

Supplementary Table 2. Metabolites and their abundances measured by faecal metabolomics in each group

Class	Metabolites	HCs	MEG	Glioma	BM
		Md (P25, P75)	Md (P25, P75)	Md (P25, P75)	Md (P25, P75)
Amino Acids	2-phenylglycine	3.63 (2.43. 2.43)	2.56 (2.12. 3.13)	4.81 (2.74. 6.09)	3.28 (2.55. 3.71)
Amino Acids	3-nitrotyrosine	3.77 (2.78. 2.78)	2.54 (1.57. 3.33)	254.43 (2.23. 5.18)	3.23 (2.48. 3.51)
Amino Acids	Alanine	1674.79 (1112.93. 1112.93)	2601.85 (1760.56. 3190.81)	1607.36 (1935.8. 3287.6)	2713.94 (1498.66. 3342.83)
Amino Acids	α-aminobutyric acid	203.24 (128.07. 128.07)	185.79 (99.3. 310.16)	119.53 (107.91. 413.83)	176.12 (127.65. 233.03)
Amino Acids	Aminocaproic acid	62.45 (49.55. 49.55)	25.11 (10.16. 108.85)	31.1 (20.52. 190.44)	45.93 (16.4. 159.81)
Amino Acids	Arginine	97.58 (58.31. 58.31)	144.36 (55.07. 349.71)	180.39 (92.29. 369.15)	97.27 (84.2. 214.22)
Amino Acids	Asparagine	77.53 (52.5. 52.5)	35.02 (27.77. 45.1)	392.28 (40.77. 159.56)	61.88 (24.4. 72.25)
Amino Acids	Aspartic acid	969.4 (733.02. 733.02)	1242.34 (775.83. 1798.46)	826.44 (1158.37. 1936.45)	1715.21 (985.58. 2526.59)
Amino Acids	Citrulline	829.07 (558.77. 558.77)	1139.35 (669.76. 1500.21)	304.19 (911. 1837.7)	1185.19 (965.72. 2042.91)
Amino Acids	Creatine	90.03 (14.35. 14.35)	18.85 (8.89. 154.39)	11.07 (8.56. 45.35)	12.79 (8.7. 25.9)
Amino Acids	Cystine	1488.74 (785. 785)	956.93 (816.54. 2318.63)	360.61 (845.21. 3178.87)	1598.92 (805.11. 3348.83)
Amino Acids	Dimethylglycine	6.72 (5.2. 5.2)	6.54 (4.89. 9.94)	21.97 (5.89. 10.02)	7.83 (6.15. 11.77)
Amino Acids	Glutamine	964.73 (788.02. 788.02)	1148.67 (769.38. 1538.26)	662.01 (1032.93. 1717.88)	1223.04 (1112.45. 1727.34)
Amino Acids	Glyceric acid	270.76 (160.74. 160.74)	364.55 (193.57. 541.7)	79.66 (318.06. 602.44)	394.74 (313.54. 811.02)
Amino Acids	Glycolic acid	785.96 (497. 497)	1016.1 (795.69. 1738.24)	237.89 (902.19. 1775.73)	876.69 (630.07. 1764.46)
Amino Acids	Histidine	118.02 (81.59. 81.59)	132.11 (79.05. 203.01)	148.08 (107.84. 200.03)	113.6 (63.62. 241)
Amino Acids	Isoleucine	422.8 (315.67. 315.67)	738.28 (593.18. 1189.11)	580.93 (782.28. 1467.72)	973.02 (555.82. 1327.06)
Amino Acids	Kynurenine	4.76 (4.07. 4.07)	3.71 (2.84. 4.21)	17.79 (3.59. 7.72)	4.18 (3.31. 5.17)
Amino Acids	Leucine	669.21 (474.82. 474.82)	1135.75 (851.87. 1824.62)	1949.17 (1148.85. 1984.52)	1526.14 (812.69. 2352.58)
Amino Acids	Lysine	1255.47 (869.76. 869.76)	1580.57 (1118.28. 2436.7)	555.99 (1124.58. 2877.31)	1801.15 (1221.24. 2428.25)
Amino Acids	Methionine	529.78 (328.82. 328.82)	684.66 (599.34. 1054.98)	39.24 (614.53. 1173.13)	799.62 (427.17. 1225.88)
Amino Acids	Methylcysteine	5.82 (4.03. 4.03)	3.76 (3.31. 4.36)	7.16 (4.33. 7.2)	4.86 (3.56. 7.27)
Amino Acids	N-acetyltryptophan	12.32 (6.85. 6.85)	9.05 (6.35. 17.44)	24.61 (5.85. 18.66)	12.99 (6.91. 19.59)
Amino Acids	N-phenylacetylphenylalanine	0.33 (0.13. 0.13)	0.9 (0.28. 1.89)	6.94 (0.51. 2.21)	1.41 (0.73. 1.81)
Amino Acids	Ornithine	207.4 (144.41. 144.41)	187.02 (84.67. 389.31)	464.83 (113.9. 305.56)	211.37 (120.81. 267.9)
Amino Acids	Phenylalanine	263.17 (223. 223)	357.93 (293.89. 593.93)	29.14 (348.37. 661.73)	499.99 (254.3. 844.61)
Amino Acids	Pipecolic acid	73.55 (19.37. 19.37)	116.39 (35.73. 208.03)	480.61 (47.72. 146.31)	94.16 (71.79. 184.28)
Amino Acids	Proline	486.94 (392.09. 392.09)	750.2 (420.36. 1812.68)	1419.6 (641.16. 1283.36)	823.28 (682.19. 1620.74)
Amino Acids	Pyroglutamic acid	1408.08 (1001.53. 1001.53)	2243.99 (1545.21. 3529.63)	464.91 (1422.68. 3522.75)	2486.14 (1377.72. 3210.12)
Amino Acids	Sarcosine	90.06 (63.15. 63.15)	87.37 (68.11. 114.81)	24.6 (57.21. 117.64)	109.12 (80.08. 137.11)
Amino Acids	Serine	478.9 (292.41. 292.41)	699.37 (528.93. 1044.51)	171.73 (698.47. 1050.86)	823.19 (472.72. 1142.23)
Amino Acids	Threonine	322.37 (217.83. 217.83)	362.31 (300. 518.21)	567.56 (353.66. 540.13)	427.33 (261.04. 635.6)
Amino Acids	Tryptophan	108.21 (73.85. 73.85)	106.85 (64.13. 167.56)	17.82 (118.05. 204.51)	137.03 (73.84. 201.52)
Amino Acids	Tyrosine	474.53 (318.78. 318.78)	616.77 (456.85. 871.74)	307.23 (624.78. 1158.36)	914.46 (475.26. 1309.98)
Amino Acids	Valine	650.32 (318.84. 318.84)	891.99 (664.49. 1322.75)	2458.67 (839.6. 1468.98)	901.67 (579. 1619.97)
Amino Acids	β-alanine	391.3 (174.51. 174.51)	163.86 (94.77. 294.49)	70.48 (105.68. 490.77)	164.08 (105.69. 684.95)
Amino Acids	γ-aminobutyric acid	186.65 (51.15. 51.15)	86.24 (37.29. 170.71)	12.31 (58.83. 755.22)	92.32 (37.68. 298.55)
Benzenoids	Mandelic acid	2.62 (1.71. 1.71)	1.9 (1.7. 2.14)	3.67 (1.8. 4.21)	2.6 (2.26. 2.73)
Benzenoids	Ortho-hydroxyphenylacetic acid	0.5 (0.22. 0.22)	0.32 (0. 0.63)	0.72 (0. 0.6)	0.46 (0. 0.96)
Benzenoids	Phenylacetic acid	934.54 (420.92. 420.92)	2530.32 (430.63. 3390.7)	120.99 (1151.75. 4295.62)	2121.28 (1087.24. 3602.47)
Benzenoids	Phenylpyruvic acid	0.39 (0. 0)	0.73 (0. 3.65)	26.44 (0. 4.85)	2.56 (0.31. 8.56)
Benzoic Acids	3-aminosalicylic acid	71.4 (28.48. 28.48)	23.29 (17.58. 49.58)	21.7 (22.18. 71.35)	38.26 (25.84. 66.61)
Benzoic Acids	3-hydroxyhippuric acid	4.1 (2.62. 2.62)	3.03 (0.61. 3.93)	7.09 (2.43. 6.74)	4.05 (3.16. 4.97)
Benzoic Acids	4-aminohippuric acid	38.72 (21.94. 21.94)	36.27 (14.72. 69.54)	26.06 (19.17. 61.34)	39.87 (24.99. 66.9)
Benzoic Acids	4-hydroxybenzoic acid	13.26 (7.73. 7.73)	4.94 (3.5. 9.49)	23.87 (5.19. 12.56)	5.56 (3.41. 12.3)
Benzoic Acids	Gallic acid	30.26 (13.8. 13.8)	12.66 (9.66. 15.33)	7.69 (14.6. 38.03)	15.17 (11. 50.37)
Benzoic Acids	Hippuric acid	12.49 (0.85. 0.85)	19.82 (11.83. 78.04)	21.7 (8.45. 45.67)	22.42 (11.44. 77.25)
Benzoic Acids	Phthalic acid	7.64 (5.64. 5.64)	7.54 (5.37. 10.47)	7.3 (6.09. 11.94)	8.92 (6.2. 15.39)
Benzoic Acids	Vanillic acid	4.14 (3.43. 3.43)	3.28 (2.1. 4.29)	7.65 (3.24. 5.97)	3.45 (2.52. 4.98)
Bile Acids	23-nordeoxycholic acid	0.18 (0.09. 0.09)	0.46 (0.07. 0.93)	3.82 (0.09. 0.81)	0.27 (0.08. 0.83)
Bile Acids	3-dehydrocholic acid	27.83 (2.6. 2.6)	0.25 (0.05. 4.29)	6.13 (0.93. 21.48)	0.05 (0.05. 54.6)
Bile Acids	3β-ursodeoxycholic Acid	11.94 (4.86. 4.86)	4.92 (2.26. 7.54)	287.52 (4.89. 17.45)	23.21 (11.47. 28.63)
Bile Acids	7-dehydrocholic acid	20.18 (3.52. 3.52)	2.92 (1.74. 9.81)	537.88 (2.99. 17.86)	9.02 (3.54. 53.13)
Bile Acids	7-ketolithocholic acid	71.29 (50.01. 50.01)	145.7 (56. 216.97)	138.5 (57.39. 205.79)	129.43 (97.24. 184.77)
Bile Acids	Apocholic acid	8.84 (5.07. 5.07)	4.09 (2.84. 6.25)	22.78 (3.22. 10.66)	5.19 (4.81. 8.14)
Bile Acids	Chenodeoxycholic acid	260.94 (35.02. 35.02)	3.85 (0.69. 131.23)	8.49 (0.69. 240.15)	19.44 (0.69. 224.27)
Bile Acids	Cholic acid	315.3 (32.8. 32.8)	10.55 (4.36. 123.43)	37.56 (7.14. 201.92)	13.23 (8.74. 409.04)
Bile Acids	Deoxycholic acid	1033.47 (835.5. 835.5)	775.87 (561.95. 1942.7)	517.86 (684.68. 1837.3)	1193.94 (1032.58. 1842.94)
Bile Acids	Glucose	2.65 (1.55. 1.55)	1.4 (0.78. 2.65)	658.06 (1.02. 2.97)	1.31 (1. 3.52)
Bile Acids	Glycochenodeoxycholate	2.85 (2.01. 2.01)	1.66 (1.18. 5.39)	2.92 (1.37. 7.22)	2.54 (1.56. 6.51)
Bile Acids	Glycocholic acid	2.4 (1.88. 1.88)	1.47 (1.13. 2.99)	4.39 (1.8. 4.34)	1.96 (1.6. 3.25)
Bile Acids	Glycodeoxycholic acid	2.5 (1.76. 1.76)	3.05 (1.5. 6.19)	4.81 (2.01. 5.89)	2.62 (1.67. 4.31)
Bile Acids	Glycolithocholate	1.27 (1.04. 1.04)	2.47 (1.31. 4.06)	1.98 (1.35. 4.14)	2.17 (1.6. 4.05)
Bile Acids	Glycoursodeoxycholic acid	1.36 (1.13. 1.13)	1.17 (0.73. 1.68)	3 (1.04. 2.78)	2.12 (1.17. 2.83)

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		Md (P25, P75)	Md (P25, P75)	Md (P25, P75)	Md (P25, P75)
Bile Acids	Hippuric acid	4.29 (2.61. 2.61)	2.69 (2.15. 2.95)	42.06 (2.32. 6.42)	2.73 (2.16. 3.68)
Bile Acids	Isolithocholic acid	31.08 (16.87. 16.87)	106.27 (27.54. 181.89)	378.29 (50.49. 169.15)	102.42 (60.89. 141.14)
Bile Acids	Lithocholic acid	542.57 (372.46. 372.46)	952.76 (425.93. 1947.52)	151.54 (513.61. 1516.2)	910.97 (826.59. 1370.64)
Bile Acids	Lithocholic acid 3 sulfate	57.78 (21.41. 21.41)	17.16 (1.65. 84.87)	473.25 (4.94. 72.17)	8.54 (3.51. 145.28)
Bile Acids	Nor cholic acid	2.74 (2.08. 2.08)	2.43 (1.36. 3.67)	1.22 (2.04. 4.35)	2.58 (1.56. 3.21)
Bile Acids	Taurochenodeoxycholate	1.9 (1.24. 1.24)	0.82 (0.71. 1.29)	1.74 (1.11. 2.37)	1.88 (1.35. 6.29)
Bile Acids	Taurocholic acid	1.63 (1.17. 1.17)	0.89 (0.61. 1.26)	1.71 (0.95. 2.58)	1.33 (1.03. 1.65)
Bile Acids	Taurodeoxycholate	2.31 (1.68. 1.68)	1.43 (0.98. 2.36)	1.63 (1.33. 2.87)	2 (1.26. 2.43)
Bile Acids	Taurohyocholate	1.63 (1.17. 1.17)	0.89 (0.61. 1.26)	91.13 (0.95. 2.58)	1.33 (1.03. 1.65)
Bile Acids	Tauroursodeoxycholic acid	1.11 (0.64. 0.64)	0.97 (0.23. 1.23)	5.85 (0.05. 1.64)	1.24 (0.98. 1.57)
Bile Acids	Ursocholic acid	33.93 (5.32. 5.32)	3.51 (0.47. 9.49)	21.16 (2.8. 43.63)	65.77 (12.08. 86.76)
Bile Acids	Ursodeoxycholic acid	104.5 (32.55. 32.55)	12.3 (5.68. 45.38)	425.42 (15.16. 116.28)	87.34 (62.47. 220.72)
Bile Acids	β-muricholic acid	55.64 (5.73. 5.73)	4.47 (0.98. 12.94)	10.78 (6.29. 46.16)	19.14 (6.47. 59.47)
Bile Acids	γ-muricholic acid/hyocholic acid	6.98 (4.09. 4.09)	6.88 (3.42. 7.92)	4.09 (3.7. 9.72)	4.44 (0.86. 10.23)
Bile Acids	ω-muricholic acid	3.26 (0.36. 0.36)	1.81 (0.73. 3.25)	2.4 (1.65. 6.31)	4.3 (0.8. 6.98)
Carbohydrates	Fructose	9.05 (7.23. 7.23)	7.47 (5.4. 13.7)	146.96 (8.06. 15.31)	10.18 (9.67. 10.91)
Carbohydrates	Gluconolactone	14.11 (8.06. 8.06)	10.16 (6.78. 20.2)	71.37 (10.44. 21.02)	11.53 (8.64. 15.98)
Carbohydrates	Glutamic acid	18504.83 (12711.68. 12711.6)	5778.6 (3522.79. 10838.63)	2853.4 (7171.12. 28739.22)	13507.52 (7948.07. 31583.8)
Carbohydrates	Glycine	34.37 (17.89. 17.89)	13.21 (7.21. 25.81)	229.52 (15.59. 37.68)	60.4 (23.53. 64.89)
Carbohydrates	N-acetyl-D-glucosamine	1092.23 (889.26. 889.26)	1021.69 (500.61. 1828.77)	153.99 (843.31. 1791.31)	1082.14 (907.13. 1324.07)
Carbohydrates	Rhamnose	440.16 (385.61. 385.61)	248.16 (134.64. 397.19)	238.93 (223.77. 566.04)	357.96 (280.62. 562.39)
Carbohydrates	Ribulose	256.19 (163.1. 163.1)	82.89 (57.04. 147.22)	337.82 (85.77. 253.23)	130.53 (89.25. 198.23)
Carbohydrates	Tartaric acid	3.84 (2.57. 2.57)	2.67 (2.42. 3.35)	18.6 (2.93. 5.9)	3.48 (2.87. 5.45)
Carbohydrates	Xylose	6258.94 (5260.48. 5260.48)	3539 (2137.47. 5983.68)	872.31 (4467.09. 7973.46)	5026.09 (4273.77. 7007.89)
Carbohydrates	Xylulose	184.94 (123.03. 123.03)	62.77 (46.21. 113.88)	15.82 (67.36. 175.27)	88.16 (73.4. 143.52)
Carnitines	Acetylcarnitine	2.36 (0.77. 0.77)	2.21 (0.7. 3.94)	2.54 (0.25. 3.87)	1.9 (1.13. 4.65)
Carnitines	Carnitine	20.25 (13.95. 13.95)	17.33 (13.04. 27.9)	11.56 (18.32. 48.94)	24.1 (14.12. 37.23)
Fatty Acids	2-butenic acid	54.12 (35.08. 35.08)	29.26 (26.11. 48.38)	10.94 (35.34. 77.94)	50.11 (34. 98.66)
Fatty Acids	2-hydroxy-3-methylbutyric acid	25.6 (12.92. 12.92)	19.18 (10.84. 111.52)	6.38 (12.37. 42.67)	18.57 (9.7. 37.03)
Fatty Acids	3-methyladipic acid	5.22 (3. 3)	8.27 (2.89. 17.1)	9.36 (2.83. 14.12)	8.68 (3.67. 14.18)
Fatty Acids	Adipic acid	23.57 (11.2. 11.2)	33 (15.1. 65.07)	416.63 (21.88. 78.78)	61.95 (43.7. 76.45)
Fatty Acids	Arachidonic acid	71.74 (31.22. 31.22)	61.24 (31.32. 112.09)	19.32 (28.94. 82.63)	58.65 (32.13. 97.23)
Fatty Acids	Azelaic acid	28.83 (19.62. 19.62)	47.9 (23.23. 70.31)	18.97 (19.88. 61.97)	46.14 (37.45. 72.63)
Fatty Acids	Citraconic acid	3.13 (2.18. 2.18)	2.33 (1.94. 2.91)	14.17 (2.35. 5.29)	3.17 (2.32. 5.01)
Fatty Acids	Citramalic acid	8.9 (5.88. 5.88)	4.5 (3.5. 6.65)	10.57 (5.93. 11.05)	5.5 (4.92. 14.21)
Fatty Acids	Decanoic acid	6.33 (3.91. 3.91)	6.3 (3.8. 8.99)	6.07 (4.61. 15.72)	6.81 (5.17. 8.51)
Fatty Acids	Dihomo-γ-linolenic acid	11.65 (4.34. 4.34)	11.96 (1.71. 19.78)	36.37 (3.24. 17.51)	25.96 (19.12. 32.05)
Fatty Acids	Docosahexaenoic acid DHA	8.36 (6. 6)	7.68 (4.03. 14.46)	8.07 (6.63. 12.45)	7.56 (5.55. 13.55)
Fatty Acids	Docosapentaenoic acid DPA	12.17 (5.17. 5.17)	9.5 (3.18. 28.06)	42 (3.27. 24.62)	34.39 (11.83. 57.51)
Fatty Acids	Dodecanoic acid	5.98 (3.22. 3.22)	6.51 (3.81. 10.77)	144.21 (4.2. 14.86)	5.68 (4.72. 8.16)
Fatty Acids	Eicosapentaenoic acid EPA	2.5 (1.55. 1.55)	3.89 (1.86. 4.87)	10.37 (1.65. 6.38)	2.8 (2.3. 5.84)
Fatty Acids	Heptanoic acid	5.49 (3.46. 3.46)	5.27 (3.74. 47.32)	5.28 (3.27. 13.43)	5.37 (3.89. 22.98)
Fatty Acids	Itaconic acid	2.22 (0.14. 0.14)	0.75 (0.14. 2.08)	2.99 (0.14. 5.28)	1.1 (0.14. 3.22)
Fatty Acids	Linoleic acid	4335.45 (1590.79. 1590.79)	1853.84 (607.68. 2606.2)	1218.1 (1536.42. 8753.13)	2475.52 (1186.45. 3321.66)
Fatty Acids	Methylglutaric acid	6.25 (2.99. 2.99)	21.24 (6.24. 60.72)	113.93 (5.21. 60.57)	15.24 (5.25. 56.85)
Fatty Acids	Methylsuccinic acid	57.1 (38.06. 38.06)	69.04 (51.82. 127.01)	23.46 (56.66. 151.12)	106.75 (76.63. 166.21)
Fatty Acids	Myristic acid	193.28 (126.96. 126.96)	306.76 (216.07. 479.26)	55.57 (172.7. 568.35)	247.52 (168.93. 358.71)
Fatty Acids	Nonanoic acid	3.43 (2.39. 2.39)	1.76 (1.23. 2.69)	1.98 (1.85. 6.24)	2.07 (1.71. 4.75)
Fatty Acids	Octanoic acid	25.51 (14.98. 14.98)	32.62 (20.48. 112.74)	84.26 (28.18. 150.27)	39.32 (26.94. 75.64)
Fatty Acids	Palmitoleic acid	122.24 (69.41. 69.41)	140.5 (69.05. 241.64)	38.58 (99.08. 285.31)	197.21 (152.35. 314.92)
Fatty Acids	Pentadecanoic acid	123.81 (73.09. 73.09)	374.43 (170.69. 481.05)	517.01 (104.45. 399.26)	265.64 (104.27. 394.75)
Fatty Acids	Suberic acid	8.92 (6.7. 6.7)	12.08 (6.85. 25.25)	4.8 (8.71. 24.23)	14.66 (10.34. 22.52)
Fatty Acids	α-linolenic acid	202.83 (109.35. 109.35)	109.13 (53.9. 152.93)	29.07 (71.21. 807.1)	111.75 (38.82. 135.13)
Indoles	5-hydroxy-tryptophan	4.79 (3.67. 3.67)	3.8 (2.65. 4.21)	29.21 (3.38. 6.17)	5.97 (3.42. 7.23)
Indoles	Indole-3-carboxylic acid	0.83 (0.63. 0.63)	0.91 (0.65. 1.09)	3.24 (0.77. 1.84)	0.68 (0.43. 1.95)
Indoles	Indole-3-methyl acetate	2.71 (1.95. 1.95)	1.87 (1.53. 2.53)	12.83 (2.11. 4.59)	2.68 (2.01. 3.44)
Indoles	Indole-3-propionic acid	18.24 (11.96. 11.96)	11.84 (5.17. 23.1)	25.33 (10.71. 34.4)	13.02 (11.32. 31.07)
Indoles	Indoleacetic acid	19.85 (5.99. 5.99)	12.65 (4.94. 25.24)	46.3 (6.79. 46.62)	29.95 (14.13. 34.46)
Indoles	N-acetylserotonin	2.87 (1.81. 1.81)	2.31 (1.85. 2.77)	16.44 (2.77. 5.19)	2.92 (2.29. 5.96)
Organic Acids	2-hydroxy-2-methylbutyric acid	8.1 (4.77. 4.77)	6.58 (4.54. 11.39)	42.38 (5.62. 17.48)	11.48 (8.49. 22.05)
Organic Acids	2-hydroxybutyric acid	99.41 (49.95. 49.95)	70.89 (44.96. 218.27)	8.75 (31.44. 164.43)	82.34 (40.3. 126.42)
Organic Acids	3-hydroxybutyric acid	75.49 (46.02. 46.02)	64.54 (35.15. 261.76)	54.64 (36.09. 146.68)	54.72 (25.91. 123.74)
Organic Acids	3-methyl-2-oxopentanoic acid	2.45 (1.42. 1.42)	4.5 (2.62. 13.05)	7.26 (3.4. 17.52)	6.5 (3.03. 22.77)
Organic Acids	Acetoacetic acid	77.22 (64.65. 64.65)	176.25 (56.87. 242.07)	57.83 (54.09. 192.62)	192.44 (117.11. 303.09)
Organic Acids	Aconitic acid	10.3 (7.07. 7.07)	9.71 (7.28. 11.33)	10.48 (9.49. 16.35)	11.22 (8.33. 20)
Organic Acids	Benzoic acid	27.83 (13.69. 13.69)	17.7 (10.54. 43.92)	6.26 (17.2. 38.57)	19.7 (12.4. 50.11)
Organic Acids	Citric acid	17.66 (10.57. 10.57)	15.15 (6.46. 32.55)	7.45 (11.98. 34.57)	32.99 (18.82. 54.4)
Organic Acids	Fumaric acid	48.47 (43.88. 43.88)	56.33 (29.95. 78.01)	62.64 (46.16. 110.85)	68.86 (39.4. 107.25)

Class	Metabolites	HCs	MEG	Glioma	BM
		Md (P25, P75)	Md (P25, P75)	Md (P25, P75)	Md (P25, P75)
Organic Acids	Glutaric acid	28.95 (18.7. 18.7)	32.55 (25.12. 56.73)	20.13 (24.64. 67.94)	43.5 (34.36. 63.99)
Organic Acids	Hydroxypropionic acid	67.82 (51.36. 51.36)	50.53 (33.1. 79.74)	78.57 (47.64. 182.77)	79.21 (53.42. 233.89)
Organic Acids	Isocitric acid	3.65 (1.89. 1.89)	2.78 (1.94. 4.64)	5.21 (0.69. 6.02)	3.5 (2.24. 4.39)
Organic Acids	Ketoleucine	3.26 (1.63. 1.63)	7.07 (2.33. 17.96)	5.93 (4.09. 29.62)	8.63 (3.57. 39.8)
Organic Acids	Lactic acid	8.36 (3.56. 3.56)	8.92 (5.96. 22.68)	6.06 (3.25. 34.53)	10.86 (6.03. 18.8)
Organic Acids	Malic acid	482.76 (367.48. 367.48)	402.7 (208.02. 723.58)	87.48 (382.6. 902.21)	380.44 (272.57. 725.05)
Organic Acids	Malonic acid	26.56 (16.4. 16.4)	27.55 (13.93. 76.22)	7.35 (13.17. 36.93)	18.54 (16.16. 26.51)
Organic Acids	Methylmalonic acid	116.63 (68.37. 68.37)	177.02 (138.23. 257.3)	414.5 (102.85. 209.82)	204.57 (163.68. 320.15)
Organic Acids	Oxalic acid	119.71 (72.5. 72.5)	68.63 (41.47. 94.61)	97.4 (65.29. 212.73)	85.85 (48.27. 122.55)
Organic Acids	Oxoglutaric acid	26.21 (8.21. 8.21)	91.46 (28.42. 281.14)	144.89 (14.37. 391.84)	151.61 (64.26. 300.78)
Organic Acids	Succinic acid	113.65 (44.14. 44.14)	213.38 (108.35. 262.96)	63.03 (57.33. 228.04)	160.76 (113.13. 408.26)
Organic Acids	α -hydroxyisobutyric acid	21.31 (8.72. 8.72)	14.68 (7.4. 83.92)	31.14 (8.55. 31.21)	19.61 (16.16. 48.13)
Organic Acids	α -hydroxycholeic acid	36.51 (28.46. 28.46)	30.6 (17.41. 35.68)	34.57 (29.52. 49.07)	43.57 (30.36. 50)
Organic Acids	α -ketoisovaleric acid	4.54 (2.15. 2.15)	4.25 (1.61. 17.06)	4.83 (4.7. 17.87)	5.59 (2.55. 21.25)
Phenols	3-hydroxyphenylacetic acid	35.95 (4.28. 4.28)	23.65 (12.89. 45.93)	29.62 (7.26. 65.43)	31.89 (16.38. 81.94)
Phenols	4-hydroxyphenylpyruvic acid	53.47 (35.39. 35.39)	68.49 (31.01. 276.73)	35.45 (63.9. 458.68)	177.2 (88.59. 400.58)
Phenols	Homovanillic acid	104.82 (31.64. 31.64)	28.5 (15.29. 39.44)	16.98 (11.88. 71.31)	10.91 (8.7. 17.99)
Phenols	P-hydroxyphenylacetic acid	91.1 (37.24. 37.24)	29.15 (21.93. 63.05)	243.99 (27.15. 86.49)	47.52 (39.71. 72.58)
Phenylpropanoic Acids	2-phenylpropionate	148.28 (56.7. 56.7)	177.02 (40.67. 217.38)	246.07 (57.17. 316.95)	185.16 (99.35. 246.8)
Phenylpropanoic Acids	3-(3-Hydroxyphenyl)-3-hydroxypropanoic acid	29.86 (9.41. 9.41)	3.32 (2.35. 4.45)	11.47 (3.99. 9.99)	4.09 (3.33. 4.93)
Phenylpropanoic Acids	Hydrocinnamic acid	299.74 (115.69. 115.69)	358.47 (86.26. 528.56)	48.34 (115.36. 793.36)	370.1 (194.77. 542.39)
Phenylpropanoic Acids	Hydroxyphenyllactic acid	18.19 (0.87. 0.87)	24.83 (17.51. 32.05)	3.33 (0.87. 31.46)	0.87 (0.87. 0.87)
Phenylpropanoic Acids	Phenyllactic acid	7.42 (6.4. 6.4)	14.46 (8.74. 28.12)	26.28 (6.98. 25)	7.74 (7.39. 9.88)
Phenylpropanoids	3,4-dihydroxyhydrocinnamic acid	282.25 (58.11. 58.11)	15.56 (8.14. 23.89)	37.08 (15.66. 64.51)	18.34 (13.57. 32.21)
Pyridines	Picolinic acid	3.81 (2.28. 2.28)	2.57 (2.1. 3.32)	1.32 (2.61. 6.02)	3.5 (2.59. 3.85)
SCFAs	3-hydroxyisovaleric acid	2.81 (1.78. 1.78)	1.68 (1.12. 2.48)	7.22 (1.33. 4.46)	5.56 (3.13. 7.59)
SCFAs	Acetic acid	1694.09 (1512.08. 1512.08)	1370.03 (1026.43. 1603.07)	653.71 (1214.21. 2181.77)	1479.61 (1118.49. 2242.91)
SCFAs	Butyric acid	1089.7 (796.37. 796.37)	723.71 (602.34. 1039.44)	512.28 (791.78. 1367.4)	965.02 (784.99. 1199.52)
SCFAs	Caproic acid	13.54 (6.52. 6.52)	18.77 (13.11. 125.86)	3.75 (7.94. 82.39)	22.62 (10.82. 35.48)
SCFAs	Ethylmethylacetic acid	79.65 (29.02. 29.02)	170.93 (35.8. 209)	50.27 (97.69. 302.73)	151.26 (124.02. 200.13)
SCFAs	Isobutyric acid	140.59 (86.5. 86.5)	215.7 (89.05. 304.48)	156.64 (152.31. 427.24)	244.18 (214.01. 294.83)
SCFAs	Isovaleric acid	140.21 (71.61. 71.61)	250.22 (77.56. 356.47)	63.58 (165.05. 504.33)	265.84 (196.31. 352.04)
SCFAs	Propionic acid	2887.77 (2057.8. 2057.8)	2141.12 (1400.66. 2496.74)	1005.8 (1811.2. 3691.86)	2675.29 (2191.66. 3031.58)
SCFAs	Valeric acid	400.15 (198.12. 198.12)	464.79 (283.46. 690.69)	18.27 (264.13. 1102.82)	567.61 (375.76. 710.69)

Note: Data are given as median (P25, P75). Abbreviations: HCs, healthy controls; MEG, meningioma; BM, brain metastasis; Md: median.