KBMO DIAGNOSTICS

METABOLIC INSIGHTS PROFILE

Name:	RANDOM, ANY
Test Type:	Organic Acids
Date of Birth:	01/01/1901
Accession Number:	199671
Provider:	Sample Doctor

Report Legend: **In Range** **Out of Normal Range**

Collection Information:

Sample Type:

Collection Date: 08/06/2024

Date Completed: 10/8/2024

Date Reported: 3/5/2025

Metabolic Insights Profile

Here to follow are the results of your Metabolic Insights Profile (MIP). You will find a list of all the various organic acids tested in this look into your system. Each of the analytes tested in the MIP will appear along with your current value, your previous value and the relavant range as well as a convenient graph showing you where your result falls within this range. A red marker will appear beside each item that falls out of normal ranges and at the end you will find a review of all the items tested that did not measure in range.

What is the MIP? The MIP is a comprehensive test for a multitude or organic acids that…

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METABOLIC INSIGHTS PROFILE

Results

Microbial Metabolites

	Current Result	Previous Result	Graphical View	Ranges
Fungal Metabolites				
1. Arabinose	**0.1**	**0.2** 9/9/2024	0 0.88	**≤0.88**
2. Arabitol	**0.2**	**0.4** 9/9/2024	0 0.4	**≤0.4**
3. Tartaric	**0.3**	**0.6** 9/9/2024	0 0.18	**≤0.18**
4. Citramalic	**0.4**	**0.8** 9/9/2024	0 0.41	**≤0.41**
5. 5-Hydroxymethyl-2-furoic	**0.5**	**1** 9/9/2024	0 2	**≤2**
6. Furancarbonylglycine	**0.1**	**0.2** 9/9/2024	0 2.6	**≤2.6**
7. Furan-2,5-dicarboyxlic	**0.2**	**0.4** 9/9/2024	0 0.85	**≤0.85**
8. Tricarballylate	**0.3**	**0.6** 9/9/2024	0 0.35	**≤0.35**
Clostridia Metabolites				
9. 3-Oxoglutaric	**0.4**	**0.8** 9/9/2024	0 0.98	**≤0.98**
10. HPHPA	**0.5**	**1** 9/9/2024	0 3.9	**≤3.9**
11. 4-Cresol	**0.1**	**0.2** 9/9/2024	0 0.21	**≤0.21**
Bacterial Metabolites				
12. Hippurate	**0.2**	**0.4** 9/9/2024	0.23 2.2	**>0.23 or <2.2**
13. Phenylpropionate	**0.2**	**0.4** 9/9/2024	0.07 0.52	**>0.07 or <0.52**
14. p-Hydroxybenzoate	**0.4**	**0.8** 9/9/2024	0 2.6	**≤2.6**
15. p-Hydroxyphenylacetate	**0.5**	**1** 9/9/2024	10.14 32.45	**>10.14 or <32.45**

Detoxification Indicators

16. L-Pyroglutamic acid	**0.2**	**0.4** 9/9/2024	0.06 1.58	**>0.06 or <1.58**
17. Orotate	**0.4**	**0.8** 9/9/2024	0 2.4	**≤2.4**
18. 8-Hydroxy-2-deoxyguanosine	**0.2**	**0.4** 9/9/2024	0 4.57	**≤4.57**
19. 4-Hydroxybutyric	**0.4**	**0.8** 9/9/2024	0 3.5	**≤3.5**
20. N-Acetylcysteine (NAC)	**0.5**	**1** 9/9/2024	0 9.6	**≤9.6**

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Metabolism & Mitocondrial Function

	Current Result	Previous Result	Graphical View	Ranges
Citric Acid Cycle				
21. Citric Acid	0.1	0.2 9/9/2024	0.03 3.9	>0.03 or <3.9
22. Cis-Aconitate	0.2	0.4 9/9/2024	0.47 2.74	>0.47 or <2.74
23. Isocitrate	0.6	1.2 9/9/2024	0.13 2.14	>0.13 or <2.14
24. 2-Oxoglutaric	0.5	1 9/9/2024	0 0.23	≤0.23
25. Alpha-Ketoglutarate	0.4	0.8 9/9/2024	0.16 2.18	>0.16 or <2.18
26. Succinate	0.1	0.2 9/9/2024	0 50.4	≤50.4
27. Fumarate	0.9	1.8 9/9/2024	0 9.4	≤9.4
28. Malate	80	160 9/9/2024	0 498.8	≤498.8
29. Hydroxymethylglutarate	0.3	0.6 9/9/2024	6.1 27.9	>6.1 or <27.9
Glycololysis Metabolism/Lactic Acid Cycle				
30. Pyruvate	0.4	0.8 9/9/2024	0 34.77	≤34.77
31. L-Lactate	0.2	0.4 9/9/2024	0 9.4	≤9.4
32. B-Hydroxybutyrate	0.8	1.6 9/9/2024	0 0.91	≤0.91
Fatty Acid Metabolism				
33. Adipate	0.6	1.2 9/9/2024	0.08 1.74	>0.08 or <1.74
34. Suberate	0.4	0.8 9/9/2024	0 4.9	≤4.9
35. Ethylmalonate	0.9	1.8 9/9/2024	0 6.2	≤6.2
36. Acetoacetic	0.4	0.8 9/9/2024	0 0.75	≤0.75
37. Methylsuccinic	0.5	1 9/9/2024	0.05 0.69	>0.05 or <0.69
38. Sebacic	0.7	1.4 9/9/2024	0 1.3	≤1.3

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Nutrition & Oxalates

	Current Result	Previous Result	Graphical View	Ranges
Nutrients				
39. Alpha-ketoisovalerate/ Alpha-ket	0.4	0.8 9/9/2024	0.74 16.98	>0.74 or <16.98
40. Xanthurenate	0.8	1.6 9/9/2024	0 0.44	≤0.44
41. Pyridoxic	800	1600 9/9/2024	0 607	≤607
42. Pantothenic	10	20 9/9/2024	0 12.67	≤12.67
43. Glutaric	60	120 9/9/2024	0 74.88	≤74.88
44. Ascorbic	22	44 9/9/2024	0 20.1	≤20.1
45. Formiminoglutamic acid (FIGLU)	450	900 9/9/2024	0 227	≤227
46. Phosphoric	0.7	1.4 9/9/2024	0 3.1	≤3.1
Pyrimidine Metabolites				
47. Uracil	27	54 9/9/2024	0 30	≤30
48. Thymine	15	30 9/9/2024	0 30	≤30
Oxalates				
49. Oxalic	0.6	1.2 9/9/2024	0 3.8	≤3.8
50. Glycolic Acid	0.5	1 9/9/2024	0 4.47	≤4.47
51. Glyceric Acid	10	20 9/9/2024	0 13.4	≤13.4
Inborn Errors of Metabolism				
52. 3-Methylglutaric	0.2	0.4 9/9/2024	0 16.7	≤16.7
53. 3-Methylglutaconic	0.3	0.6 9/9/2024	0 1.82	≤1.82
54. B-hydroxyisovalerate	0.4	0.8 9/9/2024	0 0.5	≤0.5
55. 2-Oxoisovaleric	600	1200 9/9/2024	557.3 1655.5	>557.3 or <1655.5
56. 2-Hydroxyisocaproic	1542	3084 9/9/2024	3535 8455	>3535 or <8455
57. Malonic	2400	4800 9/9/2024	2411.2 5047.8	>2411.2 or <5047.8
58. 2- Oxoisocaproic	7	14 9/9/2024	2.6 8.3	>2.6 or <8.3
59. 2-oxo-4-methiobutyric Acid	0.984	1.968 9/9/2024	0.74 1.88	>0.74 or <1.88
60. Mandelic	2000	4000 9/9/2024	1711 9788	>1711 or <9788
61. Phenyllactic	300	600 9/9/2024	125.6 991.3	>125.6 or <991.3
62. Homogentisic	2200	4400 9/9/2024	610.3 2432.9	>610.3 or <2432.9
63. 4-Hydroxybutyric	0.7	1.4 9/9/2024	0.032 1.1	>0.032 or <1.1

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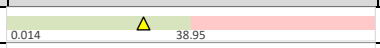
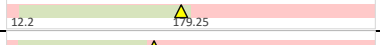
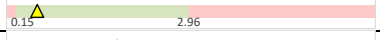
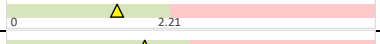
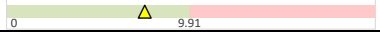
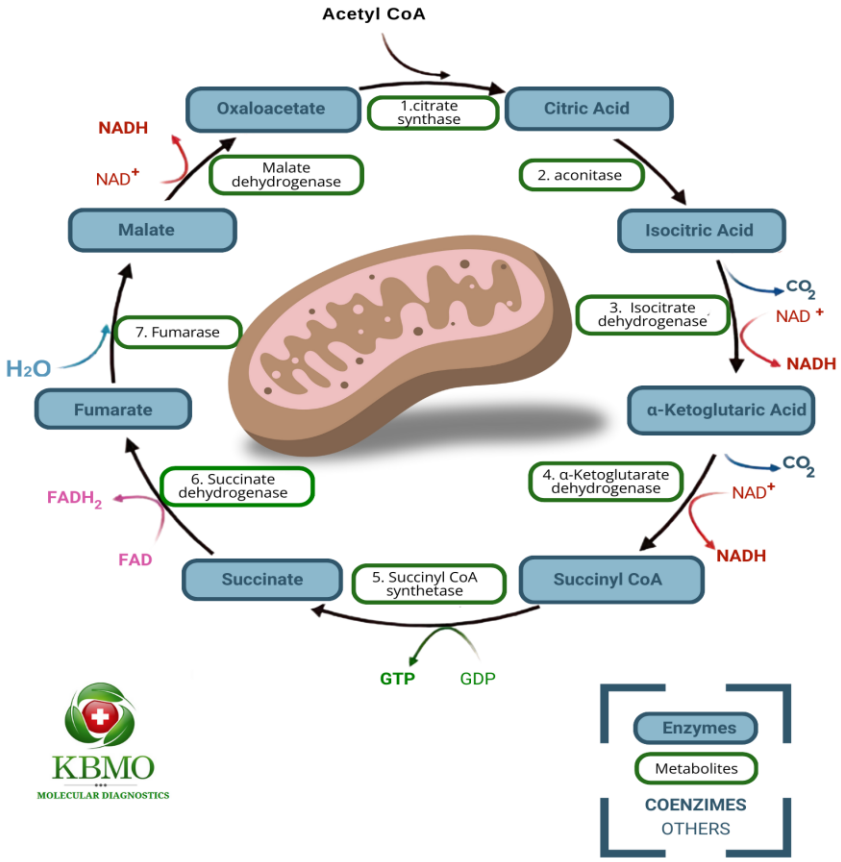
Neurotransmitter Metabolism Markers

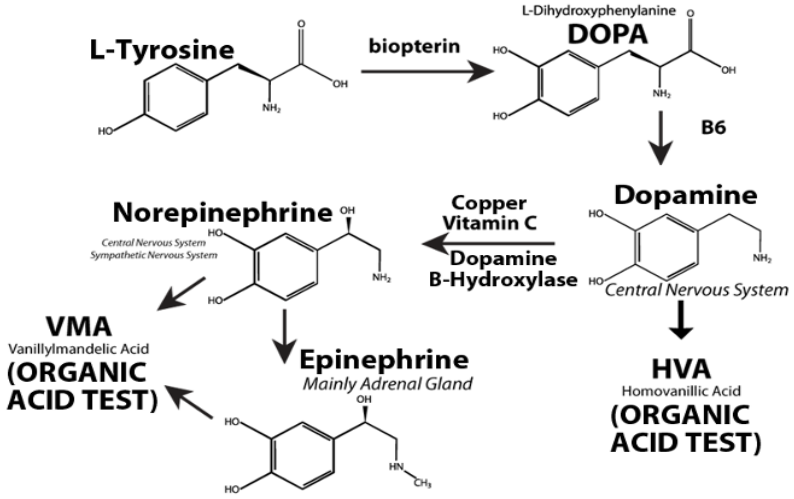
	Current Result	Previous Result	Graphical View	Ranges
64. Homovanilate	29	58 (9/9/2024)		>0.014 or <38.95
65. Vanilmandelate	170	340 (9/9/2024)		>12.2 or <179.25
66. HVA/VMA	0.4	0.8 (9/9/2024)		>0.03 or <0.38
67. 5-Hydroyxindoleacetate	0.5	1 (9/9/2024)		>0.15 or <2.96
68. Kynurenate	1.5	3 (9/9/2024)		≤2.21
69. Quinolinate	7.5	15 (9/9/2024)		≤9.91

Additional Information

Within the cell citric acid is produced in mitochondria from acetyl-coenzyme A (acetyl-CoA) and oxalacetate via the action of the enzyme citrate synthase and enters the citric acid cycle (also termed tricarboxylic acid cycle or Krebs cycle) mainly in the liver and also in skeletal muscle and renal cortex.[46] The citric acid cycle is the final common pathway for the oxidation of carbohydrates, fatty acids, and amino acids. In this cycle, citric acid is used to generate energy through the oxidation of the acetyl component of acetyl-CoA derived from carbohydrates, fats, and amino acids.



DOPA and dopamine are metabolized into their final product, homovanillic acid (HVA), while norepinephrine and epinephrine are metabolized into vanillylmandelic acid (VMA).



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Out of Range Results

Out of Range Analytes:	Result	Previous Result
3. Tartaric	0.3	0.6
Tartaric acid can be elevated from wine, grape, apple, or several other fruit ingestion or produced by some fungi(2-4) . There is no evidence that Tartaric is a metabolite of any species of Candida.		
12. Hippurate	0.2	0.4
Hippuric Acid is a metabolite of gut bacteria metabolism of phenylalanine. It can also result from the hepatic glycine conjugation of benzoic acid (13).		
15. p-Hydroxyphenylacetate	0.5	1
The detection of large amounts of p-Hydroxyphenylacetate is associated with Giarddia lamblia infestation as well as other anaerobic bacterial overgrowths (17).		
22. Cis-Aconitate	0.2	0.4
Produced during the citric acid dehydration during the Krebs Cycle and is a marker for mitochondrial activity. Activates the NRF2 pathway which leads to the production of glutathione (27).		
24. 2-Oxoglutaric	0.5	1
Very large amounts could indicate the presence of L-2-hydroxyglutaric aciduria which is an inborn error in metabolism (29). Much smaller accumulations could be from a deficiency in calcium (30).		
29. Hydroxymethylglutarate	0.3	0.6
High levels may reflect inadequate endogenous synthesis of CoQ10. CoQ10 may help prevent heart ailments, inhibition of LDL oxidation, and progression of atherosclerosis (37).		
39. Alpha-ketoisovalerate/ Alpha-ketoisocaproate/ Alpha-keto-Beta-methylvalerate	0.4	0.8
Urinary elevations of these ketoacids can be caused by deficiencies in vitamin cofactors. The enzymes required for metabolism of these molecules need vitamins B1,B2,B3,B5 and lipoic acid to perform their reactions (45, 46).		
40. Xanthurenate	0.8	1.6
Xanthurenic is a product of the kynurenine pathway which is one of the routes of tryptophan catabolism. When B6 is low xanthurenate could build up in the body and be excreted in urine. Conditions that are correlated with high xanthurenate include inflammatory diseases and immune suppression (47).		
41. Pyridoxic	800	1600
Correlated with B6 intake. Low values could indicate the patient is deficient in B6 (48).		
44. Ascorbic	22	44
Also known as vitamin C. Low amounts do not necessarily mean the patient needs additional vitamin C. Some patients show elevated amounts without supplementation. This could be contributed to yeast or other microbiota in the gut producing their own ascorbic acid (51).		

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Out of Range Results continued…

Out of Range Analytes:	Result	Previous Result
45. Formiminoglutamic acid (FIGLU)	450	900
Elevated levels of FIGLU could indicate folate, vitamin B12, or a rare genetic disorder FTD deficiency(52).		
56. 2-Hydroxyisocaproic	1542	3084
Elevated in ketoacidosis and acquired organic acidurias in newborns(63).		
57. Malonic	2400	4800
Malonic acidemia is an inherited condition in which the body is unable to break down certain proteins.		
66. HVA/VMA	0.4	0.8
The ratio indicates how well dopamine is converted to epinephrine. A high ratio is seen is people with copper deficiencies, mutations to enzymes, or inhibitions to the enzymes by toxins.		

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