

# Biomarkers Included in the MIP



## MICROBIAL METABOLITES

### Fungal Metabolites

1. Arabinose
2. Arabitol
3. Citramalic
4. 5-Hydroxymethyl-2-furoic
5. Furancarboxylglycine
6. Furan-2,5-dicarboxylic
7. Tricarballic
8. Ascorbic/Isoascorbic (vitamin C and Fungi)

### Clostridia Metabolites

9. HPHPA
10. m-Cresol-sulphate
11. 3-Indoleacetic
12. -Hydroxyhippuric

### Bacterial Metabolites

13. Benzoate
14. Hippurate
15. p-Hydroxybenzoate
16. p-Hydroxyphenylacetic
17. p-Hydroxyphenyllactic

### Miscellaneous Microbial Metabolite

18. Tartaric

## DETOXIFICATION INDICATORS

19. L-Pyrroglutamic acid
20. N-Acetylcysteine (NAC)
21. 8-Hydroxy-2-deoxyguanosine
22. 4-Hydroxybutyric
23. Orotic Acid

## METABOLISM & MITOCHONDRIAL FUNCTION

### Citric Acid Cycle

24. Citric Acid
25. Cis-Aconitate
26. Isocitrate
27. 2-Oxoglutaric
28. Succinic acid
29. Fumarate
30. Malic acid

### Glycolysis Metabolism/Lactic Acid Cycle

31. Pyruvic acid
32. L-Lactic acid
33. B-Hydroxybutyrate
34. 2,4-dihydroxybutanoic acid

### Fatty Acid Metabolism

35. Adipate
36. Suberic acid
37. Ethylmalonate

### Ketone and Fatty Acid Oxidation

38. Acetoacetic
39. Methylsuccinic
40. Sebacic

### Miscellaneous Metabolism Metabolite

41. Creatinine

## NUTRITION & OXALATES

### Nutrients

42. Alpha-ketoisovalerate/ Alpha-ketoisocaproate/ Alpha-keto-Beta-methylvalerate
43. Xanthurenic acid
44. 4-Pyridoxic (B6)
45. Pantothenic (B5)
46. Glutaric (B2)
47. Formiminoglutamic acid (FIGLU)
48. Methylmalonic (MMA)

### Pyrimidine Metabolites

49. Uracil
50. Thymine

### Oxalates

51. Oxalic
52. Glycolic Acid
53. Glyceric Acid

### Inborn Errors of Metabolism

54. 3-Methylglutaric
55. 3-Methylglutaconic
56. B-hydroxyisovalerate
57. 2-Oxoisovaleric
58. Malonic
59. 2-Oxoisocaproic
60. 2-Oxo-4-methylbutyric acid
61. 3-Hydroxy-3-Methylglutaric (CoQ10)
62. Mandelic
63. 3-Phenyllactic
64. Homogentisic

## NEUROTRANSMITTER METABOLISM MARKERS

65. Homovanillic acid (HVA)
66. Vanilmandelic acid (VMA)
67. HVA/VMA ratio
68. DOPAC
69. 5-Hydroxyindoleacetic acid (5-HIAA)
70. Kynurenic acid
71. Quinolinic acid
72. Kynurenic acid/ Quinolinic Acid