

Client: Example Client ABC123
123 Test Drive
Salt Lake City, UT 84108
UNITED STATES

Physician: Doctor, Example

Patient: Patient, Example

DOB: 4/16/2018
Gender: Unknown
Patient Identifiers: 01234567890ABCD, 012345
Visit Number (FIN): 01234567890ABCD
Collection Date: 00/00/0000 00:00

Autism and Intellectual Disability Metabolic Panel

ARUP test code 2014312

Creatinine, Urine	143 mg/dL	
Alpha-amino butyric acid, Plasma	16 umol/L	(Ref Interval: <=40)
Alanine, Plasma	360 umol/L	(Ref Interval: 160-530)
Allo-isoleucine, Plasma	<2 umol/L	(Ref Interval: <=5)
Alpha-aminoadipic acid, Plasma	<2 umol/L	(Ref Interval: <=4)
Anserine, Plasma	<5 umol/L	(Ref Interval: <=5)
Arginine, Plasma	80 umol/L	(Ref Interval: 35-125)
Argininosuccinic Acid, Plasma	<2 umol/L	(Ref Interval: <=2)
Asparagine, Plasma	35 umol/L	(Ref Interval: 20-80)
Aspartic Acid, Plasma	<5 umol/L	(Ref Interval: <=15)
Beta-amino isobutyric acid, Plasma	<5 umol/L	(Ref Interval: <=10)
Beta-alanine, Plasma	<25 umol/L	(Ref Interval: <=25)

H=High, L=Low, *=Abnormal, C=Critical

Citrulline, Plasma	28 umol/L	(Ref Interval: 10-45)
Cystathionine, Plasma	<5 umol/L	(Ref Interval: <=5)
Cystine, Plasma	39 umol/L	(Ref Interval: 10-65)
Ethanolamine, Plasma	10 umol/L	(Ref Interval: <=15)
Gamma-amino butyric acid, Plasma	<5 umol/L	(Ref Interval: <=5)
Glutamic Acid, Plasma	39 umol/L	(Ref Interval: 15-130)
Glutamine, Plasma	425 umol/L	(Ref Interval: 380-680)
Glycine, Plasma	218 umol/L	(Ref Interval: 140-420)
Histidine, Plasma	70 umol/L	(Ref Interval: 50-130)
Homocitrulline, Plasma	<5 umol/L	(Ref Interval: <=5)
Homocystine, Plasma	<2 umol/L	(Ref Interval: <=2)
Hydroxylysine, Plasma	<5 umol/L	(Ref Interval: <=5)
Hydroxyproline, Plasma	8 umol/L	(Ref Interval: 5-40)
Isoleucine, Plasma	59 umol/L	(Ref Interval: 30-120)
Leucine, Plasma	115 umol/L	(Ref Interval: 60-180)
Lysine, Plasma	161 umol/L	(Ref Interval: 85-230)

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Methionine, Plasma	23 umol/L	(Ref Interval: 15-40)
Ornithine, Plasma	61 umol/L	(Ref Interval: 25-110)
Phenylalanine, Plasma	63 umol/L	(Ref Interval: 30-82)
Proline, Plasma	157 umol/L	(Ref Interval: 90-350)
Sarcosine, Plasma	<5 umol/L	(Ref Interval: <=5)
Serine, Plasma	99 umol/L	(Ref Interval: 60-170)
Taurine, Plasma	75 umol/L	(Ref Interval: 30-130)
Threonine, Plasma	94 umol/L	(Ref Interval: 60-190)
Tryptophan, Plasma	49 umol/L	(Ref Interval: 25-80)
Tyrosine, Plasma	67 umol/L	(Ref Interval: 35-110)
Valine, Plasma	220 umol/L	(Ref Interval: 120-320)
C2, Acetyl	7.13 umol/L	(Ref Interval: 3.69-24.71)
C3, Propionyl	0.26 umol/L	(Ref Interval: 0.00-0.97)
C4, Iso-/Butyryl	0.28 umol/L	(Ref Interval: 0.00-0.50)
C5, Isovaleryl/2Mebutyryl	0.05 umol/L	(Ref Interval: 0.00-0.28)
C5-DC, Glutaryl	0.06 umol/L	(Ref Interval: 0.00-0.07)

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C5-OH, 3-OH Isovaleryl	0.02 umol/L		(Ref Interval: 0.00-0.07)
C6, Hexanoyl	0.48 umol/L	H	(Ref Interval: 0.00-0.12)
C8, Octanoyl	1.42 umol/L	H	(Ref Interval: 0.00-0.23)
C8:1, Octenoyl	0.27 umol/L		(Ref Interval: 0.00-0.63)
C10, Decanoyl	1.84 umol/L	H	(Ref Interval: 0.00-0.35)
C10:1, Decenoyl	0.39 umol/L		(Ref Interval: 0.00-0.41)
C12, Dodecanoyl	0.41 umol/L	H	(Ref Interval: 0.00-0.12)
C12:1, Dodecenoyl	0.24 umol/L	H	(Ref Interval: 0.00-0.16)
C12-OH, 3-OH-Dodecanoyl	0.00 umol/L		(Ref Interval: 0.00-0.02)
C14, Tetradecanoyl	0.09 umol/L	H	(Ref Interval: 0.00-0.07)
C14:1, Tetradecenoyl	0.29 umol/L	H	(Ref Interval: 0.00-0.23)
C14:2, Tetradecadienoyl	0.13 umol/L	H	(Ref Interval: 0.00-0.12)
C14-OH, 3-OH-Tetradecanoyl	0.00 umol/L		(Ref Interval: 0.00-0.02)
C14:1-OH, 3-OH-Tetradecenoyl	0.01 umol/L		(Ref Interval: 0.00-0.03)
C16, Palmitoyl	0.09 umol/L		(Ref Interval: 0.00-0.10)
C16:1, Palmitoleyl	0.10 umol/L	H	(Ref Interval: 0.00-0.05)

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C16-OH, 3-OH-Palmitoyl	0.00 umol/L	(Ref Interval: 0.00-0.01)
C16:1-OH, 3-OH-Palmitoleyl	0.01 umol/L	(Ref Interval: 0.00-0.01)
C18, Stearoyl	0.03 umol/L	(Ref Interval: 0.00-0.05)
C18:1, Oleyl	0.13 umol/L	(Ref Interval: 0.00-0.16)
C18:2, Linoleyl	0.07 umol/L	(Ref Interval: 0.00-0.08)
C18-OH, 3-OH-Stearoyl	0.00 umol/L	(Ref Interval: 0.00-0.01)
C18:1-OH, 3-OH-Oleyl	0.00 umol/L	(Ref Interval: 0.00-0.01)
C18:2-OH, 3-OH-Linoleyl	0.00 umol/L	(Ref Interval: 0.00-0.01)
Mucopolysaccharides mg/mmol CRT	6.3	(Ref Interval: 5.4-30.8)
	REFERENCE INTERVAL: Mucopolysaccharides mg/mmol CRT	
	Access complete set of age- and/or gender-specific reference intervals for this test in the ARUP Laboratory Test Directory (aruplab.com).	
	Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement B: aruplab.com/CS	
Lactic Acid, Urine	80	(Ref Interval: 0-150)
Pyruvic Acid, Urine	11	(Ref Interval: 0-30)
Succinic Acid, Urine	3	(Ref Interval: 0-80)
Fumaric Acid, Urine	Not Detected	(Ref Interval: 0-10)
2-Ketoglutaric Acid, Urine	12	(Ref Interval: 0-120)

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Methylmalonic Acid, Urine	1	(Ref Interval: 0-5)
3-OH-Butyric Acid, Urine	1	(Ref Interval: 0-4)
Acetoacetic Acid, Urine	Not Detected	(Ref Interval: 0-4)
2-Keto-3-methylvaleric Acid, Urine	Not Detected	(Ref Interval: 0-10)
2-Ketoisocaproic Acid, Urine	Not Detected	(Ref Interval: 0-4)
2-Ketoisovaleric Acid, Urine	Not Detected	(Ref Interval: 0-4)
Ethylmalonic Acid, Urine	1	(Ref Interval: 0-15)
Adipic Acid, Urine	2	(Ref Interval: 0-35)
Suberic Acid, Urine	1	(Ref Interval: 0-10)
Sebacic Acid, Urine	Not Detected	(Ref Interval: 0-3)
4-OH-phenylacetic Acid, Urine	11	(Ref Interval: 0-100)
4-OH-phenyllactic Acid, Urine	Not Detected	(Ref Interval: 0-4)
4-OH-phenylpyruvic Acid, Urine	Not Detected	(Ref Interval: 0-2)
Succinylacetone, Urine	Not Detected	(Ref Interval: 0-0)
Creatine, Urine	39 mmol/mol CRT	(Ref Interval: 23-1500)
Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement B: aruplab.com/CS		

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Guanidinoacetic acid, Urine	63 mmol/mol CRT	(Ref Interval: 45-250)
Creatinine, Urine	10723.0 umol/L	
Creatine, Serum/Plasma	53.7 umol/L	(Ref Interval: 37.0-117.0)
Guanidinoacetic acid, Serum/Plasma	1.45 umol/L	(Ref Interval: 0.50-1.80)

Autism/Intellectual Disability Interp **See Note**

Plasma acylcarnitines analysis showed elevated concentration of several acylcarnitine species. We have seen this pattern in patients with generalized mitochondrial dysfunction, with riboflavin deficiency, recovering from ketosis, and/or receiving dietary supplements. Cannot exclude Multiple Acyl-CoA Dehydrogenase Deficiency (MADD, Glutaric acidemia type II), a disorder of fatty acids and protein metabolism due to a defect in electron transfer flavoprotein or in electron transfer flavoprotein ubiquinone oxidoreductase, although it is unlikely given normal urine organic acids. No other abnormalities were detected by the other tests included in this panel. Would repeat plasma acylcarnitine profile and, if the pattern observed persists, would consider molecular testing to exclude MADD. Genetic and metabolic evaluations are recommended.

INTERPRETIVE INFORMATION: Autism and Intellectual Disability Metabolic Panel
 MPS Screen, Urine: Mucopolysaccharides (Glycosaminoglycans) include: Keratan Sulfate, Heparan Sulfate, Dermatan Sulfate, and Chondroitin Sulfates 4 and 6. The excretion of Heparan Sulfate is variable. A normal mucopolysaccharides screen does not exclude Sanfilippo Syndrome (Mucopolysaccharidosis Type III).

Organic Acids, Urine: Results are reported in mmol/mol creatinine.

Test developed and characteristics determined by ARUP Laboratories. See Compliance Statement B: aruplab.com/CS

VERIFIED/REPORTED DATES				
Procedure	Accession	Collected	Received	Verified/Reported
Creatinine, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Alpha-amino butyric acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Alanine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Allo-isoleucine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Alpha-aminoadipic acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Anserine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

H=High, L=Low, *=Abnormal, C=Critical

Arginine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Argininosuccinic Acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Asparagine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Aspartic Acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Beta-amino isobutyric acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Beta-alanine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Citrulline, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Cystathionine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Cystine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Ethanolamine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Gamma-amino butyric acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Glutamic Acid, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Glutamine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Glycine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Histidine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Homocitrulline, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Homocystine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Hydroxylysine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Hydroxyproline, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Isoleucine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Leucine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Lysine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Methionine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Ornithine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Phenylalanine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Proline, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Sarcosine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Serine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Taurine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Threonine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Tryptophan, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Tyrosine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Valine, Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C2, Acetyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C3, Propionyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C4, Iso-/Butyryl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C5, Isovaleryl/2Mebutyryl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C5-DC, Glutaryl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C5-OH, 3-OH Isovaleryl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C6, Hexanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C8, Octanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C8:1, Octenoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

H=High, L=Low, *=Abnormal, C=Critical

C10, Decanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C10:1, Decenoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C12, Dodecanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C12:1, Dodecenoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C12-OH, 3-OH-Dodecanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C14, Tetradecanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C14:1, Tetradecenoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C14:2, Tetradecadienoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C14-OH, 3-OH-Tetradecanoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C14:1-OH, 3-OH-Tetradecenoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C16, Palmitoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C16:1, Palmitoleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C16-OH, 3-OH-Palmitoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C16:1-OH, 3-OH-Palmitoleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18, Stearoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18:1, Oleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18:2, Linoleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18-OH, 3-OH-Stearoyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18:1-OH, 3-OH-Oleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
C18:2-OH, 3-OH-Linoleyl	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Mucopolysaccharides mg/mmol CRT	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Lactic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Pyruvic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Succinic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Fumaric Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
2-Ketoglutaric Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Methylmalonic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
3-OH-Butyric Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Acetoacetic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
2-Keto-3-methylvaleric Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
2-Ketoisocaproic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
2-Ketisovaleric Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Ethylmalonic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Adipic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Suberic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Sebacic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
4-OH-phenylacetic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
4-OH-phenyllactic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
4-OH-phenylpyruvic Acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Succinylacetone, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Creatine, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Guanidinoacetic acid, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

H=High, L=Low, *=Abnormal, C=Critical

Creatinine, Urine	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Creatine, Serum/Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Guanidinoacetic acid, Serum/Plasma	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00
Autism/Intellectual Disability Interp	20-106-102746	00/00/0000 00:00	00/00/0000 00:00	00/00/0000 00:00

END OF CHART

H=High, L=Low, *=Abnormal, C=Critical
