Amino Acids; Urine

SPECIMEN VALIDITY	RESULT per creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Creatinine	77 mg/dL	35 - 225	
Glutamine/Glutamate	12	5 - 160	
Ammonia Level (NH_4)	8640 µM/g	12000 - 49000	
Specimen Validity Index			

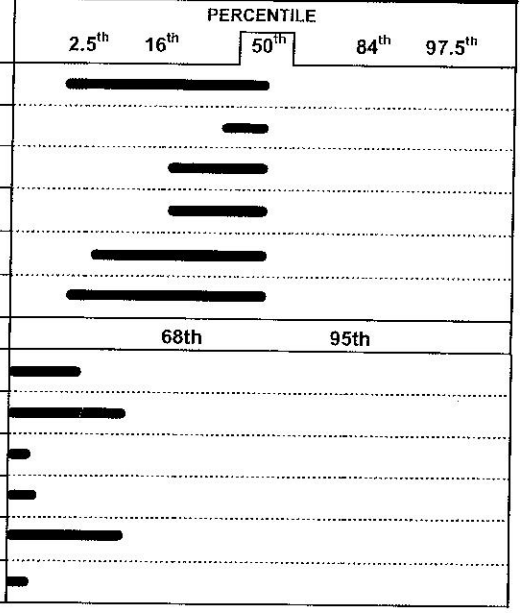
ESSENTIAL / CONDIIONALLY INDISPENSABLE AMINO ACIDS	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Methionine	7.2	8 - 48	
Lysine	32	40 - 530	
Threonine	99	75 - 330	
Leucine	20	22 - 100	
Isoleucine	10	9 - 50	
Valine	33	15 - 70	
Phenylalanine	39	25 - 100	
Tryptophan	21	20 - 100	
Taurine	170	220 - 1300	
Cysteine	40	25 - 73	
Arginine	29	8 - 55	
Histidine	120	350 - 1700	

NONESSENTIAL AMINO ACIDS	RESULT µM/g creatinine	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Alanine	280	130 - 600	
Aspartate	10	8 - 30	
Asparagine	110	35 - 200	
Glutamine	230	200 - 740	
Glutamate	20	6 - 52	
Cystine	33	30 - 105	
Glycine	1490	500 - 4100	
Tyrosine	36	28 - 120	
Serine	220	180 - 600	
Proline	4.5	1 - 55	

GASTROINTESTINAL MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL
Ammonia (NH_4)	**8640**	12000 - 49000
Ethanolamine	**240**	120 - 440
Alpha-Aminoadipitate	**16**	6 - 72
Threonine	**99**	75 - 330
Tryptophan	**21**	20 - 100
Taurine	**170**	220 - 1300

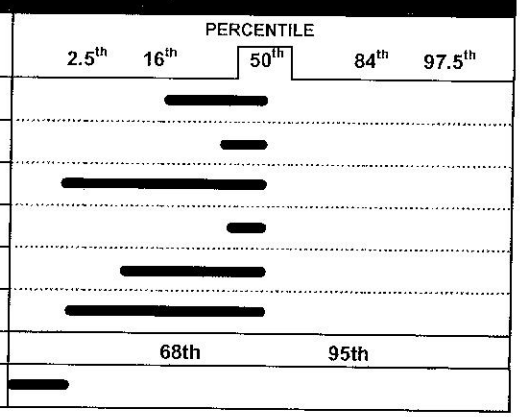
Beta-alanine	**2**	< 20
Beta-aminoisobutyrate	**75**	< 380
Anserine	**1.7**	< 95
Carnosine	**1.9**	< 50
Gamma-aminobutyrate	**1.7**	< 15
Hydroxyproline	**2**	< 45



MAGNESIUM DEPENDANT MARKERS

	RESULT µM/g creatinine	REFERENCE INTERVAL
Citrulline	**3.2**	1 - 30
Ethanolamine	**240**	120 - 440
Phosphoethanolamine	**14**	20 - 75
Phosphoserine	**0.17**	0.05 - 0.8
Serine	**220**	180 - 600
Taurine	**170**	220 - 1300

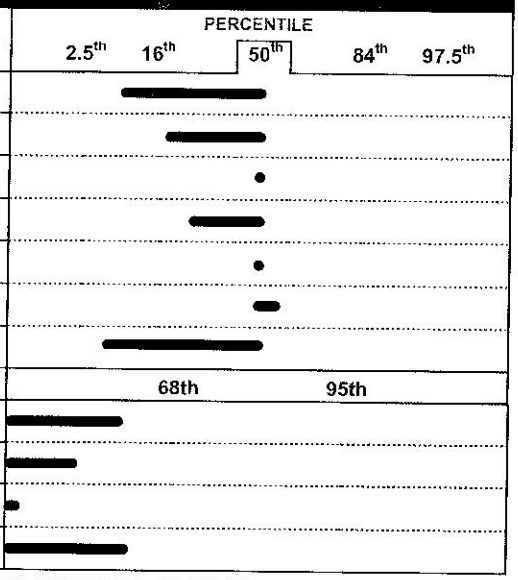
Methionine Sulfoxide	**1.7**	< 10



B6, B12, & FOLATE DEPENDANT MARKERS

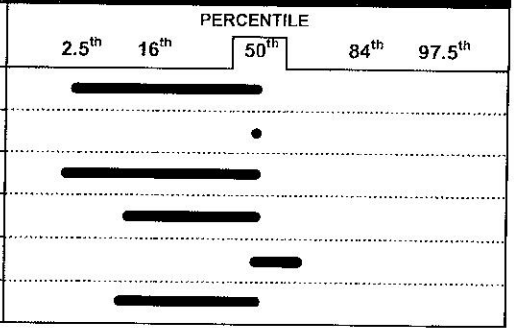
	RESULT µM/g creatinine	REFERENCE INTERVAL
Serine	**220**	180 - 600
Alpha-aminoadipate	**16**	6 - 72
Cysteine	**40**	25 - 73
Cystathionine	**13**	8 - 50
1-Methylhistidine	**150**	70 - 280
3-Methylhistidine	**560**	55 - 1100
Alpha-amino-N-butyrate	**8**	5 - 72

Beta-aminoisobutyrate	**75**	< 380
Beta-alanine	**2**	< 20
Homocystine	**0.052**	< 5
Sarcosine	**7.3**	< 50



DETOXIFICATION MARKERS

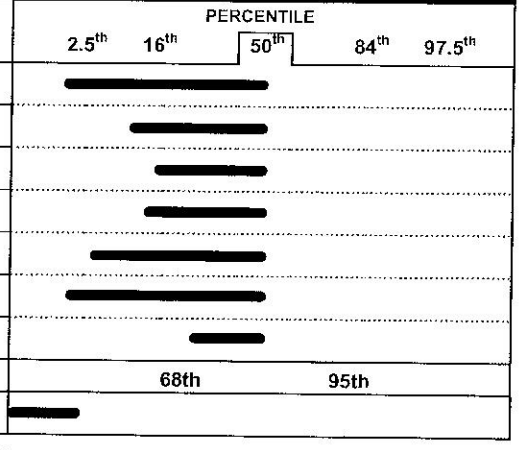
	RESULT µM/g creatinine	REFERENCE INTERVAL
Methionine	**7.2**	8 - 48
Cysteine	**40**	25 - 73
Taurine	**170**	220 - 1300
Glutamine	**230**	200 - 740
Glycine	**1490**	500 - 4100
Aspartate	**10**	8 - 30



NEUROLOGICAL MARKERS

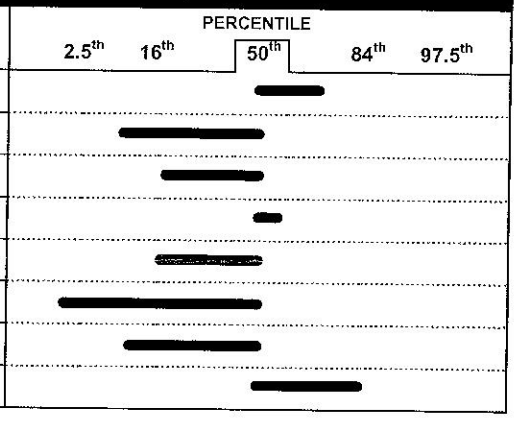
	RESULT µM/g creatinine	REFERENCE INTERVAL
Ammonia (NH_4)	**8640**	12000 - 49000
Glutamine	**230**	200 - 740
Phenylalanine	**39**	25 - 100
Tyrosine	**36**	28 - 120
Tryptophan	**21**	20 - 100
Taurine	**170**	220 - 1300
Cystathionine	**13**	8 - 50

Beta-alanine	**2**	< 20



UREA CYCLE METABOLITES

	RESULT per creatinine		REFERENCE INTERVAL
Arginine	**29**	**µM/g**	8 - 55
Aspartate	**10**	**µM/g**	8 - 30
Citrulline	**3.2**	**µM/g**	1 - 30
Ornithine	**12**	**µM/g**	3 - 45
Urea	**240**	**mM/g**	150 - 590
Ammonia (NH_4)	**8640**	**µM/g**	12000 - 49000
Glutamine	**230**	**µM/g**	200 - 740
Asparagine	**110**	**µM/g**	35 - 200



SPECIMEN DATA

Comments:

Date Collected: 03/10/2013
Date Received: 03/15/2013
Date Completed: 03/22/2013

Collection Period: **Random**
Volume:

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

v3

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

Ammonia (low)

The level of ammonia is abnormally low in this patient's urine specimen. This is typically associated with general insufficiency of dietary protein, or less likely severe maldigestion/ malabsorption. Check for generalized hypoamminoaciduria and low urea. A less common cause of low urinary ammonia is renal alkalosis in which there would be a marked decrease in the normal renal decomposition of glutamine to produce ammonia. (check for high urine pH).

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.

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.

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

Taurine (low)

Taurine, a conditionally essential amino acid, is low in this urine specimen. Taurine is an important antioxidant, neurotransmitter (CNS), osmoregulator (intracellular magnesium and potassium) and a component of bile acids. 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. Taurine insufficiency is commonly associated with magnesium deficiency, chemical sensitivity, non-epileptic seizures, bile insufficiency with or without dyslipoproteinemias, and deficiencies in essential fatty acids and fat soluble vitamins. In humans little taurine is derived from cysteine and most taurine is derived from the diet. Foods that are relatively high in taurine include red meat, organ meats, fish and shellfish. Taurine is often very low in people who consume meat sparingly and/or patients with excessive exposure to chemicals.

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.

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.