LAB #: U000000-0000-0
PATIENT: Sample Patient
ID: PATIENT-S-00001
SEX: Male
DOB: 11/1/2001

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

Amino Acids; Urine

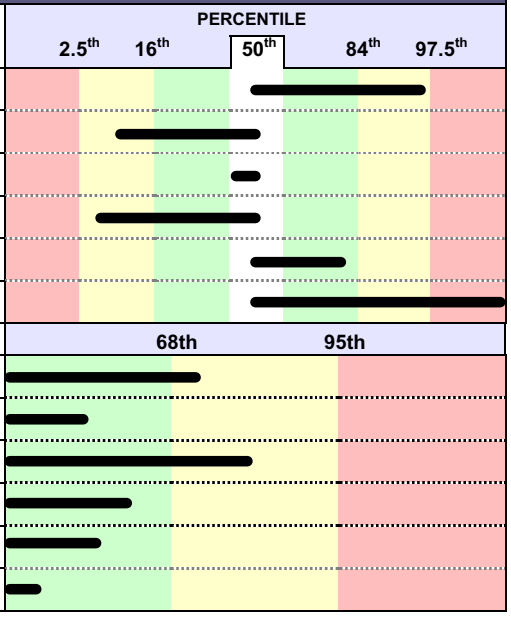
SPECIMEN VALIDITY	RESULT per creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Creatinine	100 mg/dL	25 - 180	
Glutamine/Glutamate	14	5 - 160	
Ammonia Level (NH_4)	73000 µM/g	16000 - 75000	
Specimen Validity Index			

ESSENTIAL / CONDIIONALLY INDISPENSABLE AMINO ACIDS	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Methionine	7.2	12 - 46	
Lysine	170	55 - 550	
Threonine	93	80 - 400	
Leucine	33	20 - 100	
Isoleucine	8.6	8 - 45	
Valine	53	20 - 94	
Phenylalanine	93	40 - 180	
Tryptophan	99	35 - 145	
Taurine	2270	200 - 1600	
Cysteine	16	25 - 93	
Arginine	21	12 - 70	
Histidine	910	520 - 2100	

NONESSENTIAL AMINO ACIDS	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Alanine	230	170 - 800	
Aspartate	5.7	12 - 33	
Asparagine	87	60 - 360	
Glutamine	310	300 - 1200	
Glutamate	22	10 - 80	
Cystine	28	28 - 91	
Glycine	1070	800 - 3400	
Tyrosine	130	60 - 225	
Serine	200	200 - 880	
Proline	10	2 - 90	

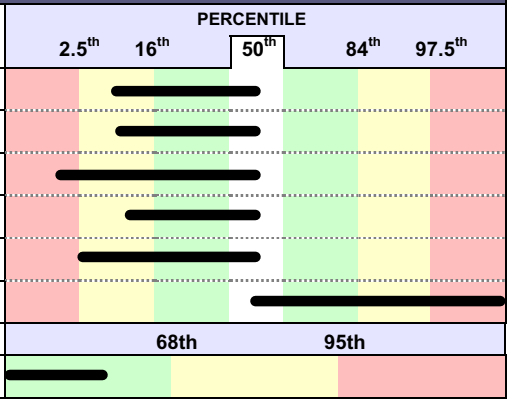
GASTROINTESTINAL MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL
Ammonia (NH_4)	73000	16000 - 75000
Ethanolamine	220	150 - 580
Alpha-Aminoadipitate	32	8 - 100
Threonine	93	80 - 400
Tryptophan	99	35 - 145
Taurine	2270	200 - 1600
		68th 95th
Beta-alanine	6.3	< 22
Beta-aminoisobutyrate	75	< 470
Anserine	130	< 200
Carnosine	56	< 200
Gamma-aminobutyrate	1.4	< 50
Hydroxyproline	4.3	< 60



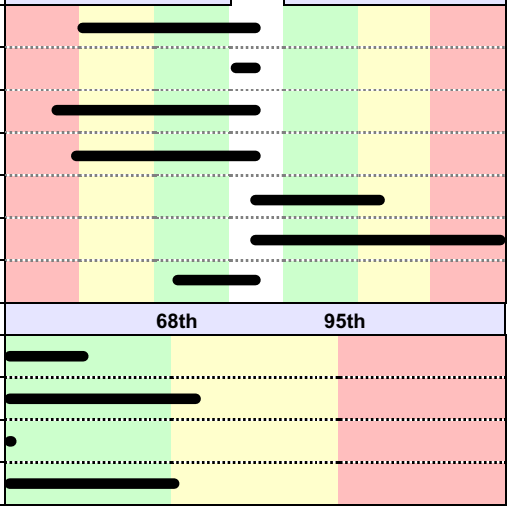
MAGNESIUM DEPENDANT MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL
Citrulline	5	1 - 47
Ethanolamine	220	150 - 580
Phosphoethanolamine	32	46 - 140
Phosphoserine	0.12	0.07 - 1.2
Serine	200	200 - 880
Taurine	2270	200 - 1600
		68th 95th
Methionine Sulfoxide	3	< 15



B6, B12, & FOLATE DEPENDANT MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL
Serine	200	200 - 880
Alpha-aminoadipate	32	8 - 100
Cysteine	16	25 - 93
Cystathionine	9.1	10 - 43
1-Methylhistidine	340	130 - 430
3-Methylhistidine	2590	55 - 900
Alpha-amino-N-butyrate	17	8 - 65
		68th 95th
Beta-aminoisobutyrate	75	< 470
Beta-alanine	6.3	< 22
Homocystine	0.029	< 10
Sarcosine	3.2	< 50



DETOXIFICATION MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Methionine	7.2	12 - 46	
Cysteine	16	25 - 93	
Taurine	2270	200 - 1600	
Glutamine	310	300 - 1200	
Glycine	1070	800 - 3400	
Aspartate	5.7	12 - 33	

NEUROLOGICAL MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Ammonia (NH_4)	73000	16000 - 75000	
Glutamine	310	300 - 1200	
Phenylalanine	93	40 - 180	
Tyrosine	130	60 - 225	
Tryptophan	99	35 - 145	
Taurine	2270	200 - 1600	
Cystathionine	9.1	10 - 43	
			68th 95th
Beta-alanine	6.3	< 22	

UREA CYCLE METABOLITES

	RESULT per creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Arginine	21 µM/g	12 - 70	
Aspartate	5.7 µM/g	12 - 33	
Citrulline	5 µM/g	1 - 47	
Ornithine	11 µM/g	5 - 55	
Urea	460 mM/g	210 - 750	
Ammonia (NH_4)	73000 µM/g	16000 - 75000	
Glutamine	310 µM/g	300 - 1200	
Asparagine	87 µM/g	60 - 360	

SPECIMEN DATA

Comments:

Date Collected: **11/30/2011**
Date Received: **12/7/2011**
Date Completed: **12/9/2011**

Collection Period: **Random**
Volume:

Methodology: **LC MS/MS**
NH_4, Urea, Creatinine by Automated Chem Analyzer

v3

SUPPLEMENTATION SCHEDULE

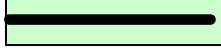
L-configured Amino Acids	Total Daily Oral Dose
Tryptophan	**260 mg**
Arginine	**810 mg**
Histidine	**640 mg**
Isoleucine	**1280 mg**
Leucine	**1115 mg**
Lysine	**810 mg**
Methionine	**1115 mg**
Phenylalanine	**1115 mg**
Threonine	**1065 mg**
Valine	**1120 mg**
Pyridoxal-5-phosphate	**30 mg**
Alpha-ketoglutarate	**650 mg**
Taurine	**0 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

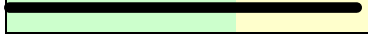
NEED FOR VITAMIN B6

NEED FOR FOLATE, VITAMIN B12

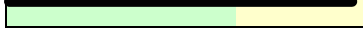


NEED FOR MAGNESIUM

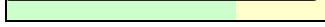
SUSCEPTIBILITY TO VASCULAR DISEASE



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.

”Presumptive Needs” are not the result of direct analyses of B vitamins or magnesium but are based upon algorithms that utilize levels of specific amino acids (AA) and intermediary metabolites that may be abnormal if nutrient cofactors limit normal AA metabolism. Direct testing for B vitamins and magnesium (Red Blood Cell Elements) may be warranted. ”Implied conditions” may infer further clinical evaluation, functional testing and direct laboratory testing (e.g. Comprehensive Stool Analysis, Cardiovascular Risk Profile, DNA Oxidative Damage, Methylation Profile).

Creatinine

The urinary creatinine concentration (CC) presented in this report represents the actual creatinine concentration in the specimen that was submitted. Under normal conditions, the rate of excretion of creatinine is quite constant and highly correlated with lean body mass (muscle). However, the CC can vary significantly as a function of urine volume. An unusually high CC most likely indicates poor hydration of the patient at the time of the urine collection. A very low CC most likely indicates unusually high fluid consumption, or perhaps the influence of diuretics. If the urine specimen is very dilute (extremely low CC), the accuracy of the amino acid analysis may be compromised due to analytical detection limits. It is emphasized that the CC in this specimen should not be utilized to assess renal function or glomerular filtration. For that purpose, one should perform a bona fide creatinine clearance test.

For a given age and gender, intra-individual variability in daily creatinine excretion can vary by as much as two-fold. Therefore, to more accurately assess amino acid status using a random collection, the reported values for each analyte are expressed per gram ”normalized” creatinine. Creatinine values are adjusted to account for body surface

area (BSA) using the formula:

CreatinineN (Normalized) = creatinine concentration x (1.73/BSA).

Methionine (low)

Methionine, an essential amino acid, is low in this urine specimen. Methionine is a precursor of other important amino acids and metabolites. Cysteine and taurine are derived in part from methionine. Cysteine is the rate limiting amino acid in the endogenous production of glutathione, a predominant amino acid in metallothionein, and is required for the production of Coenzyme A that is involved in fatty acid metabolism and the Krebs cycle. Taurine is an important antioxidant, a component of bile, a neurotransmitter, and very importantly, an osmoregulator that facilitates the intracellular retention of magnesium and potassium. Methionine also serves as a methyl donor (serine, creatine, epinephrine). Methionine deficiency can result in fatty liver and decreased capacity for endogenous detoxification of sulfhydryl reactive metals and xenobiotics. Symptoms that may be associated with insufficient methionine include inflammation, headaches, fatigue, biliary insufficiency, occlusive arterial disease, myopia and skeletal disorders. Animal products, as well as almonds and cashews are a good dietary sources of methionine. Supplementation with methionine should be accompanied with magnesium, B-6, folate and B-12.

Taurine (high)

Taurine, a conditionally essential amino acid, is abnormally high in this urine specimen. Elevated urinary taurine is usually associated with impaired renal conservation (wasting) due to competition by elevated levels of B-alanine (check B-alanine). Excessive levels of B-alanine are commonly associated with dysbyosis (bacterial and/or fungal). However, first rule out oral supplementation of taurine. B-alanine could also accumulate and compete for retention of taurine with a frank B-6 deficiency; in such a case one would also expect to see elevations in other amino acids that require transamination (eg. leucine, isoleucine, valine). Urinary wasting of taurine can be associated with low intracellular taurine that can negatively impact on intracellular electrolytes (magnesium, potassium, calcium, sodium). Taurine accounts for about 50% of the free amino acids in cardiac tissue, therefore taurine deficiency can result in arrhythmias. Taurine is also an important antioxidant, neurotransmitter (CNS), and a component of bile acids (fat and fat soluble vitamin absorption). Taurine is a key scavenger of hypochlorite ions, thus a shortage of taurine after viral or bacterial infections, or exposure to xenobiotics (eg. chlorine, chlorite, alcohol, aldehydes) can result in excessive inflammation or chemical sensitivity. It can be futile to simply supplement taurine (or magnesium) without correcting the cause of renal wasting of taurine, therefore a Comprehensive Stool Analysis test may be warranted.

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.

Aspartate (low)

Aspartate, a nonessential amino acid, is low in this urine specimen. Aspartate is derived directly from dietary protein and, is also synthesized from glutamate via the B-6 dependent enzyme SGOT. Adequate aspartate is required for proper urea cycle function: in a magnesium dependent reaction, aspartate combines with citrulline to form arginosuccinate. Low urinary aspartate can result from general dietary protein insufficiency, maldigestion, or possibly B-6 deficiency.

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.

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.

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.

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-methylhistidine is high in this urine specimen. 3-methylhistidine is derived primarily from skeletal muscle, and to a lesser extent from skin. Elevated 3-methylhistidine may be indicative of an abnormal rate of catabolism of muscle protein in the body or an abnormal rate of turnover of muscle tissue. This may be a degenerative condition, or simply the result of very strenuous, prolonged exercise/athletic training. 3-methylhistidine may also be higher than normal if the diet or assimilation of folic acid and B-12 are insufficient.