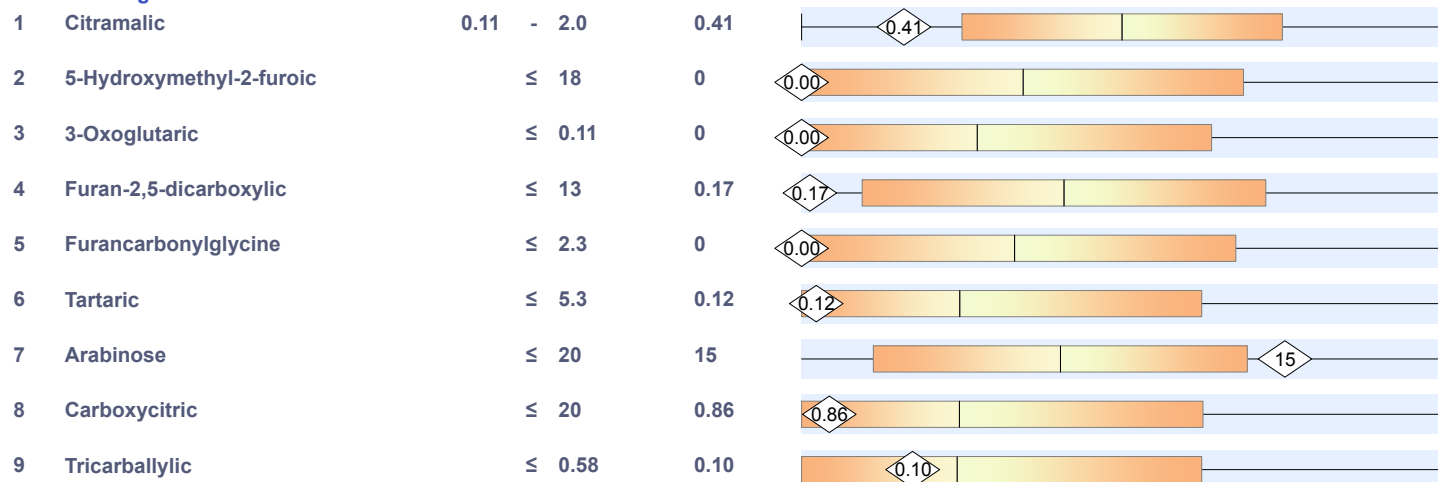
Reference Range
(mmol/mol creatinine)

Patient
Value

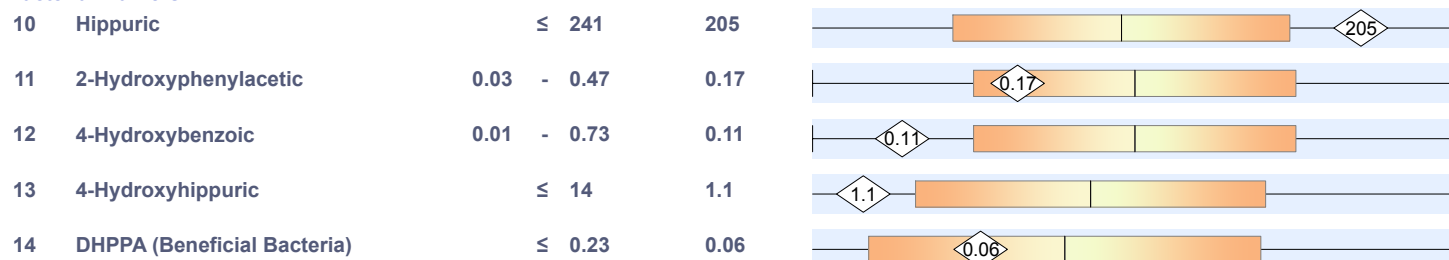
Reference Population - Males Age 13 and Over

Intestinal Microbial Overgrowth

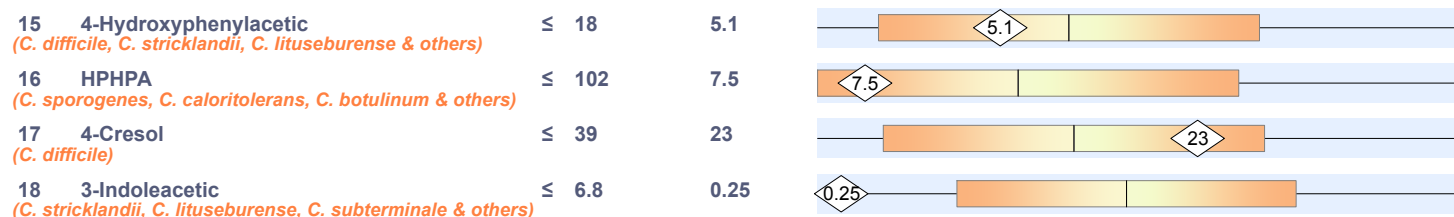
Yeast and Fungal Markers



Bacterial Markers



Clostridia Bacterial Markers



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Metabolic Markers in Urine

Reference Range
(mmol/mol creatinine)

Patient
Value

Reference Population - Males Age 13 and Over

Oxalate Metabolites

19	Glyceric	0.21 - 4.9	0.94	
20	Glycolic	18 - 81	L 9.6	
21	Oxalic	8.9 - 67	47	

Glycolytic Cycle Metabolites

22	Lactic	0.74 - 19	2.8	
23	Pyruvic	0.28 - 6.7	1.4	

Mitochondrial Markers - Krebs Cycle Metabolites

24	Succinic	≤ 5.3	3.3	
25	Fumaric	≤ 0.49	0.06	
26	Malic	≤ 1.1	0.09	
27	2-Oxoglutaric	≤ 18	5.9	
28	Aconitic	4.1 - 23	L 2.8	
29	Citric	2.2 - 260	47	

Mitochondrial Markers - Amino Acid Metabolites

30	3-Methylglutaric	0.02 - 0.38	0.27	
31	3-Hydroxyglutaric	≤ 4.6	1.5	
32	3-Methylglutaconic	0.38 - 2.0	0.86	

Neurotransmitter Metabolites

Phenylalanine and Tyrosine Metabolites

33	Homovanillic (HVA) (dopamine)	0.39 - 2.2	0.89	
34	Vanillylmandelic (VMA) (norepinephrine, epinephrine)	0.53 - 2.2	0.94	
35	HVA / VMA Ratio	0.32 - 1.4	0.95	

Tryptophan Metabolites

36	5-Hydroxyindoleacetic (5-HIAA) (serotonin)	≤ 2.9	0.10	
37	Quinolinic	0.52 - 2.4	0.55	
38	Kynurenic	0.12 - 1.8	0.42	
39	Quinolinic / 5-HIAA Ratio	≤ 2.5	H 5.5	

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Metabolic Markers in Urine

Reference Range
(mmol/mol creatinine)


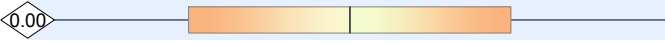
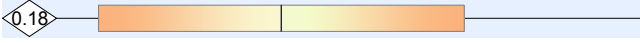
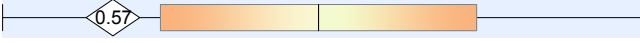
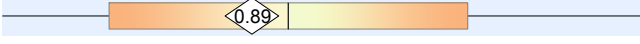
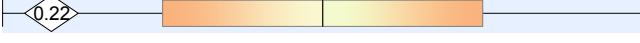
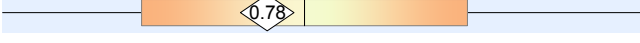
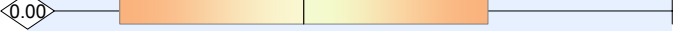
Patient
Value

Reference Population - Males Age 13 and Over

Pyrimidine Metabolites - Folate Metabolism

40	Uracil	≤ 6.9	5.0	
41	Thymine	≤ 0.36	0.11	

Ketone and Fatty Acid Oxidation

42	3-Hydroxybutyric	≤ 1.9	0.23	
43	Acetoacetic	≤ 10	0	
44	4-Hydroxybutyric	≤ 4.3	0.18	
45	Ethylmalonic	0.13 - 2.7	0.57	
46	Methylsuccinic	≤ 2.3	0.89	
47	Adipic	≤ 2.9	0.22	
48	Suberic	≤ 1.9	0.78	
49	Sebacic	≤ 0.14	0	

Nutritional Markers

Vitamin B12

50	Methylmalonic *	≤ 2.3	0.38	
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Vitamin B6

51	Pyridoxic (B6)	≤ 26	0	
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Vitamin B5

52	Pantothenic (B5)	≤ 5.4	0.78	
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Vitamin B2 (Riboflavin)

53	Glutaric *	≤ 0.43	0.09	
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Vitamin C

54	Ascorbic	10 - 200	L 0	
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Vitamin Q10 (CoQ10)

55	3-Hydroxy-3-methylglutaric *	≤ 26	5.8	
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Glutathione Precursor and Chelating Agent

56	N-Acetylcysteine (NAC)	≤ 0.13	0	
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Biotin (Vitamin H)

57	Methylcitric *	0.15 - 1.7	0.22	
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* A high value for this marker may indicate a deficiency of this vitamin.

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Metabolic Markers in Urine

Reference Range
(mmol/mol creatinine)

Patient
Value

Reference Population - Males Age 13 and Over

Indicators of Detoxification

Glutathione

58	Pyroglutamic *	5.7 - 25	9.5	
59	2-Hydroxybutyric *	≤ 1.2	0.32	

Ammonia Excess

60	Orotic	≤ 0.46	0.10	
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Aspartame, salicylates, or GI bacteria

61	2-Hydroxyhippuric	≤ 0.86	0.32	
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* A high value for this marker may indicate a Glutathione deficiency.

Amino Acid Metabolites

62	2-Hydroxyisovaleric	≤ 0.41	0	
63	2-Oxoisovaleric	≤ 1.5	0.11	
64	3-Methyl-2-oxovaleric	≤ 0.56	0.06	
65	2-Hydroxyisocaproic	≤ 0.39	0.04	
66	2-Oxoisocaproic	≤ 0.34	0.07	
67	2-Oxo-4-methiolbutyric	≤ 0.14	0.02	
68	Mandelic	≤ 0.09	0.05	
69	Phenyllactic	≤ 0.10	0.01	
70	Phenylpyruvic	0.02 - 1.4	0.30	
71	Homogentisic	≤ 0.23	0	
72	4-Hydroxyphenyllactic	≤ 0.62	0.09	
73	N-Acetylaspartic	≤ 2.5	0	
74	Malonic	≤ 9.9	2.2	

Mineral Metabolism

75	Phosphoric	1 000 - 4 900	1 321	
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Indicator of Fluid Intake

76 *Creatinine

270 mg/dL

*The creatinine test is performed to adjust metabolic marker results for differences in fluid intake. Urinary creatinine has limited diagnostic value due to variability as a result of recent fluid intake. Samples are rejected if creatinine is below 20 mg/dL unless the client requests results knowing of our rejection criteria.

Explanation of Report Format

The reference ranges for organic acids were established using samples collected from typical individuals of all ages with no known physiological or psychological disorders. The ranges were determined by calculating the mean and standard deviation (SD) and are defined as $\pm 2SD$ of the mean. Reference ranges are age and gender specific, consisting of Male Adult (≥ 13 years), Female Adult (≥ 13 years), Male Child (< 13 years), and Female Child (< 13 years).

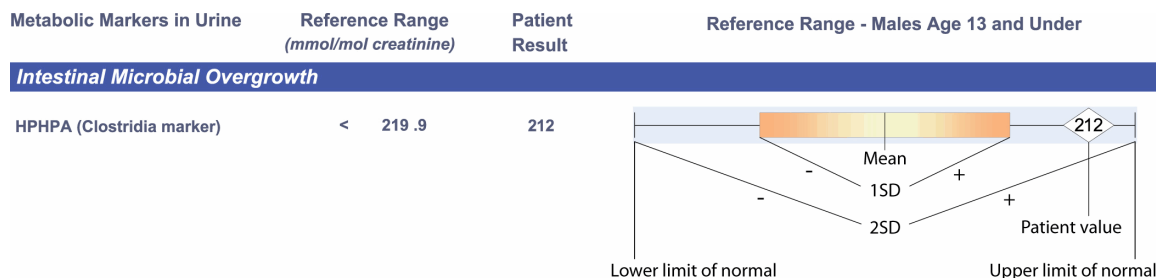
There are two types of graphical representations of patient values found in the new report format of both the standard Organic Acids Test and the Microbial Organic Acids Test.

The first graph will occur when the value of the patient is within the reference (normal) range, defined as the mean plus or minus two standard deviations.

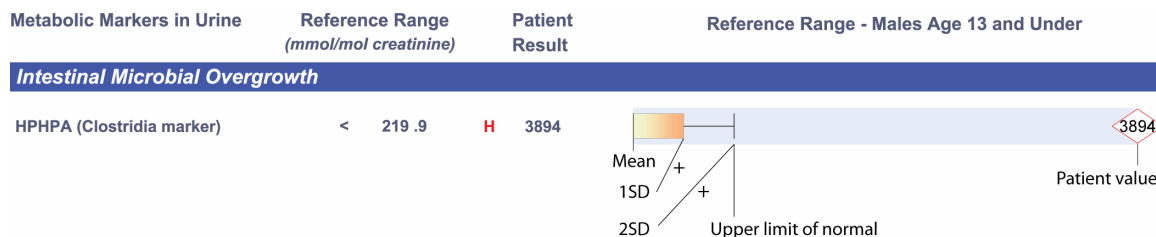
The second graph will occur when the value of the patient exceeds the upper limit of normal. In such cases, the graphical reference range is "shrunk" so that the degree of abnormality can be appreciated at a glance. In this case, the lower limits of normal are not shown, only the upper limit of normal is shown.

In both cases, the value of the patient is given to the left of the graph and is repeated on the graph inside a diamond. If the value is within the normal range, the diamond will be outlined in black. If the value is high or low, the diamond will be outlined in red.

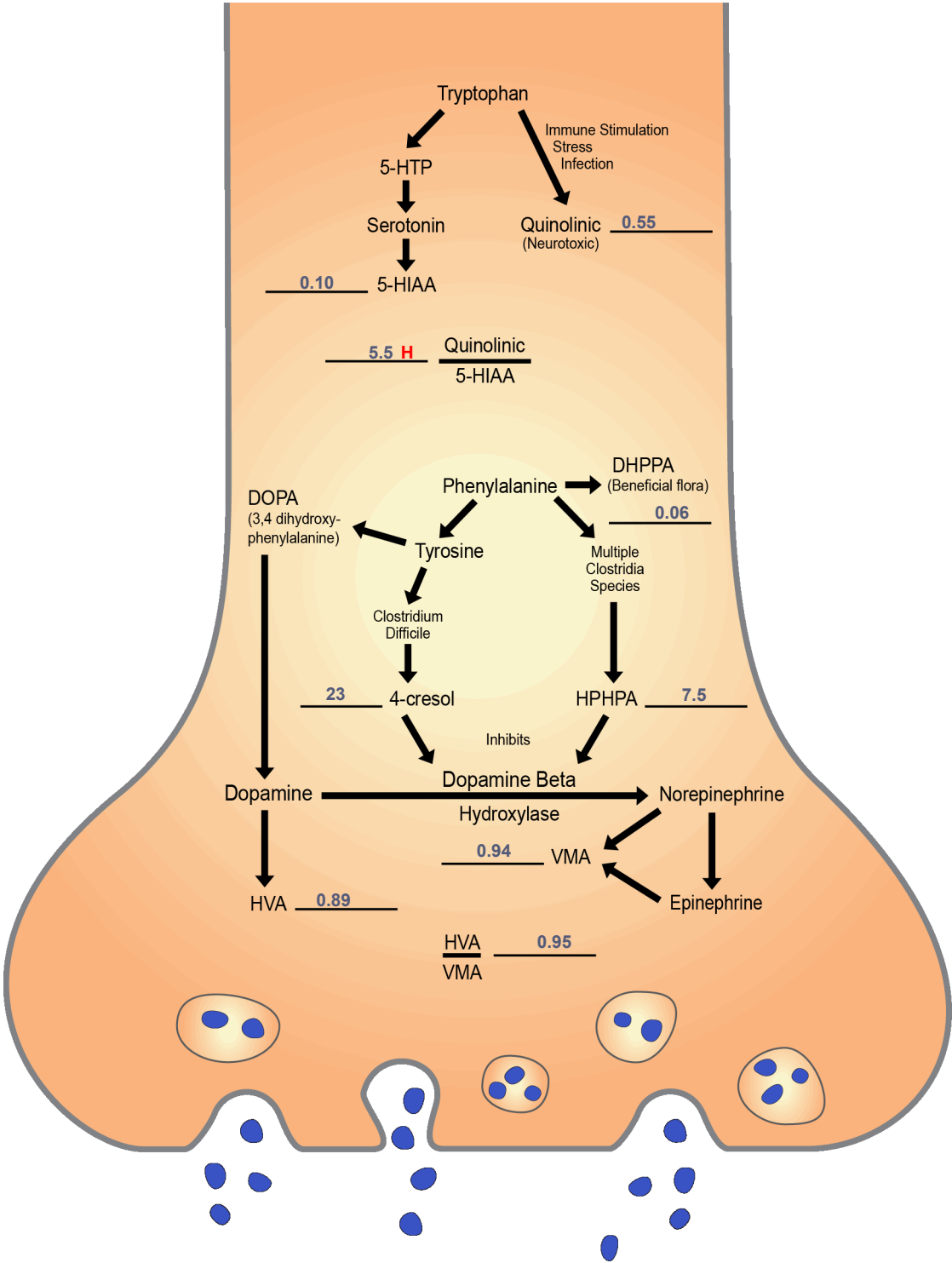
Example of Value Within Reference Range



Example of Elevated Value



Neurotransmitter Metabolism Markers



The diagram contains the patient's test results for neurotransmitter metabolites and shows their relationship with key biochemical pathways within the axon terminal of nerve cells. The effect of microbial byproducts on the blockage of the conversion of dopamine to norepinephrine is also indicated.

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Interpretation

HVA levels below the mean (Marker 33) may indicate lower production of the neurotransmitter dopamine, perhaps due to low dietary intake of the amino acid precursors phenylalanine or tyrosine. Homovanillic acid is a metabolite of the neurotransmitter dopamine. Supplementation with phenylalanine or tyrosine may be beneficial. Enzyme cofactors magnesium, B6 (pyridoxine) or biopterin may also be deficient; neurotransmitter levels may increase with supplementation with these cofactors if these are deficient.

VMA levels below the mean (Marker 34) may indicate lower production of the neurotransmitter norepinephrine or the hormone adrenaline, perhaps due to low dietary intake of the amino acid precursors phenylalanine or tyrosine. Vanylmandelic acid (VMA) is a metabolite of norepinephrine or adrenaline. Low VMA may also result from blocked conversion of dopamine to norepinephrine by *Clostridia* metabolites. Supplementation with phenylalanine or tyrosine may be beneficial. Enzyme cofactors magnesium, B6 (pyridoxine) or biopterin may also be deficient and respond to supplementation.

5-hydroxyindoleacetic acid (5-HIAA) levels below the mean (Marker 36) may indicate lower production of the neurotransmitter serotonin. 5-hydroxy-indoleacetic acid is a metabolite of serotonin. Low values have been correlated with symptoms of depression. Supplementation with the precursor 5-HTP (5-hydroxytryptophan) at 50-300 mg/day may be beneficial. Supplementation with tryptophan itself may form the neurotoxic metabolite quinolinic acid, however, 5-HTP is not metabolized to quinolinic acid. Excessive tryptophan supplementation has been associated with eosinophilia myalgia syndrome.

High quinolinic acid / 5-HIAA ratio (Marker 39) indicates an imbalance of these organic acids and may be a sign of neural excitotoxicity. Quinolinic acid is an excitotoxic stimulant of certain brain cells that have NMDA-type receptors. Overstimulated nerve cells may die. Brain toxicity due to quinolinic acid has been implicated in Alzheimer's disease, autism, Huntington's disease, stroke, dementia of old age, depression, HIV-associated dementia, and schizophrenia. However, quinolinic acid is derived from the amino acid tryptophan and is an important intermediate that the body uses to make the essential nutritional cofactor nicotinamide adenine dinucleotide (NAD), which can also be derived from niacin (B3).

An elevated ratio is not specific for a particular medical condition and is commonly associated with excessive inflammation due to recurrent infections. If quinolinic acid is not elevated, low 5-HIAA from serotonin may be the source of the imbalance. Supplementation with 5-HTP may increase serotonin levels, but 5-HTP is not metabolized to quinolinic acid. Immune overstimulation, excess adrenal production of cortisol due to stress, or high exposure to phthalates may also increase the quinolinic acid/5-HIAA acid ratio.

The drug deprenyl or the dietary supplements carnitine, melatonin, capsaicin, turmeric (curcumin) and garlic may reduce brain damage caused by quinolinic acid. Niacin (nicotinic acid) and niacinamide may also reduce quinolinic acid production by decreasing tryptophan shunting to the quinolinic acid pathway. Inositol hexaniacinate as an adult dose of 500-1000 mg does not cause niacin flush.

Pyridoxic acid (B6) levels below the mean (Marker 51) may be associated with less than optimum health conditions (low intake, malabsorption, or dysbiosis). Supplementation with B6 (20 - 50 mg/day) or a multivitamin may be beneficial.

Pantothenic acid (B5) levels below the mean (Marker 52) may be associated with less than optimum health conditions. Supplementation with B5 (250 mg/day) or a multivitamin may be beneficial.

Ascorbic acid (vitamin C) levels below the mean (Marker 54) may indicate a less than optimum level of the antioxidant vitamin C. Suggested supplementation is 1000 mg/day of buffered vitamin C, divided into 2-3 doses.

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Low citramalic, 2-hydroxyphenylacetic, 4-hydroxyphenylacetic, 4-hydroxybenzoic, 4-hydroxyhippuric, 3-indoleacetic, glyceric, glycolic, oxalic, lactic, pyruvic, 2-hydroxybutyric, fumaric, malic, aconitic, quinolinic, kynurenic, quinolinic/5-HIAA ratio, thymine, ethylmalonic, methylsuccinic, adipic, suberic, glutaric, 3-hydroxy-3-methylglutaric, methylcitric, or orotic values have no known clinical significance.

Low values for amino acid metabolites (Markers 62-74) indicate the absence of genetic disorders of amino acid metabolism. These markers are deamination (ammonia removed) byproducts that are very elevated only when a key enzyme has low activity; slight elevations may indicate a genetic variation or heterozygous condition which may be mitigated with diet or supplementation. Low values are not associated with inadequate protein intake and have not been proven to indicate specific amino acid deficiencies.

High quality nutritional supplements can be purchased through your practitioner or at New Beginnings Nutritionals, www.NBNUS.com <<http://www.NBNUS.com>>, or call 877-575-2467.