

<b>Requisition #:</b>	1475231	<b>Practitioner:</b>	RN LABS
<b>Patient Name:</b>	Olivia Parbery	<b>Date of Collection:</b>	08/25/2025
<b>Date of Birth:</b>	05/13/2015	<b>Patient Age:</b>	10
<b>Patient Sex:</b>	F	<b>Time of Collection:</b>	Not Given
		<b>Report Date:</b>	09/12/2025


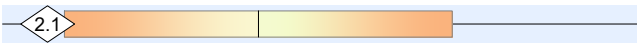

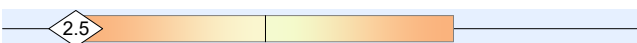
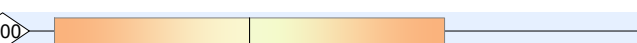
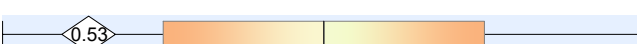
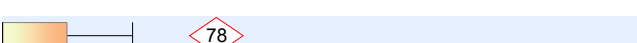
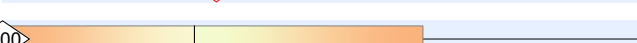
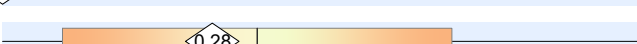


## Organic Acids Test - Nutritional and Metabolic Profile



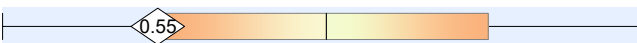

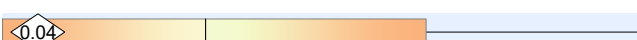
Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)	Patient Value	Reference Population - Females Under Age 13
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### Intestinal Microbial Overgrowth

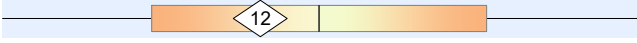

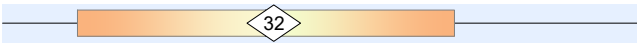
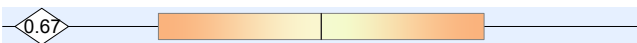
#### Yeast and Fungal Markers

1 Citramalic	≤ 5.3	1.5	
2 5-Hydroxymethyl-2-furoic (Aspergillus)	≤ 30	2.1	
3 3-Oxoglutaric	≤ 0.52	0.04	
4 Furan-2,5-dicarboxylic (Aspergillus)	≤ 22	2.5	
5 Furancarboxylglycine (Aspergillus)	≤ 3.6	0	
6 Tartaric (Aspergillus)	≤ 3.9	0.53	
7 Arabinose	≤ 56	<b>H</b> 78	
8 Carboxycitric	≤ 34	0	
9 Tricarballic (Fusarium)	≤ 0.86	0.28	

#### Bacterial Markers

10 Hippuric	≤ 717	57	
11 2-Hydroxyphenylacetic	≤ 1.1	0.23	
12 4-Hydroxybenzoic	0.09 - 2.0	0.55	
13 4-Hydroxyhippuric	≤ 27	12	
14 DHPA (Beneficial Bacteria)	≤ 0.73	0.04	

#### Clostridia Bacterial Markers

15 4-Hydroxyphenylacetic (C. difficile, C. stricklandii, C. lituseburens & others)	≤ 30	12	
16 HPHPA (C. sporogenes, C. caloritolerans, C. botulinum & others)	≤ 227	54	
17 4-Cresol (C. difficile)	≤ 76	32	
18 3-Indoleacetic (C. stricklandii, C. lituseburens, C. subterminale & others)	≤ 11	0.67	

This test was developed, and its performance characteristics determined by Mosaic Diagnostics Laboratory. It has not been cleared or approved by the US Food and Drug Administration, however, does comply with CLIA regulations for clinical use.

The results should be interpreted in conjunction with the complete clinical picture, given patient history and presentation, and at the discretion of the medical provider.

Methodology: GC-MS. Creatinine by Jaffe Reaction. \*The creatinine test is performed to adjust metabolic marker results for differences in fluid intake. Urinary creatinine, from a random collection, has limited diagnostic value due to variability as a result of recent fluid intake.

Requisition #:

1475231

Practitioner:

RN LABS

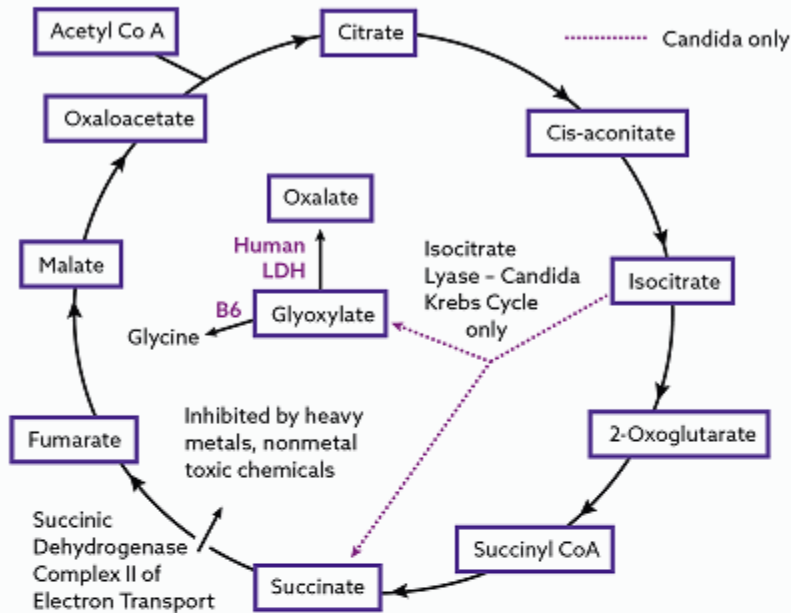
Patient Name:

Olivia Parbery

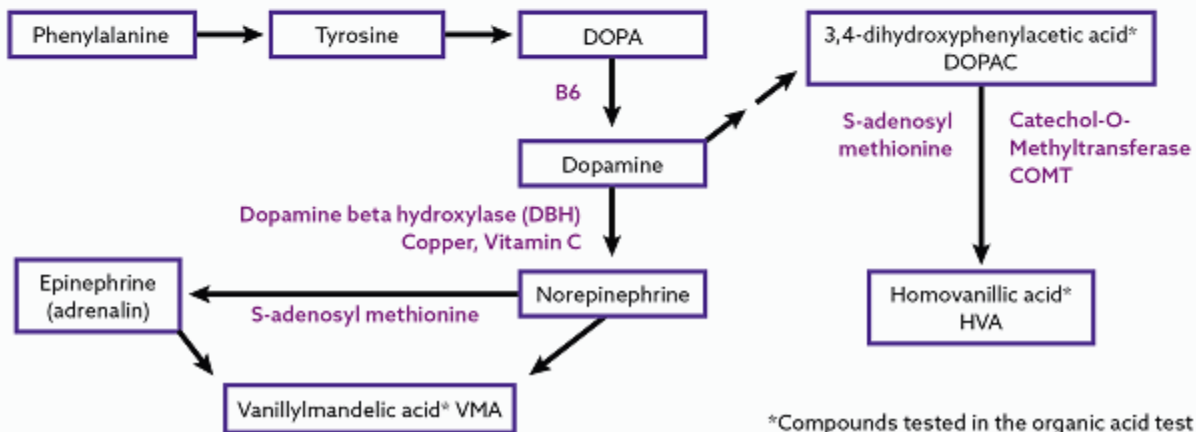
Date of Collection:

08/25/2025

## Human Krebs Cycle showing Candida Krebs Cycle variant that causes excess Oxalate via Glyoxylate



## Major pathways in the synthesis and breakdown of catecholamine neurotransmitters in the absence of microbial inhibitors

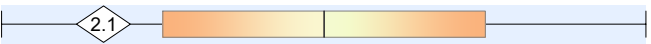
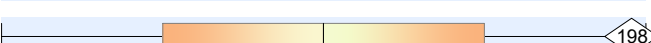
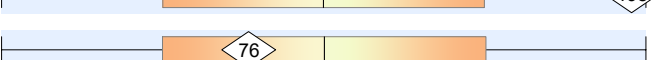


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Patient Name: Olivia Parbery

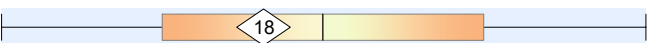
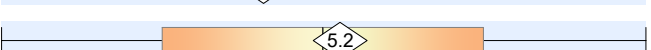
Practitioner: RN LABS  
Date of Collection: 08/25/2025

Metabolic Markers in Urine      Reference Range (mmol/mol creatinine)      Patient Value      Reference Population - Females Under Age 13

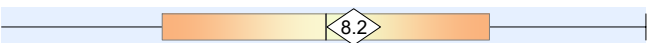

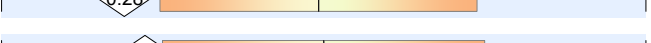

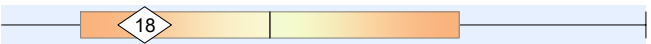
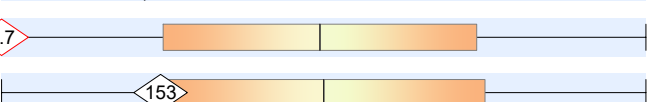
### Oxalate Metabolites

19	Glyceric	0.71 - 9.5	2.1	
20	Glycolic	20 - 202	198	
21	Oxalic	15 - 174	76	

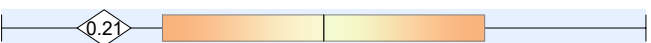
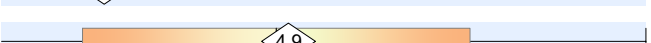
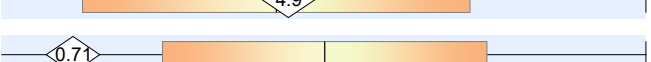
### Glycolytic Cycle Metabolites

22	Lactic	0.18 - 44	18	
23	Pyruvic	0.88 - 9.1	5.2	

### Mitochondrial Markers - Krebs Cycle Metabolites

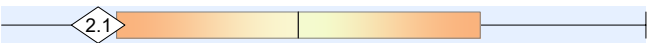
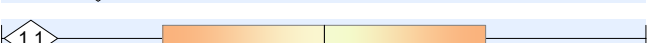
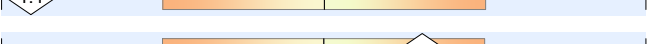
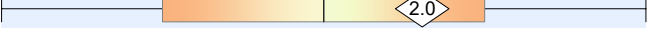
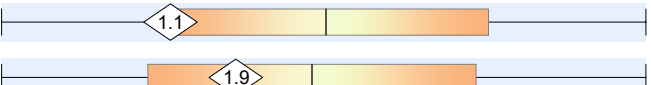
24	Succinic	≤ 15	8.2	
25	Fumaric	0.04 - 1.3	0.28	
26	Malic	≤ 2.2	0.49	
27	2-Oxoglutaric	≤ 81	18	
28	Aconitic	11 - 35	<b>L</b> 8.7	
29	Citric	59 - 440	153	

### Mitochondrial Markers - Amino Acid Metabolites

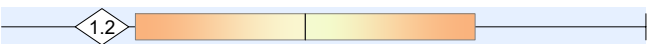
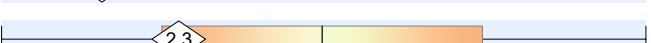
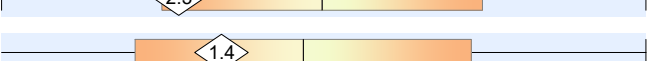
30	3-Methylglutaric	0.07 - 0.95	0.21	
31	3-Hydroxyglutaric	≤ 11	4.9	
32	3-Methylglutaconic	≤ 6.4	0.71	

### Neurotransmitter Metabolites

#### Phenylalanine and Tyrosine Metabolites

33	Homovanillic (HVA) (dopamine)	≤ 14	2.1	
34	Vanillylmandelic (VMA) (norepinephrine, epinephrine)	0.87 - 5.9	1.1	
35	HVA / VMA Ratio	0.12 - 3.0	2.0	
36	Dihydroxyphenylacetic (DOPAC) (dopamine)	0.07 - 4.0	1.1	
37	HVA / DOPAC Ratio	1.5 - 2.6	1.9	

#### Tryptophan Metabolites

38	5-Hydroxyindoleacetic (5-HIAA) (serotonin)	≤ 7.7	1.2	
39	Quinolinic	0.63 - 6.7	2.3	
40	Kynurenic	≤ 4.1	1.4	


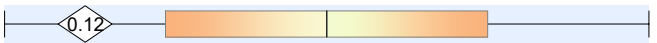
## Mosaic Diagnostics

Requisition #: 1475231  
Patient Name: Olivia Parbery

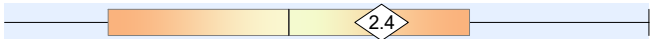
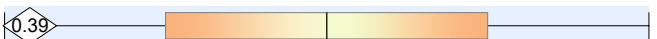
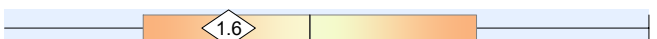
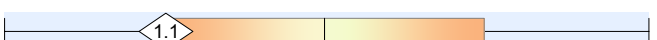
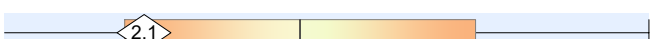

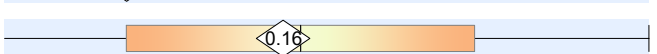
Practitioner: RN LABS  
Date of Collection: 08/25/2025

Metabolic Markers in Urine      Reference Range (mmol/mol creatinine)      Patient Value      Reference Population - Females Under Age 13

### Pyrimidine Metabolites - Folate Metabolism

41 Uracil	≤ 19	2.0	
42 Thymine	0.01 - 0.89	0.12	

### Ketone and Fatty Acid Oxidation

43 3-Hydroxybutyric	≤ 4.1	2.4	
44 Acetoacetic	≤ 10	0.39	
45 Ethylmalonic	≤ 4.6	1.6	
46 Methylsuccinic	≤ 4.3	1.1	
47 Adipic	≤ 9.7	2.1	
48 Suberic	≤ 9.5	1.8	
49 Sebacic	≤ 0.37	0.16	

### Nutritional Markers

#### Vitamin B12

50 Methylmalonic *	≤ 6.2	2.0	
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#### Vitamin B6

51 Pyridoxic (B6)	≤ 59	0	
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#### Vitamin B5

52 Pantothenic (B5)	≤ 26	7.8	
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#### Vitamin B2 (Riboflavin)

53 Glutaric *	≤ 1.1	0.43	
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#### Vitamin C

54 Ascorbic	10 - 200	L 0.69	
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#### Vitamin Q10 (CoQ10)

55 3-Hydroxy-3-methylglutaric *	≤ 101	14	
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#### Glutathione Precursor and Chelating Agent

56 N-Acetylcysteine (NAC)	≤ 0.41	0	
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#### Biotin (Vitamin H)

57 Methylcitric *	≤ 5.5	1.0	
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\* A high value for this marker may indicate a deficiency of this vitamin.

## Mosaic Diagnostics

Requisition #: 1475231  
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Practitioner: RN LABS  
Date of Collection: 08/25/2025

Metabolic Markers in Urine      Reference Range (mmol/mol creatinine)      Patient Value      Reference Population - Females Under Age 13

### Indicators of Detoxification

#### Glutathione

58 Pyroglutamic \*      7.0 - 63      23      

#### Methylation, Toxic exposure

59 2-Hydroxybutyric \*\*      ≤ 2.2      1.4      

#### Ammonia Excess

60 Orotic      ≤ 0.88      0.19      

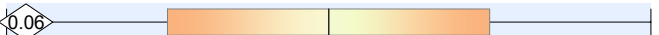
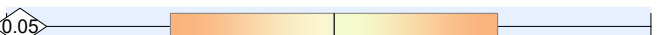
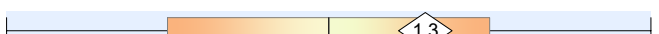

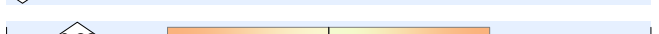
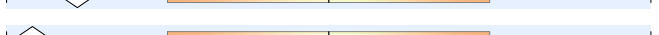
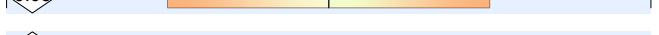
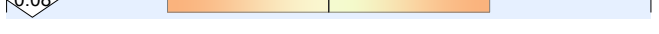

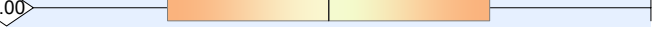
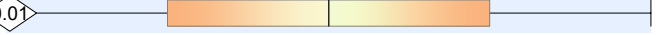
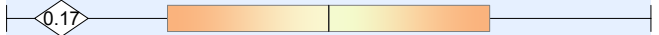
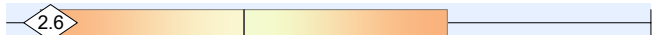

#### Aspartame, salicylates, or GI bacteria

61 2-Hydroxyhippuric      ≤ 1.2      0.27      

\* A high value for this marker may indicate a Glutathione deficiency.  
\*\* High values may indicate methylation defects and/or toxic exposures.

### Amino Acid Metabolites

Low values are not associated with inadequate protein intake and have not been demonstrated to indicate specific amino acid deficiencies.

62 2-Hydroxyisovaleric	≤ 2.0	0.06	
63 2-Oxoisovaleric	≤ 2.4	0.05	
64 3-Methyl-2-oxovaleric	≤ 2.0	1.3	
65 2-Hydroxyisocaproic	≤ 2.0	0.05	
66 2-Oxoisocaproic	≤ 2.0	0.22	
67 2-Oxo-4-methiolbutyric	≤ 2.0	0.08	
68 Mandelic	≤ 2.0	0.08	
69 Phenyllactic	≤ 2.3	0.02	
70 Phenylpyruvic	≤ 2.3	0	
71 Homogentisic	≤ 2.0	0.01	
72 4-Hydroxyphenyllactic	≤ 2.0	0.17	
73 N-Acetylaspartic	≤ 38	2.6	
74 Malonic	≤ 12	5.8	
75 4-Hydroxybutyric	≤ 3.4	<b>H</b> 3.8	

### Mineral Metabolism

76 Phosphoric      1,000 - 7,300      1,096      

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Indicator of Fluid Intake

77 \*Creatinine 243 mg/dL

\*The creatinine test is performed to adjust metabolic marker results for differences in fluid intake. Urinary creatinine has limited diagnostic value due to variability as a result of recent fluid intake. Samples are rejected if creatinine is below 20 mg/dL unless the client requests results knowing of our rejection criteria.

Explanation of Report Format

The reference ranges for organic acids were established using samples collected from typical individuals of all ages with no known physiological or psychological disorders. The ranges were determined by calculating the mean and standard deviation (SD) and are defined as  $\pm 2SD$  of the mean. Reference ranges are age and gender specific, consisting of Male Adult ( $\geq 13$  years), Female Adult ( $\geq 13$  years), Male Child ( $<13$  years), and Female Child ( $<13$  years).

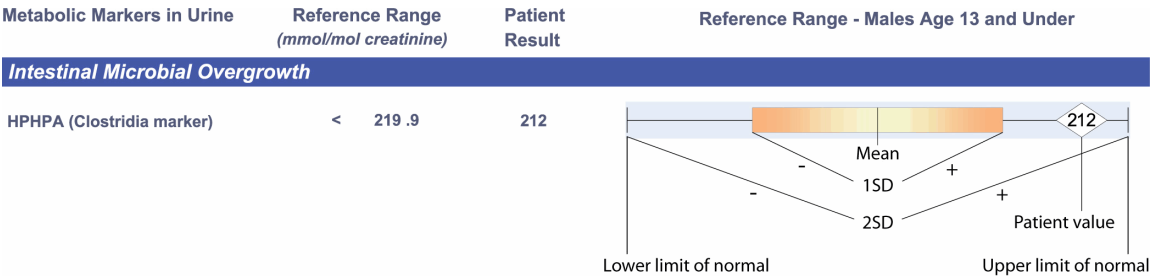
There are two types of graphical representations of patient values found in the new report format of both the standard Organic Acids Test and the Microbial Organic Acids Test.

The first graph will occur when the value of the patient is within the reference (normal) range, defined as the mean plus or minus two standard deviations.

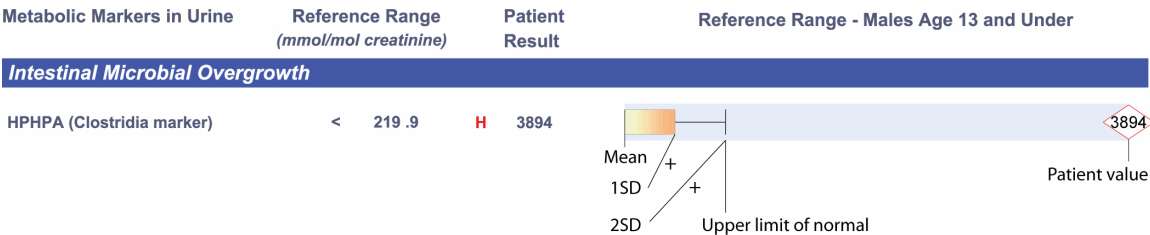
The second graph will occur when the value of the patient exceeds the upper limit of normal. In such cases, the graphical reference range is "shrunk" so that the degree of abnormality can be appreciated at a glance. In this case, the lower limits of normal are not shown, only the upper limit of normal is shown.

In both cases, the value of the patient is given to the left of the graph and is repeated on the graph inside a diamond. If the value is within the normal range, the diamond will be outlined in black. If the value is high or low, the diamond will be outlined in red.

Example of Value Within Reference Range



Example of Elevated Value



Requisition #:

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Practitioner:

RN LABS

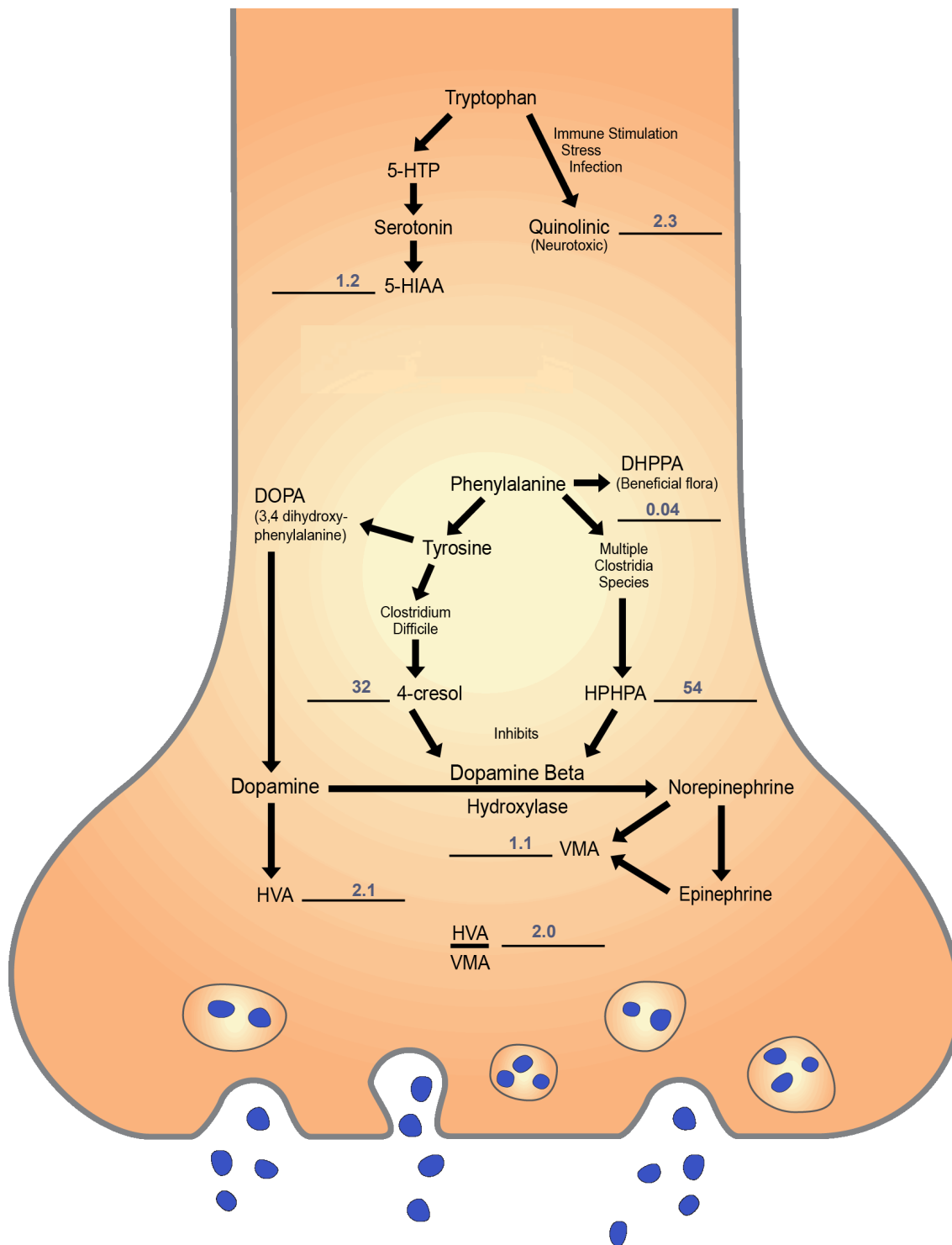
Patient Name:

Olivia Parbery

Date of Collection:

08/25/2025

## Neurotransmitter Metabolism Markers



The diagram contains the patient's test results for neurotransmitter metabolites and shows their relationship with key biochemical pathways within the axon terminal of nerve cells. The effect of microbial byproducts on the blockage of the conversion of dopamine to norepinephrine is also indicated.

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## Interpretation

**High yeast/fungal metabolites (1-8)** Elevations of one or more metabolites indicate a yeast/fungal overgrowth of the gastrointestinal (GI) tract. Prescription or natural (botanical) anti-fungals, along with supplementation of high potency multi-strain probiotics, may reduce yeast/fungal levels.

**Low or low normal citric acid (29)** may be due to impaired function of the Krebs cycle, low dietary intake of citrate-containing foods such as citrus fruits and juices, potassium deficiency, acidosis (especially renal tubular acidosis), chronic kidney failure, diabetes, hypoparathyroidism, or excessive muscle activity. Low values may indicate increased risk of oxalate kidney stone formation, especially if oxalic acid is elevated also. Supplement with calcium or magnesium citrate if oxalic acid is elevated.

**Homovanillic acid (HVA) levels (33) below the mean** indicate low production and/or decreased metabolism of the neurotransmitter dopamine. Homovanillic acid is a metabolite of the neurotransmitter dopamine. Low production of HVA can be due to decreased intake or absorption of dopamine's precursor amino acids such as phenylalanine and/or tyrosine, decreased quantities of cofactors needed for biosynthesis of dopamine such as tetrahydrobiopterin and vitamin B6 coenzyme or decreased amounts of cofactors such as S-adenosylmethionine (Sam-e) needed to convert dopamine to HVA. In addition, a number of genetic variations such as single nucleotide polymorphisms (SNPs) or mutations can cause reduced production of HVA due to enzymes with decreased function. HVA values below the mean but which are much higher than VMA values are usually due to impairment of dopamine beta hydroxylase due to excessive Clostridia metabolites, the mold metabolite fusaric acid, pharmaceuticals such as disulfiram, or food additives like aspartame or deficiencies of cofactors such as vitamin C or copper. Values may also be decreased in patients on monoamine oxidase (MAO) inhibitors. In addition, a number of genetic variations such as single nucleotide polymorphisms (SNPs) or mutations in MAO or COMT genes can cause reduced production of HVA. Such SNPs are available on **The Great Plains DNA methylation pathway test** which can be performed on a cheek swab.

**Vanillylmandelic acid (VMA) levels (34) below the mean** indicate low production and/or decreased metabolism of the neurotransmitters norepinephrine and epinephrine. Vanillylmandelic acid is a metabolite of the neurotransmitters norepinephrine and epinephrine. Low production of VMA can be due to decreased intake or absorption of norepinephrine's and epinephrine's precursor amino acids such as phenylalanine and/or tyrosine, decreased quantities of cofactors needed for biosynthesis of norepinephrine and epinephrine such as tetrahydrobiopterin and vitamin B6 coenzyme or decreased amounts of cofactors such as S-adenosylmethionine (Sam-e) needed to convert norepinephrine and epinephrine to VMA. In addition, a number of genetic variations such as single nucleotide polymorphisms (SNPs) or mutations in MAO or COMT genes can cause reduced production of VMA. Such SNPs are available on **The Great Plains DNA methylation pathway test** which can be performed on a cheek swab. VMA values below the mean but which are much lower than HVA values are usually due to impairment of dopamine beta hydroxylase due to Clostridia metabolites, the mold metabolite fusaric acid, pharmaceuticals such as disulfiram, or food additives like aspartame or deficiencies of cofactors such as vitamin C or copper. Values may be decreased in patients on monoamine oxidase (MAO) inhibitors. Another cause for a low VMA value is a genetic variation (single nucleotide polymorphism or SNP) of the DBH enzyme. Patients with low VMA due to Clostridia metabolites or genetic DBH deficiency should not be supplemented with phenylalanine, tyrosine, or L-DOPA.



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**5-hydroxyindoleacetic acid (5HIAA) (38) levels below the mean** may indicate lower production and/or decreased metabolism of the neurotransmitter serotonin. 5-hydroxy-indoleacetic acid is a metabolite of serotonin. Low values have been correlated with symptoms of depression. Low production of 5HIAA can be due to decreased intake or absorption of serotonin's precursor amino acid tryptophan, decreased quantities of cofactors needed for biosynthesis of serotonin such as tetrahydrobiopterin and vitamin B6 coenzyme. In addition, a number of genetic variations such as single nucleotide polymorphisms (SNPs) or mutations can cause reduced production of 5HIAA. Such SNPs are available on **The Great Plains DNA methylation pathway test** which can be performed on a cheek swab. Values may be decreased in patients on monoamine oxidase (MAO) inhibitors that are drugs or foods that contain tyramine such as Chianti wine and vermouth, fermented foods such as cheeses, fish, bean curd, sausage, bologna, pepperoni, sauerkraut, and salami.

**Pyridoxic acid (B6) levels below the mean (51)** may be associated with less than optimum health conditions (low intake, malabsorption, or dysbiosis). Supplementation with B6 or a multivitamin may be beneficial.

**Pantothenic acid (B5) levels below the mean (52)** may be associated with less than optimum health conditions. Supplementation with B5 or a multivitamin may be beneficial.

**Ascorbic acid (vitamin C) levels below the mean (54)** may indicate a less than optimum level of the antioxidant vitamin C. Individuals who consume large amounts of vitamin C can still have low values if the sample is taken 12 or more hours after intake. Supplementation with buffered vitamin C taken 2 or 3 times a day is suggested.

**Slightly high 4-hydroxybutyric acid (75)** may be due to the interference from closely related compounds or due to the use of 4-hydroxybutyric acid (also called gamma-hydroxy butyric acid) as a supplement.

**Low citramalic, 2-hydroxyphenylacetic, 4-hydroxyphenylacetic, 4-hydroxybenzoic, 4-hydroxyhippuric, 3-indoleacetic, glyceric, glycolic, oxalic, lactic, pyruvic, 3-Methylglutaric, 3-methylglutaconic, 2-hydroxybutyric, fumaric, malic, aconitic, quinolinic, kynurenic, thymine, ethylmalonic, methylsuccinic, adipic, suberic, glutaric, 3-hydroxy-3-methylglutaric, methylcitric, or orotic** values have no known clinical significance.

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