LAB #: U160525-2181-1
PATIENT: Jack Lunn
ID: LUNN-J-00019
SEX: Male
DOB: 02/08/1992

CLIENT #: 38596
DOCTOR:
Regenerus Laboratories Ltd
Aero 14, Redhill Aerodrome, Kings Mill Lane
Redhill, Surrey, RH1 5YP UNITED KINGDOM

Amino Acids; Urine 24-hour

SPECIMEN VALIDITY	RESULT per 24 hours	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Creatinine	2980 mg	900 - 3000	
24 Hour Volume	2710 mL	600 - 2500	
Glutamine/Glutamate	9.4	3 - 120	
Ammonia Level (NH_4)	40200 µM	12000 - 65000	
Specimen Validity Index			

ESSENTIAL / CONDITIONALLY INDISPENSABLE AMINO ACIDS	RESULT µM/24 hours	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Methionine	14	9 - 56	
Lysine	93	45 - 700	
Threonine	220	60 - 340	
Leucine	56	12 - 95	
Isoleucine	20	6 - 32	
Valine	74	18 - 85	
Phenylalanine	57	30 - 130	
Tryptophan	50	25 - 140	
Taurine	1550	350 - 1850	
Cysteine	39	31 - 90	
Arginine	36	10 - 70	
Histidine	930	390 - 1900	

NONESSENTIAL AMINO ACIDS	RESULT µM/24 hours	REFERENCE INTERVAL	PERCENTILE 2.5th 16th 50th 84th 97.5th
Alanine	560	120 - 690	
Aspartate	13	7 - 38	
Asparagine	190	45 - 260	
Glutamine	460	190 - 725	
Glutamate	49	6 - 65	
Cystine	59	32 - 130	
Glycine	2610	380 - 3500	
Tyrosine	93	30 - 188	
Serine	390	140 - 568	
Proline	18	1 - 70	

DOCTOR'S DATA INC

PATIENT: Jack Lunn
DOCTOR:
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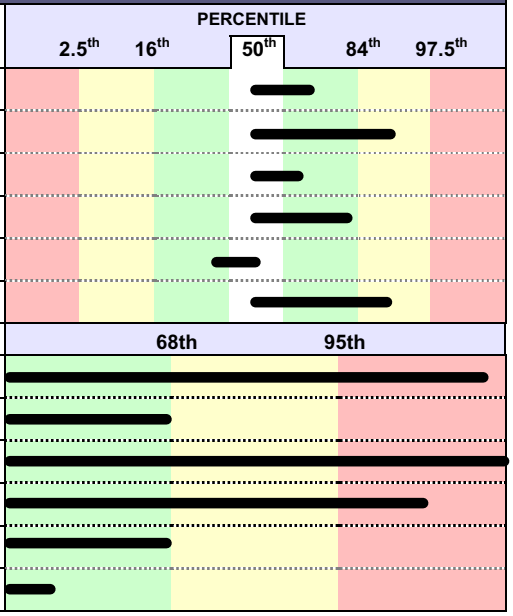
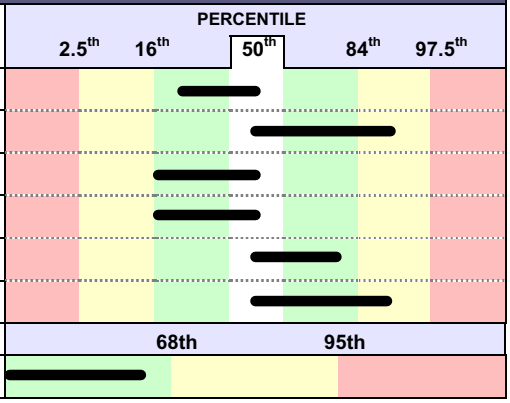
GASTROINTESTINAL MARKERS

	RESULT µM/24 hours	REFERENCE INTERVAL
Ammonia (NH_4)	**40200**	12000- 65000
Ethanolamine	**530**	125- 600
Alpha-Aminoadipitate	**51**	8- 90
Threonine	**220**	60- 340
Tryptophan	**50**	25- 140
Taurine	**1550**	350- 1850
		68th 95th
Beta-alanine	**92**	< 35
Beta-aminoisobutyrate	**120**	< 400
Anserine	**420**	< 110
Carnosine	**120**	< 60
Gamma-aminobutyrate	**3**	< 7
Hydroxyproline	**7.8**	< 55



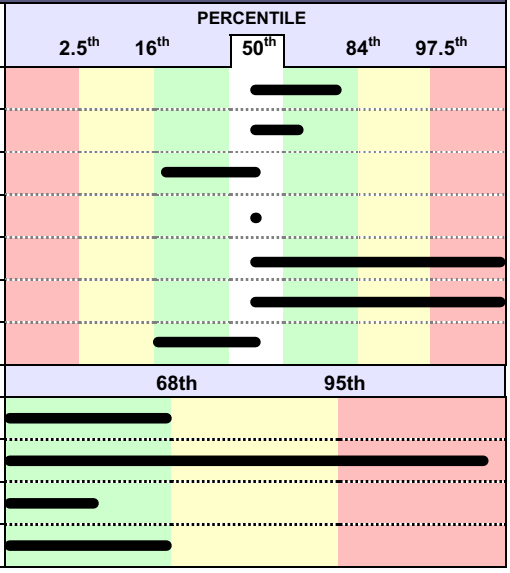
MAGNESIUM DEPENDANT MARKERS

	RESULT µM/24 hours	REFERENCE INTERVAL
Citrulline	**6**	1- 40
Ethanolamine	**530**	125- 600
Phosphoethanolamine	**30**	20- 100
Phosphoserine	**0.16**	0.06- 0.8
Serine	**390**	140- 568
Taurine	**1550**	350- 1850
		68th 95th
Methionine Sulfoxide	**4.2**	< 10



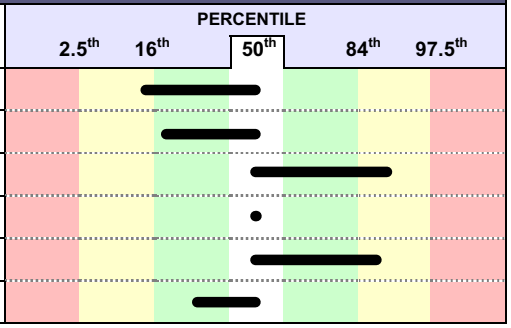
B6, B12, & FOLATE DEPENDANT MARKERS

	RESULT µM/24 hours	REFERENCE INTERVAL
Serine	**390**	140- 568
Alpha-aminoadipate	**51**	8- 90
Cysteine	**39**	31- 90
Cystathionine	**22**	9- 65
1-Methylhistidine	**650**	80- 450
3-Methylhistidine	**2570**	60- 1500
Alpha-amino-N-butyrate	**18**	8- 90
		68th 95th
Beta-aminoisobutyrate	**120**	< 400
Beta-alanine	**92**	< 35
Homocystine	**0.33**	< 1.2
Sarcosine	**2**	< 10



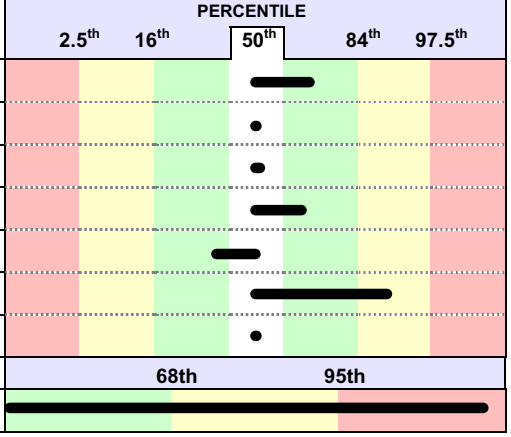
DETOXIFICATION MARKERS

	RESULT µM/24 hours	REFERENCE INTERVAL
Methionine	**14**	9 - 56
Cysteine	**39**	31 - 90
Taurine	**1550**	350 - 1850
Glutamine	**460**	190 - 725
Glycine	**2610**	380 - 3500
Aspartate	**13**	7 - 38



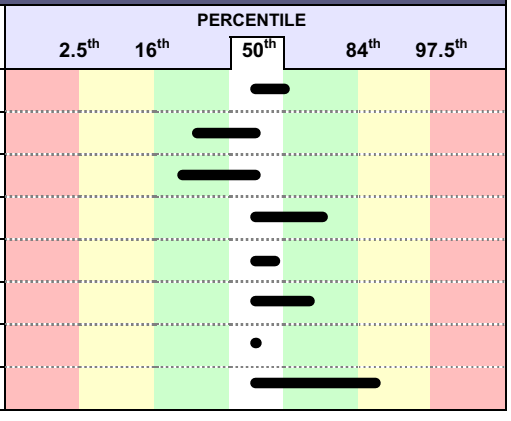
NEUROLOGICAL MARKERS

	RESULT µM/24 hours	REFERENCE INTERVAL
Ammonia (NH_4)	**40200**	12000 - 65000
Glutamine	**460**	190 - 725
Phenylalanine	**57**	30 - 130
Tyrosine	**93**	30 - 188
Tryptophan	**50**	25 - 140
Taurine	**1550**	350 - 1850
Cystathionine	**22**	9 - 65
Beta-alanine	**92**	< 35



UREA CYCLE METABOLITES

	RESULT per 24 hours		REFERENCE INTERVAL
Arginine	**36**	**µM**	10 - 70
Aspartate	**13**	**µM**	7 - 38
Citrulline	**6**	**µM**	1 - 40
Ornithine	**21**	**µM**	3 - 55
Urea	**490**	**mM**	180 - 900
Ammonia (NH_4)	**40200**	**µM**	12000 - 65000
Glutamine	**460**	**µM**	190 - 725
Asparagine	**190**	**µM**	45 - 260



SPECIMEN DATA

Comments:

Date Collected: **05/23/2016**
Date Received: **05/25/2016**
Date Completed: **05/31/2016**

Collection Period: **24 hr**
Volume: **2710 ml**

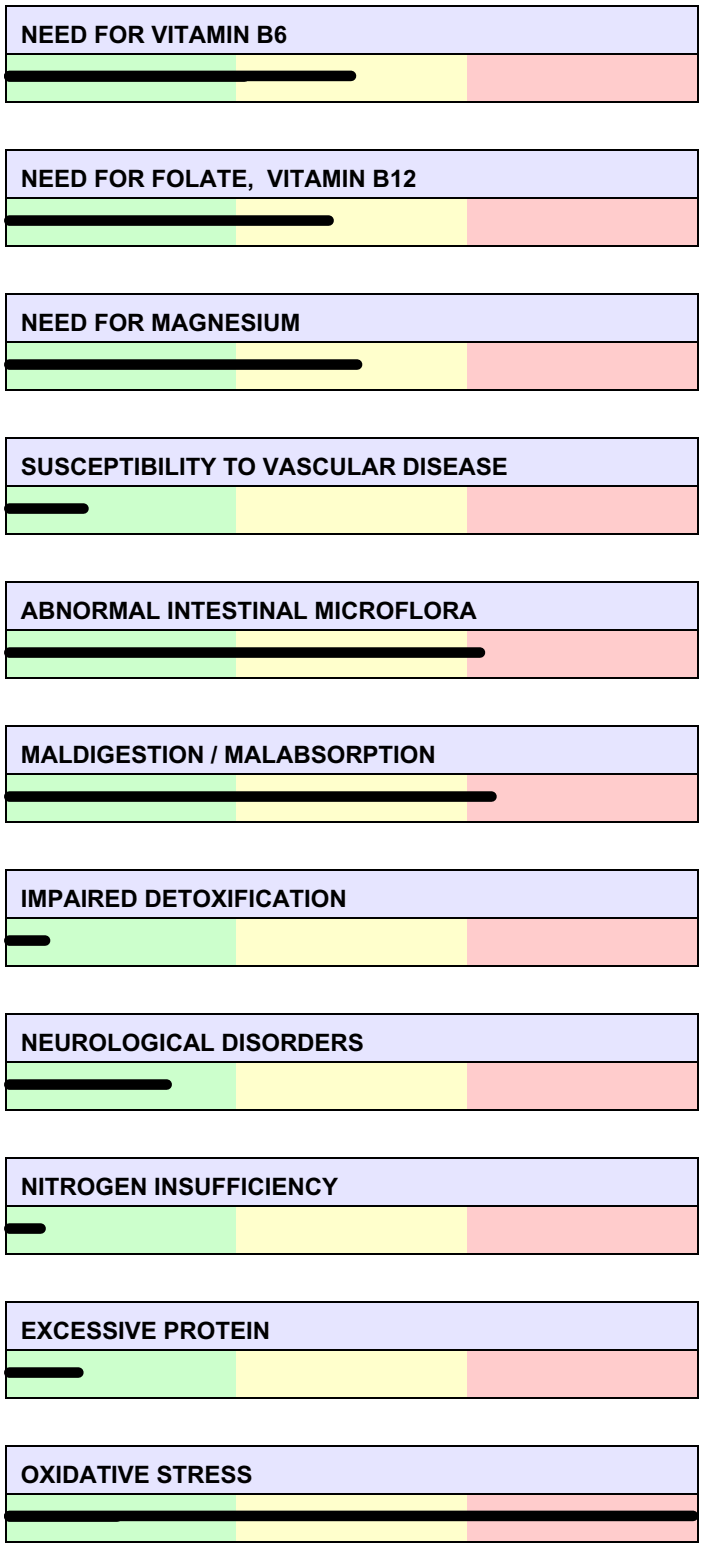
Methodology: **LC MS/MS**
NH_4, Urea by Automated Chem Analyzer

v3

SUPPLEMENTATION SCHEDULE

An amino acid supplement schedule is not provided for this patient because there were no essential amino acid deficiencies associated with this analysis. Assimilation of nutritionally essential amino acids appears to be adequate, there are no significant excesses or deficiencies, and kidney excretion and conservation processes appear to be normal.

PRESUMPTIVE NEEDS / IMPLIED CONDITIONS



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).

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.

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.

Anserine (high)

Anserine, a dietary peptide is high in this urine specimen. Anserine is an incompletely digested peptide that is derived primarily from poultry, duck, rabbit, tuna and salmon. Anserine consists of 3-methylhistidine and beta-alanine. Breakdown of the peptide requires a zinc dependent peptidase, which can be inhibited by high levels of the ”end product” beta-alanine. Beta-alanine can accumulate if deamination of beta-alanine to

alpha-ketoglutarate is impaired due to B-6 insufficiency. Therefore anserine can accumulate as a result of high intake of anserine containing protein with insufficient zinc and/or B-6 availability. Beta-alanine can also be elevated as a product of gastrointestinal bacterial conversion of aspartate and/or breakdown of pyrimidines that are high in yeast. Thus beta-alanine can accumulate and inhibit hydrolysis of anserine as a result of significant dysbiosis, or deficiencies of B-6 and/or zinc. Beta-alanine can have adverse effects in the central nervous system but, more commonly elevated levels of beta-alanine inhibit renal conservation of the amino acid taurine which is an important antioxidant, neurotransmitter and, essential for the retention and metabolism of intracellular magnesium and potassium. If urinary taurine is either low or high, magnesium deficiency is likely or pending. Comprehensive Stool Analysis (yeast/bacteria), Red Blood Cell Elements analysis (zinc, potassium, and magnesium) and assessment of B-6 status are useful to identify the cause and potential consequences of the inability to breakdown this dietary peptide.

Carnosine (high)

Carnosine, a dietary peptide, is high in this urine specimen. Carnosine is an incompletely digested peptide that is derived primarily from beef and pork. Carnosine consists of histidine and beta-alanine. Breakdown of the peptide requires a zinc dependent peptidase, which can be inhibited by high levels of the ”end product” beta-alanine. Beta-alanine can accumulate if deamination of beta-alanine to alpha-ketoglutarate is impaired due to B-6 insufficiency. Therefore, carnosine can accumulate as a result of high intake of carnosine containing meats with insufficient zinc and/or B-6 availability. Beta-alanine can also be elevated as a product of gastrointestinal bacterial conversion of aspartate and/or breakdown of pyrimidines that are high in yeast. Thus beta-alanine can accumulate and inhibit hydrolysis of carnosine as a result of significant dysbiosis, or deficiencies of B-6 and/or zinc. Beta-alanine can have adverse effects in the central nervous system, but more commonly elevated levels of beta-alanine inhibit renal conservation of the amino acid taurine which is an important antioxidant, neurotransmitter and essential for the retention and metabolism of intracellular magnesium and potassium. If urinary taurine is either low or high, magnesium deficiency is likely or pending. Comprehensive Stool Analysis (yeast/bacteria), Red Blood Cell Elements Analysis (zinc, potassium, and magnesium) and assessment of B-6 status are useful to identify the cause and potential consequences of the inability to break down this dietary peptide.

1-Methylhistidine (high)

1-methylhistidine is high in this urine specimen. 1-methylhistidine is derived primarily from skeletal muscle, and to a lesser extent from skin. Elevated 1-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. 1-methylhistidine may also be higher than normal if the diet or assimilation of folic acid and B-12 are insufficient.

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.