24-HOUR URINE AMINO ACIDS

DOCTOR'S DATA INC.

LAB#: U000000-0000-0
PATIENT: Sample Patient
SEX: Female
AGE: 20

CLIENT#: 12345
DOCTOR:
Doctor's Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174

SPECIMEN VALIDITY

SPECIMEN MARKERS	RESULT PER 24 HOURS	REFERENCE RANGE	PERCENTILE (2.5th / 16th / 50th / 84th / 97.5th)
Creatinine	1380	600- 1900mg	
24 Hour Volume	4600	600- 2500mL	
Glutamine/Glutamate	7.2	5- 160	
Ammonia Level	34600	12000- 56000µM	
SPECIMEN VALIDITY INDEX			

ESSENTIAL / CONDITIONALLY INDISPENSABLE AMINO ACIDS

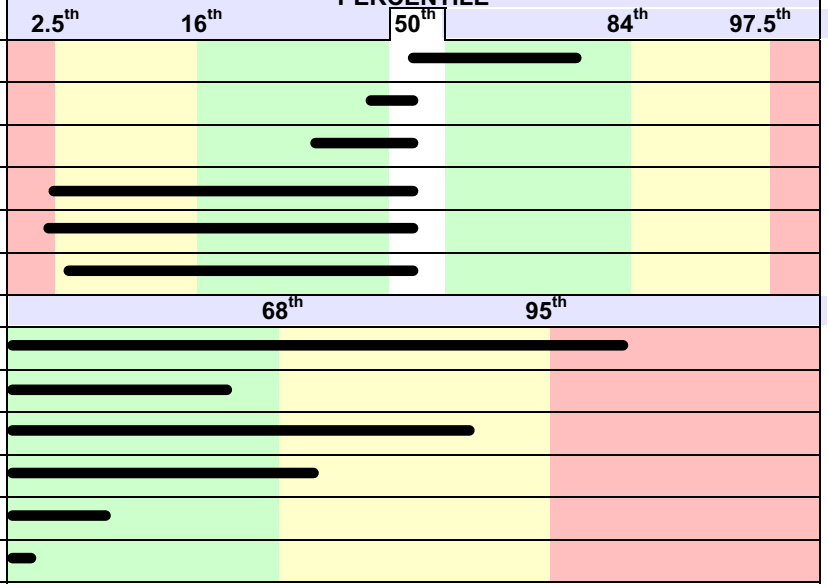
ESSENTIAL AMINO ACIDS	RESULT µMOLE/24 HRS	REFERENCE RANGE	PERCENTILE (2.5th / 16th / 50th / 84th / 97.5th)
Methionine	9.9	8- 50	
Lysine	28	40- 640	
Threonine	64	75- 375	
Leucine	20	24- 120	
Isoleucine	5	10- 60	
Valine	23	15- 80	
Phenylalanine	19	25- 120	
Tryptophan	15	20- 120	
Taurine	230	220- 1420	
Cysteine	23	25- 84	
Arginine	15	8- 60	
Histidine	130	350- 1900	

NONESSENTIAL AMINO ACIDS

NONESSENTIAL AMINO ACIDS	RESULT µMOLE/24 HRS	REFERENCE RANGE	PERCENTILE (2.5th / 16th / 50th / 84th / 97.5th)
Alanine	150	130- 650	
Aspartate	11	8- 33	
Asparagine	66	35- 225	
Glutamine	260	200- 900	
Glutamate	36	6- 55	
Cystine	22	30- 120	
Glycine	210	500- 4200	
Tyrosine	31	29- 143	
Serine	180	180- 700	
Proline	9.4	1- 60	

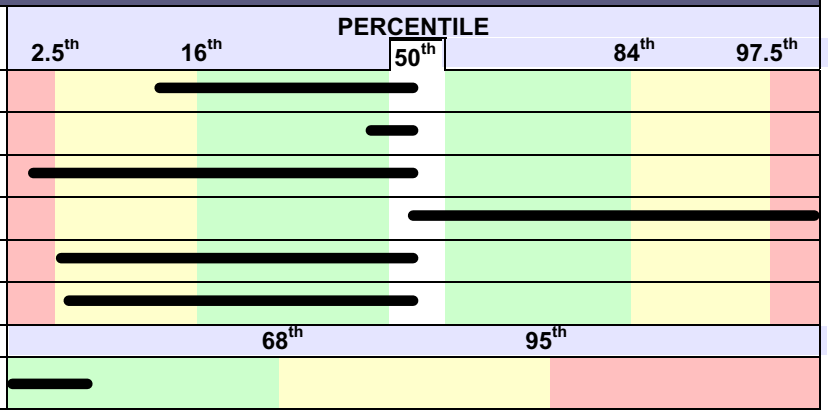
GASTROINTESTINAL MARKERS

GI MARKERS	RESULT µMOLE/24 HRS	REFERENCE RANGE
Ammonia	34600	12000- 56000
Ethanolamine	260	120- 550
Alpha-Aminoadipate	22	5- 80
Threonine	64	75- 375
Tryptophan	15	20- 120
Taurine	230	220- 1420
Beta-alanine	36	< 20
Beta-aminoisobutyrate	98	< 400
Anserine	74	< 95
Carnosine	20	< 50
Gamma-aminobutyrate	0.92	< 35
Hydroxyproline	1.8	< 48



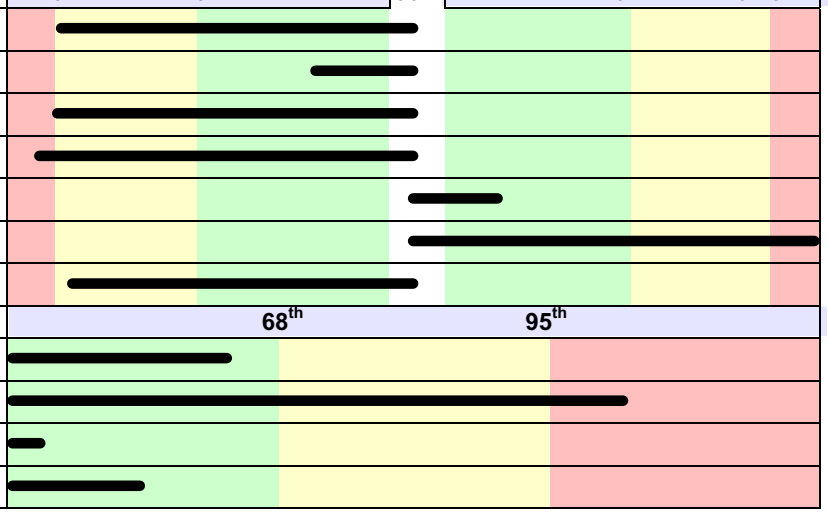
MAGNESIUM DEPENDANT MARKERS

MAGNESIUM MARKERS	RESULT µMOLE/24 HRS	REFERENCE RANGE
Citrulline	2.4	1- 35
Ethanolamine	260	120- 550
Phosphoethanolamine	8.8	20- 95
Phosphoserine	1.2	0.06- 0.8
Serine	180	180- 700
Taurine	230	220- 1420
Methionine Sulfoxide	1.5	< 10



B6, B12, & FOLATE DEPENDANT MARKERS

B-VITAMIN MARKERS	RESULT µMOLE/24 HRS	REFERENCE RANGE
Serine	180	180- 700
Alpha-aminoadipate	22	5- 80
Cysteine	23	25- 84
Cystathionine	4.5	8- 60
1-Methylhistidine	190	70- 350
3-Methylhistidine	1530	55- 1200
Alpha-amino-N-butyrate	5.8	5- 80
Beta-aminoisobutyrate	98	< 400
Beta-alanine	36	< 20
Homocystine	0.23	< 8
Sarcosine	4.9	< 50



DETOXIFICATION MARKERS

DETOX MARKERS	RESULT µMOLE/24 HRS	REFERENCE RANGE	PERCENTILE 2.5th 16th 50th 84th 97.5th
Methionine	9.9	8- 50	
Cysteine	23	25- 84	
Taurine	230	220- 1420	
Glutamine	260	200- 900	
Glycine	210	500- 4200	
Aspartate	11	8- 33	

NEUROLOGICAL MARKERS

NEUROLOGICAL MARKERS	RESULT µMOLE/24 HRS	REFERENCE RANGE	PERCENTILE 2.5th 16th 50th 84th 97.5th
Ammonia	34600	12000- 56000	
Glutamine	260	200- 900	
Phenylalanine	19	25- 120	
Tyrosine	31	29- 143	
Tryptophan	15	20- 120	
Taurine	230	220- 1420	
Cystathionine	4.5	8- 60	
			68th 95th
Beta-alanine	36	< 20	

UREA CYCLE METABOLITES

UREA CYCLE METABOLITES	RESULT µMOLE/24 HRS	REFERENCE RANGE	PERCENTILE 2.5th 16th 50th 84th 97.5th
Arginine	15	8- 60	
Aspartate	11	8- 33	
Citrulline	2.4	1- 35	
Ornithine	6.2	3- 45	
Urea	350	150- 650	
Ammonia	34600	12000- 56000	
Glutamine	260	200- 900	
Asparagine	66	35- 225	

SPECIMEN DATA

Comments:
Date Collected: **8/11/2007**
Date Received: **8/16/2007**
Date Completed: **8/30/2007**
Methodology: **HPLC**
Collection Period: **24 Hr/Coll**
Volume: **4600 ml**

V07.02

SUPPLEMENTATION SCHEDULE

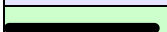
L-configured Amino Acids	Total Daily Oral Dose
Tryptophan	**330 mg**
Arginine	**680 mg**
Histidine	**945 mg**
Isoleucine	**1085 mg**
Leucine	**1330 mg**
Lysine	**1080 mg**
Methionine	**725 mg**
Phenylalanine	**1110 mg**
Threonine	**760 mg**
Valine	**940 mg**
Pyridoxal-5-phosphate	**30 mg**
Alpha-ketoglutarate	**650 mg**
Taurine	**225 mg**

The supplement schedule is not intended for use by pregnant females and is strictly contraindicated for individuals with suspected or known renal insufficiency or renal failure.

PRESUMPTIVE NEEDS / IMPLIED CONDITIONS

NEED FOR VITAMIN B6

NEED FOR FOLATE, VITAMIN B12



NEED FOR MAGNESIUM

SUSCEPTIBILITY TO VASCULAR DISEASE

ABNORMAL INTESTINAL MICROFLORA

MALDIGESTION / MALABSORPTION

IMPAIRED DETOXIFICATION

NEUROLOGICAL DISORDERS

NITROGEN INSUFFICIENCY

EXCESSIVE PROTEIN

OXIDATIVE STRESS

This recommended Amino Acid Supplement Schedule was calculated based upon the difference between the test results for this specific patient and optimal urine levels, and guidelines for human amino acid requirements as provided by the Food and Nutrition Board of the NRC. The schedule has been provided at the request of a licensed medical practitioner and the calculated levels of amino acids only apply to ORAL administration. The supplement schedule is not intended for use by pregnant females and is strictly contraindicated for individuals with suspected or known renal insufficiency or renal failure.

Only pure, L-form crystalline amino acids should be used and the custom formulation should be prepared by credible pharmacies or purveyors who specialize in amino acid formulations. In order to get the full benefit of the amino acid supplementation, one needs to ensure adequate intake of CALORIES and the essential co-factors that permit proper metabolism of the amino acids (eg. B-6, B-12, folate, magnesium). Supplemental cystine or N-acetylcysteine should not be given to patients who have been diagnosed with intestinal candidiasis.

This analysis of amino acids and related metabolites was performed using High Pressure Liquid Chromatography. The test provides fundamental information about the adequacy of dietary protein, digestive disorders, dysbiosis, mood and sleep disorders, and vitamin and mineral deficiencies. When the level of a specific amino acid or metabolite deviates significantly from the norm, an interpretive paragraph is presented which briefly discusses the possible causes, clinical implications and remedies for the metabolic aberrations. If no significant abnormalities are detected, interpretive paragraphs and amino acid supplementation schedules are not provided.

24 Hour Urine volume (high)

The 24 hr urine volume is atypically high. This may be of no clinical significance and may merely reflect an unusually high fluid intake. However, diabetes insipidus is associated with polydypsia/polyuria. Excessive urine volume could affect the reliability of the test results due to excessive dilution of the urinary analytes.

Lysine (low)

Lysine, an essential amino acid, is low in this urine specimen. Lysine is a component of structural proteins and enzymes in the body. Transamination of amino acids requires lysine as an ”anchor” point for coenzyme pyridoxal phoshate. Some individuals who exhibit symptoms of B-6 deficiency actually have a lysine deficiency that limits functional B-6 activity. Lysine is abundant in animal source proteins and legumes, but is often deficient in vegetarian diets that are based on corn, rice and cereal grains. Symptoms commonly associated with lysine deficiency include poor appetite, muscle weakness/poor muscle tone, weight loss, anemia, and poor dream recall.

Threonine (low)

Threonine, an essential amino acid, is low in this urine specimen. Threonine is the precursor of serine and glycine, and is required in the formation of glycoproteins that are essential in immune function. Threonine is slowly absorbed and is often low as a result of rapid transit time, maldigestion or insufficient quality or quantity of dietary protein. Meats, poultry, fish, some nuts and peanuts and, cheeses are good sources of threonine.

Leucine (low)

Leucine, an essential amino acid, is low in this urine specimen. Leucine is a branched-chain amino acid that is a common constituent of proteins, peptides and hormones. It also promotes wound healing, promotes insulin release from the pancreas, and is component of elastin (ligaments). Low leucine can result from protein malnutrition, zinc deficiency (Zn dependent peptidase), or other gastrointestinal dysfunctions such as hypochlorhydria.

Isoleucine (low)

Isoleucine, an essential amino acid, is low in this urine specimen. Isoleucine is a branched-chain structural amino acid that like leucine and valine is a common component of proteins, peptides and hormones. Leucine is catabolyzed as a source of carbon for energy production during exercise in skeletal muscle. Isoleucine and the other branched chain amino acids can be low as a result of zinc deficiency (zinc dependent intestinal peptidase), protein malnutrition or other gastrointestinal dysfunctions.

Phenylalanine (low)

Phenylalanine, an essential amino acid, is low in this urine specimen. Phenylalanine is required for the synthesis of proteins and is the precursor of tyrosine. Tyrosine is required for the production of neurotransmitters (eg.dopamine, DOPA, epinephrine) and, thyroid hormone. Phenylalanine is typically low as a result of unbalanced protein in the diet or gastrointestinal dysfunction, particularly hypochlorhydria. Phenylalanine is often low in patients with endogenous depression. Soy protein, legumes/lentils, cheese, nuts and shellfish are good dietary sources of phenylalanine.

Tryptophan (low)

Tryptophan, an essential amino acid, is low in this urine specimen. Tryptophan is the precursor of niacin and serotonin (vasoconstrictor and neurotransmitter). Low serotonin is often associated with disturbed sleep cycle or insomnia, anxiety or depression, aggressive behavior and low pain threshold. Tryptophan can be low as a result of low quality/quantity protein intake or intestinal malabsorption (eg. hypochlorhydria). Bacterial action on unabsorbed tryptophan in the intestine produces elevated levels of mildly toxic indole compounds such as indican (”blue diaper syndrome” in infants). A Comprehensive Stool Analysis may be warranted if dietary intake of protein appears to be adequate. Foods that are good sources of tryptophan include turkey, wild game, pork, soy protein, sunflower seeds, and cheeses.

Cysteine (low)

Cysteine, the reduced and reactive form of cystine is low in this urine specimen. Cysteine is required for the formation of coenzyme A, proteins with cross-linked polypeptide chains (eg. insulin), metallothionein, and enzymes with active sulfhydryl (SH-) groups (eg. glutathione peroxidase, Na/ K ATPase). Cysteine is the rate limiting amino acid for the formation of intracellular glutathione, which is one of the most

important endogenous antioxidants and detoxifying (metals and chemicals) molecules in the body. Cysteine may be low due to: (1) chronic exposure to sulfhydryl reactive metals (eg. mercury, cadmium, arsenic), or toxic chemicals, (2) oxidative stress or insufficient antioxidants (vitamins E and C), (3) inflammation, (4) methionine insufficiency or impaired methionine metabolism (inadequate folic acid, B-12, B-6, magnesium), or (5) cysteinurea or hypertaurinurea. Supplementation with N-acetyl cysteine may be beneficial except in cystinurea, intestinal candidiasis or insulin-dependent diabetes. Undenatured whey protein and eggs are excellent dietary sources of cysteine.

Histidine (low)

Histidine, a semi essential amino acid, is low in this urine specimen. Histidine is required for maintenance and growth of tissue, transport of copper, and it is the precursor of histamine (vasodilator). Histamine stimulates gastric secretions (HCL) and is necessary for proper digestion of food and assimilation of nutrients. Histidine is commonly low in patients with rheumatoid arthritis. Low histidine may result from protein malnutrition or gastrointestinal dysfunction.

Cystine (low)

Cystine, the oxidized dimer form of cysteine, is low in this urine specimen. Cystine is derived from dietary protein and, end formed endogenously from cysteine. Cystine may be low as a result of dietary protein insufficiency, malabsorption or impaired methionine metabolism. Supplementation of cystine along with antioxidant nutrients, N-acetylcysteine, or cofactors involved in methionine metabolism may be beneficial. Cystine and N-acetylcysteine supplementation should be avoided in the presence of intestinal yeast overgrowth and definitely contraindicated for insulin-dependent diabetics.

Glycine (low)

Glycine, a nonessential amino acid, is abnormally low in this urine specimen. Glycine is an extremely abundant amino acid in dietary protein and, is formed endogenously from the amino acids threonine (essential) and serine (nonessential). Glycine is also produced endogenously from glycolysis. Other than near complete avoidance of dietary protein, low urinary glycine could result from impaired renal clearance.

Serine (low)

Serine, a nonessential amino acid, is low in this urine specimen. Serine is plentiful in dietary protein and is also formed endogenously from dietary phosphoserine (magnesium dependent), glycine and threonine. In addition, serine is derived from glycolysis provided that the status of B-6 and magnesium are good. Serine is also required for proper metabolism of methionine; a blatant serine deficiency would be expected to be associated with low cysteine and cystathionine and, homocystinurea (elevated plasma homocysteine). Elevated phosphoserine: serine is a good indicator of functional magnesium insufficiency. Low urinary serine is usually associated with insufficient protein intake or malabsorption or magnesium deficiency.

Beta-alanine (high)

Beta-alanine, a nonessential intermediary amino acid, is abnormally elevated in this urine specimen. Normally beta-alanine is near completely deaminated to alpha-ketoglutarate (B-6 dependent). Beta-alanine is derived from: (1) the breakdown of DNA/RNA (yeast, pyrimidine, uracil), (2) activity of unusual bacteria on aspartic acid and, (3) the hydrolysis of anserine and carnosine, which are peptides found in beef, pork, poultry, salmon, and tuna. Elevated beta-alanine inhibits the breakdown of anserine and carnosine, and impairs the renal conservation of taurine and beta-aminoisobutyric acid; taurine is an important antioxidant, neurotransmitter and essential for the retention and homeostasis of intracellular magnesium and potassium. Beta-alanine is a neurotoxic substance that suppresses development in the brain and spinal cord. Beta-alanine also interferes with the metabolism of the neuroinhibitory neurotransmitter gamma-aminobutyric acid. Hyper-B- alaninurea has been associated with seizures and somnolence.Patients exhibiting elevated urinary B-alanine should be retested after given a trial on a low-protein, low-pyrimidine diet and high B-6 (P-5-P). Elevated levels of B-alanine are highly correlated with gastrointestinal and genitourinary infections in patients with Chronic Fatigue Syndrome. Intestinal dysbiosis, especially candidiasis, should be evaluated via a Comprehensive Stool Analysis.

Phosphoethanolamine (low)

Phophoethanolamine, a nonessential phosphorous bearing amino acid, is low in this urine specimen. Phosphoethanolamine is derived from dietary sources and is also formed endogenously from serine via phosphorylation of ethanolamine. When ethanolamine is high or normal and phosphoethanolamine is low there is a presumptive need for magnesium (magnesium dependent kinase). Phosphoethanolamine is a precursor of phosphotidyl choline, choline and the neurotransmitter acetylcholine. If low phosphoethanolamine results in low acetylcholine, and there is insufficient choline from dietary lecithin, there may be depressed activity of the parasympathetic nervous system (eg. decreased peristalsis, ability to sweat), and poor memory and cognitive function. Low phosphoethanolamine is usually the result of magnesium deficiency or protein malnutrition.

Phophoserine (high)

The nonessential amino acid phosphoserine is abnormally high in this urine specimen. Phosphoserine is derived directly from dietary sources, and metabolically as an intermediary metabolite from glycolysis and gluconeogenesis. Towards gluconeogenesis, phosphoserine is deaminated via a B-6 dependent enzyme. Towards glycolysis, phosphoethanolamine is converted to serine via a magnesium dependent enzyme. Therefore, elevated phosphoserine can be caused by inadequate assimilation of magnesium or insufficient P-5-P activity (or both). A third possible cause is a disorder in phosphate metabolism. This would be accompanied by elevated phosphoethanolamine (check for elevated phosphoethanolamine). Phosphoserine may also be elevated, along with phophoethanolamine, as a result of parathyroid dysfunction.

Cystathionine (low)

Cystathionine is low in this urine specimen. Cystathionine is an intermediary metabolite that is formed in the sequential enzymatic conversion of methionine (essential amino acid) to cysteine. Serine and B-6 are required to produce cystathionine from homocysteine. Subnormal cystathionine is usually a nutritional condition that is readily corrected by adequate provision of serine and B-6/P-5-P. If dietary cysteine intake is concomitantly insufficient, there could also be a cysteine deficiency that could be associated with subnormal intracellular glutathione and decreased antioxidant and detoxification (chemical and heavy metal) capacity.

3-Methylhistidine (high)

3-methylhistine is abnormally high in this urine specimen. 3-methyhistidine is abundant in poultry tuna and salmon and can be elevated if intake of these foods is excessive. A reduction in the intake of such dietary protein sources may be warranted, and supplemental B-12 and folic acid may be beneficial.