**Investigating the potential use of chemical biopsy devices to characterize brain tumor lipidomes.**

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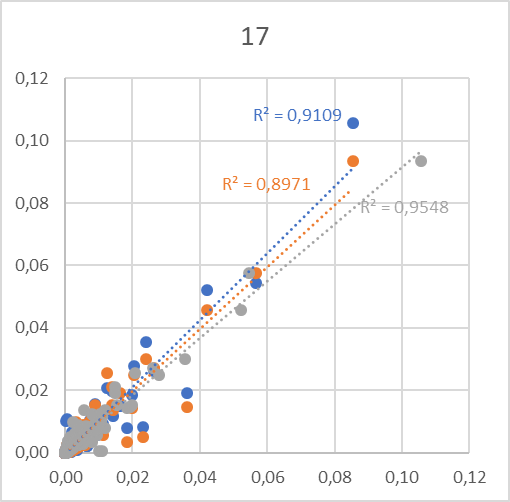
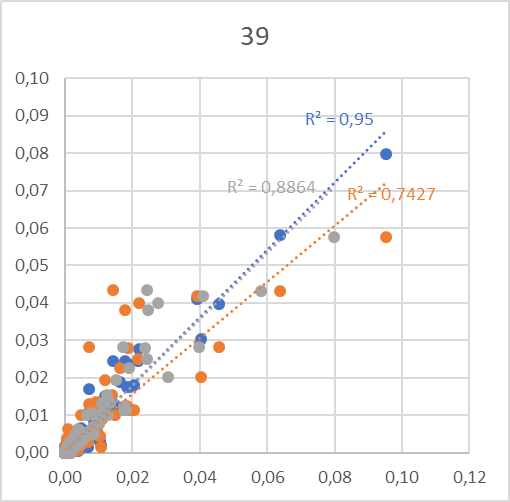
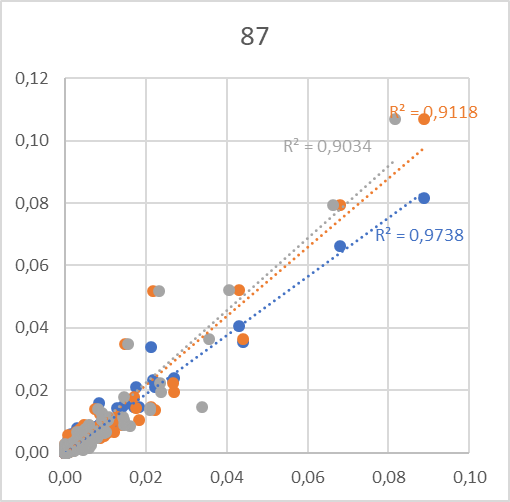
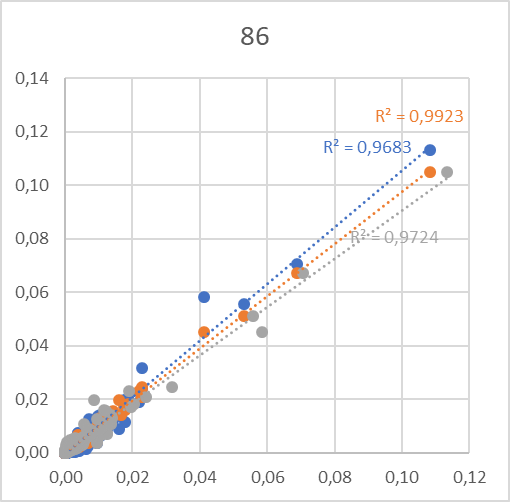
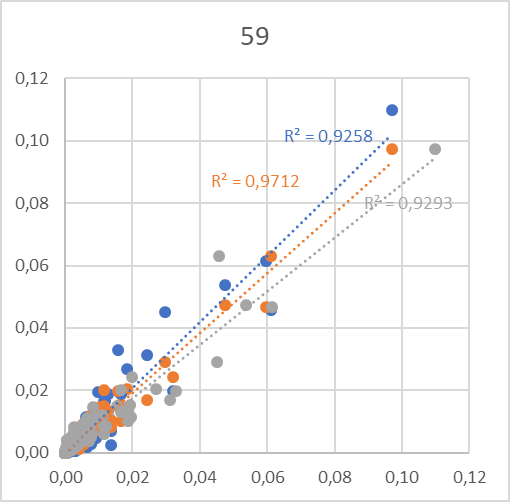
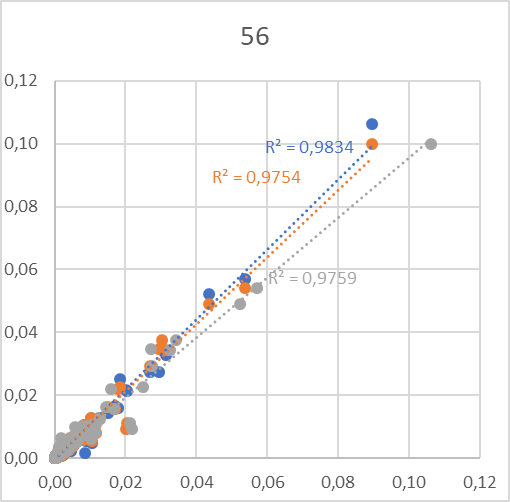
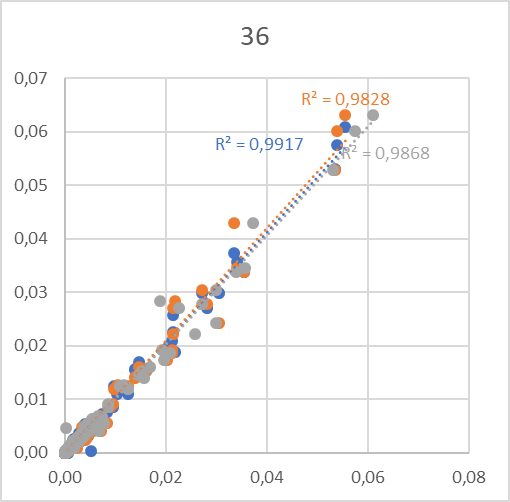
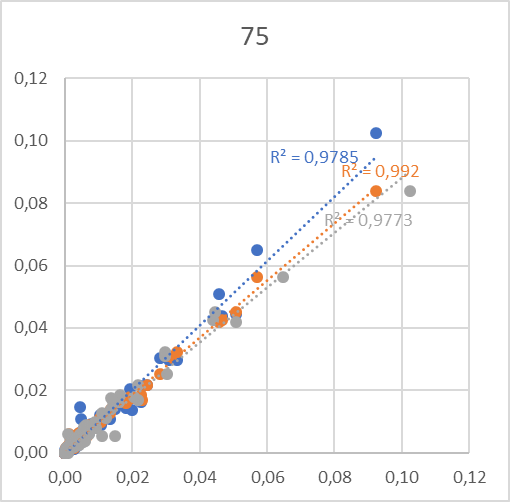
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**SUPLEMENTARY MATERIALS**

**Figure S1.** Plots presenting correlation factors of lipidome obtained using three different SPME probes in four different meningioma samples. Blue dots – correlation of fiber 1 and fiber 2; orange dots – correlation of fiber 1 and fiber 3; grey dots – correlation of fiber 2 and fiber 3. Axes represent normalized peak areas for subsequent lipids extracted by studied probes.



**Figure S2.** Plots presenting correlation factors of lipidome obtained using three different SPME probes in four glioma samples. Blue dots – correlation of fiber 1 and fiber 2; orange dots – correlation of fiber 1 and fiber 3; grey dots – correlation of fiber 2 and fiber 3. Axes represent normalized peak areas for subsequent lipids extracted by studied probes.

|  |  |
| --- | --- |
|  |  |
| **(A)** | **(B)** |

**Figure S3**. Plots presenting lipidome profile of (A) meningiomas; (B) gliomas. *CER – ceramides and its deriviates; LPC – lysophosphatidylcholines; LPE – lysophosphatidylethanolamines; PC – phosphatidylcholines; PE – phosphatidylethanolamines; SM – sphingomyelins*

|  |  |
| --- | --- |
| PCA do Fig. 3.pdf - Adobe Acrobat Reader DC (64-bit) |  |

**Figure S4.** Principal component analysis (PCA) of gliomas with different histological type. *HGG – high grade glioma; LGG – low grade glioma; MEN – meningioma*

|  |  |
| --- | --- |
| PCA do Fig.4 - 3D wszystkie zmienne.pdf - Adobe Acrobat Reader DC (64-bit) | PCA do Fig. 4 na 4 zmiennych.pdf - Adobe Acrobat Reader DC (64-bit) |
| **(A)** | **(B)** |

**Figure S5.** Principal component analysis (PCA) of gliomas with different grade. (A) Three-dimensional principal component analysis of brain tumors with different grade performed on significantly altered features. (B) One-dimensional principal component analysis of brain tumors with different grade performed on significantly altered features with VIP above 1.0. *HGG – high grade glioma; LGG – low grade glioma*

|  |
| --- |
| PCA do Fig. 5.pdf - Adobe Acrobat Reader DC (64-bit) |

**Figure S6.** Principal component analysis (PCA) of gliomas with different IDH 1/2 mutation status. *IDHm – isocitrate dehydrogenase gene mutant; IDHw – isocitrate dehydrogenase gene wiltype*

**Table S1.** The list of lipids with confirmed structure which were detected in heterogeneity test

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lipid Species Shorthand** | **Adduct** | **m/z** | **QC** | | **MEN** | | | | | | | | | | **HGG** | | | | | | | | | |
| **36** | | **56** | | **59** | | **75** | | **MEN** | | **17** | | **39** | | **86** | | **87** | | **HGG** | |
| **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** | **Average\*** | **CV** |
| LPE P-16:0 | +Na | 460.2798 | 5.21E-03 | 9% | 7.74E-03 | 4% | 5.92E-03 | 9% | 5.03E-03 | 19% | 6.23E-03 | 6% | **6.23E-03** | **18%** | 7.58E-03 | 74% | 4.24E-03 | 7% | 5.42E-03 | 19% | 6.13E-03 | 49% | **5.84E-03** | **52%** |
| Cer 42:3; O2 | +H | 646.6133 | 2.46E-04 | 16% | 3.45E-04 | 11% | 4.19E-04 | 16% | 2.80E-04 | 14% | 2.76E-04 | 15% | **3.30E-04** | **22%** | 4.43E-04 | 23% | 2.89E-04 | 33% | 3.91E-04 | 26% | 1.89E-04 | 11% | **3.28E-04** | **39%** |
| HexCer 36:2; O2 | +H | 726.5878 | 3.40E-04 | 13% | - | - | 7.08E-07 | 173% | 2.62E-06 | 87% | 2.26E-06 | 173% | **1.40E-06** | **164%** | 1.77E-03 | 33% | 5.14E-04 | 40% | 9.61E-04 | 68% | 1.13E-05 | 31% | **8.15E-04** | **95%** |
| HexCer 38:1; O2 | +H | 756.6348 | 2.25E-04 | 12% | 3.32E-06 | 98% | 6.46E-06 | 33% | 4.44E-06 | 14% | - | - | **3.56E-06** | **84%** | 1.60E-03 | 31% | 1.73E-04 | 73% | 3.36E-04 | 79% | 2.11E-05 | 173% | **5.34E-04** | **131%** |
| HexCer 41:1; O2 | +H | 798.6817 | 1.02E-03 | 6% | 4.76E-05 | 16% | 1.05E-05 | 119% | 6.87E-05 | 77% | 3.66E-05 | 56% | **4.08E-05** | **81%** | 5.73E-03 | 26% | 4.73E-06 | 88% | 1.45E-03 | 76% | 9.40E-06 | 106% | **1.80E-03** | **143%** |
| HexCer 42:2; O2 | +H | 810.6817 | 4.03E-04 | 10% | 4.55E-04 | 164% | 6.38E-04 | 170% | 8.93E-05 | 88% | 3.35E-04 | 163% | **3.80E-04** | **170%** | 2.37E-03 | 24% | 3.43E-04 | 164% | 7.88E-04 | 78% | 1.69E-04 | 145% | **9.18E-04** | **110%** |
| HexCer 43:2; O2 | +H | 824.6974 | 6.28E-05 | 15% | - | - | 1.37E-06 | 173% | 2.80E-07 | 173% | 5.71E-06 | 173% | **1.84E-06** | **270%** | 4.86E-04 | 49% | - | - | 1.54E-04 | 89% | 5.48E-06 | 173% | **1.61E-04** | **147%** |
| HexCer 44:2; O2 | +H | 838.7130 | 2.31E-03 | 4% | - | - | 1.68E-06 | 93% | 4.64E-04 | 68% | 7.39E-05 | 171% | **1.35E-04** | **184%** | 1.15E-02 | 27% | - | - | 2.58E-03 | 76% | 2.89E-06 | 173% | **3.52E-03** | **147%** |
| LPC P-16:0 | +H | 480.3449 | 2.73E-03 | 12% | 2.24E-03 | 8% | 6.01E-03 | 13% | 2.23E-03 | 14% | 2.73E-03 | 4% | **3.30E-03** | **51%** | 5.50E-03 | 31% | 1.34E-03 | 20% | 1.84E-03 | 38% | 1.31E-03 | 36% | **2.50E-03** | **80%** |
| LPC O-16:0 | +H | 482.3605 | 1.30E-03 | 15% | 4.65E-04 | 13% | 1.19E-03 | 13% | 6.59E-04 | 37% | 4.13E-04 | 5% | **6.81E-04** | **50%** | 3.75E-03 | 40% | 6.89E-04 | 27% | 2.38E-03 | 9% | 1.53E-03 | 40% | **2.09E-03** | **66%** |
| LPC 16:1 | +H | 494.3241 | 3.42E-03 | 8% | 2.99E-04 | 19% | 1.69E-03 | 37% | 3.95E-04 | 12% | 8.58E-04 | 88% | **8.11E-04** | **88%** | 2.73E-03 | 134% | 1.21E-02 | 66% | 8.70E-03 | 29% | 9.82E-03 | 14% | **8.34E-03** | **64%** |
| LPC 16:0 | +H | 496.3398 | 2.59E-02 | 11% | 1.38E-02 | 8% | 1.84E-02 | 4% | 1.77E-02 | 13% | 1.62E-02 | 8% | **1.65E-02** | **13%** | 3.76E-02 | 34% | 4.89E-02 | 21% | 4.19E-02 | 15% | 5.97E-02 | 17% | **4.70E-02** | **26%** |
| LPC P-18:0 | +H | 508.3762 | 1.52E-03 | 12% | 5.52E-04 | 16% | 9.09E-04 | 11% | 6.83E-04 | 16% | 6.85E-04 | 12% | **7.07E-04** | **22%** | 2.45E-03 | 46% | 7.26E-04 | 31% | 3.42E-03 | 90% | 1.72E-03 | 26% | **2.08E-03** | **84%** |
| LPC 18:3 | +H | 518.3241 | 1.51E-02 | 5% | 8.07E-03 | 7% | 1.10E-02 | 5% | 9.79E-03 | 9% | 9.64E-03 | 12% | **9.61E-03** | **13%** | 2.20E-02 | 41% | 3.15E-02 | 19% | 2.52E-02 | 8% | 3.71E-02 | 22% | **2.90E-02** | **29%** |
| LPC 18:2 | +H | 520.3398 | 2.84E-03 | 13% | 4.43E-04 | 12% | 3.16E-03 | 7% | 1.74E-03 | 36% | 2.92E-04 | 56% | **1.41E-03** | **88%** | 1.04E-03 | 53% | 1.97E-03 | 7% | 9.51E-03 | 19% | 6.03E-03 | 36% | **4.64E-03** | **81%** |
| LPC 18:1 | +H | 522.3554 | 1.46E-02 | 8% | 6.05E-03 | 10% | 1.45E-02 | 13% | 6.21E-03 | 7% | 9.26E-03 | 22% | **9.00E-03** | **42%** | 2.00E-02 | 28% | 2.14E-02 | 35% | 3.36E-02 | 18% | 2.12E-02 | 16% | **2.40E-02** | **32%** |
| LPC 18:0 | +H | 524.3711 | 8.85E-03 | 5% | 6.53E-03 | 6% | 1.12E-02 | 12% | 8.38E-03 | 22% | 6.98E-03 | 5% | **8.27E-03** | **26%** | 1.98E-02 | 75% | 7.47E-03 | 18% | 8.64E-03 | 21% | 1.28E-02 | 41% | **1.22E-02** | **69%** |
| PC 30:0 | +Na | 728.5201 | 1.13E-02 | 2% | 9.23E-03 | 6% | 1.36E-02 | 11% | 9.68E-03 | 17% | 1.00E-02 | 3% | **1.06E-02** | **19%** | 1.19E-02 | 19% | 1.83E-02 | 5% | 1.37E-02 | 22% | 6.87E-03 | 31% | **1.27E-02** | **37%** |
| PC P-34:1 | +H | 744.5902 | 1.94E-02 | 8% | 2.06E-02 | 6% | 3.21E-02 | 7% | 1.76E-02 | 38% | 2.60E-02 | 10% | **2.41E-02** | **27%** | 3.70E-02 | 21% | 3.22E-03 | 7% | 1.38E-02 | 47% | 1.59E-03 | 47% | **1.39E-02** | **111%** |
| PC 32:1 | +Na | 754.5357 | 2.21E-02 | 8% | 5.51E-03 | 16% | 1.74E-02 | 6% | 1.16E-02 | 13% | 1.38E-02 | 6% | **1.21E-02** | **38%** | 3.29E-02 | 22% | 5.51E-02 | 24% | 3.21E-02 | 4% | 3.39E-02 | 11% | **3.85E-02** | **31%** |
| PC 32:0 | +Na | 756.5514 | 7.25E-02 | 2% | 9.70E-02 | 3% | 5.15E-02 | 10% | 8.90E-02 | 15% | 5.44E-02 | 6% | **7.30E-02** | **30%** | 5.18E-02 | 6% | 7.95E-02 | 13% | 8.91E-02 | 12% | 7.57E-02 | 6% | **7.40E-02** | **21%** |
| PC 34:3 | +H | 756.5538 | 7.08E-02 | 8% | 9.08E-02 | 6% | 4.81E-02 | 5% | 8.17E-02 | 26% | 5.47E-02 | 6% | **6.89E-02** | **30%** | 4.63E-02 | 11% | 7.43E-02 | 9% | 8.13E-02 | 22% | 7.51E-02 | 7% | **6.93E-02** | **24%** |
| PC P-36:4 | +H | 766.5745 | 1.70E-02 | 5% | 1.80E-02 | 4% | 3.17E-02 | 14% | 1.60E-02 | 28% | 2.04E-02 | 9% | **2.15E-02** | **32%** | 2.35E-02 | 9% | 7.38E-03 | 19% | 8.96E-03 | 42% | 3.82E-03 | 21% | **1.09E-02** | **74%** |
| PC 34:2 | +Na | 780.5514 | 2.37E-02 | 2% | 6.89E-03 | 22% | 1.60E-02 | 9% | 2.50E-02 | 23% | 9.68E-03 | 27% | **1.44E-02** | **54%** | 2.01E-02 | 30% | 2.53E-02 | 18% | 4.07E-02 | 4% | 3.03E-02 | 25% | **2.91E-02** | **32%** |
| PC 34:1 | +Na | 782.5670 | 2.08E-01 | 2% | 1.21E-01 | 5% | 1.84E-01 | 2% | 2.00E-01 | 2% | 2.14E-01 | 8% | **1.80E-01** | **21%** | 2.19E-01 | 2% | 1.84E-01 | 14% | 2.33E-01 | 3% | 2.25E-01 | 13% | **2.15E-01** | **12%** |
| PC 36:4 | +Na | 804.5514 | 1.31E-02 | 6% | 5.66E-03 | 15% | 9.64E-03 | 8% | 1.35E-02 | 22% | 1.29E-02 | 19% | **1.04E-02** | **35%** | 1.16E-02 | 15% | 1.71E-02 | 18% | 1.17E-02 | 20% | 2.00E-02 | 3% | **1.51E-02** | **28%** |
| PC 36:3 | +Na | 806.5670 | 1.35E-02 | 3% | 3.48E-03 | 13% | 1.09E-02 | 15% | 1.58E-02 | 9% | 9.03E-03 | 13% | **9.80E-03** | **48%** | 1.25E-02 | 14% | 1.47E-02 | 7% | 1.80E-02 | 10% | 2.10E-02 | 7% | **1.66E-02** | **22%** |
| PC 36:2 | +Na | 808.5827 | 2.55E-02 | 3% | 7.90E-03 | 18% | 2.27E-02 | 4% | 2.34E-02 | 19% | 1.83E-02 | 16% | **1.81E-02** | **38%** | 2.58E-02 | 10% | 2.30E-02 | 16% | 3.92E-02 | 6% | 2.54E-02 | 16% | **2.84E-02** | **25%** |
| PC 36:1 | +Na | 810.5983 | 5.32E-02 | 8% | 2.98E-02 | 4% | 7.35E-02 | 13% | 4.84E-02 | 25% | 6.64E-02 | 10% | **5.45E-02** | **35%** | 5.81E-02 | 9% | 3.32E-02 | 21% | 3.94E-02 | 21% | 4.11E-02 | 11% | **4.29E-02** | **26%** |
| PC 38:5 | +Na | 830.5670 | 3.68E-03 | 3% | 1.27E-03 | 9% | 2.66E-03 | 18% | 4.15E-03 | 20% | 3.59E-03 | 20% | **2.92E-03** | **43%** | 3.67E-03 | 13% | 5.51E-03 | 22% | 4.18E-03 | 17% | 5.11E-03 | 17% | **4.62E-03** | **23%** |
| PC 38:4 | +Na | 832.5827 | 1.12E-02 | 7% | 6.39E-03 | 13% | 1.45E-02 | 14% | 1.47E-02 | 36% | 1.60E-02 | 28% | **1.29E-02** | **39%** | 1.03E-02 | 8% | 9.41E-03 | 4% | 8.16E-03 | 13% | 1.06E-02 | 16% | **9.63E-03** | **14%** |
| PE P-34:2 | +H | 700.5276 | 1.37E-03 | 8% | 1.85E-03 | 7% | 1.90E-03 | 10% | 1.93E-03 | 23% | 1.14E-03 | 8% | **1.70E-03** | **24%** | 1.43E-03 | 26% | 6.91E-04 | 62% | 1.37E-03 | 17% | 3.90E-04 | 59% | **9.71E-04** | **56%** |
| PE P-34:1 | +H | 702.5432 | 3.61E-02 | 8% | 7.02E-02 | 7% | 3.98E-02 | 7% | 3.64E-02 | 17% | 6.13E-02 | 6% | **5.19E-02** | **30%** | 3.49E-02 | 17% | 1.01E-02 | 7% | 1.46E-02 | 37% | 6.47E-03 | 23% | **1.65E-02** | **73%** |
| PE 34:2 | +H | 716.5225 | 1.50E-03 | 13% | 1.41E-03 | 20% | 2.24E-03 | 11% | 2.68E-03 | 34% | 7.37E-04 | 6% | **1.77E-03** | **50%** | 4.84E-04 | 25% | 9.33E-04 | 43% | 1.64E-03 | 15% | 1.59E-03 | 7% | **1.16E-03** | **47%** |
| PE 34:1 | +H | 718.5381 | 1.23E-02 | 7% | 2.18E-02 | 6% | 1.93E-02 | 6% | 1.53E-02 | 18% | 1.78E-02 | 6% | **1.85E-02** | **16%** | 3.11E-03 | 30% | 8.78E-03 | 4% | 7.99E-03 | 14% | 1.25E-02 | 48% | **8.10E-03** | **54%** |
| PE P-34:1 | +Na | 724.5252 | 4.36E-02 | 17% | 7.92E-02 | 24% | 4.24E-02 | 6% | 3.69E-02 | 17% | 6.92E-02 | 17% | **5.69E-02** | **37%** | 4.06E-02 | 18% | 4.39E-02 | 8% | 1.47E-02 | 35% | 2.16E-02 | 18% | **3.02E-02** | **45%** |
| PE 34:2 | +Na | 738.5044 | 1.59E-03 | 19% | 1.54E-03 | 10% | 2.17E-03 | 21% | 2.77E-03 | 30% | 8.02E-04 | 7% | **1.82E-03** | **48%** | 6.59E-04 | 35% | 1.42E-03 | 14% | 1.74E-03 | 12% | 1.80E-03 | 9% | **1.41E-03** | **36%** |
| PE 34:1 | +Na | 740.5201 | 1.62E-02 | 11% | 2.66E-02 | 10% | 2.37E-02 | 4% | 1.76E-02 | 19% | 1.89E-02 | 4% | **2.17E-02** | **19%** | 4.19E-03 | 44% | 1.32E-02 | 13% | 1.01E-02 | 19% | 1.73E-02 | 27% | **1.12E-02** | **49%** |
| PE 36:2 | +H | 744.5538 | 5.19E-03 | 17% | 3.05E-03 | 11% | 8.68E-03 | 9% | 6.02E-03 | 14% | 2.69E-03 | 4% | **5.11E-03** | **51%** | 2.28E-03 | 38% | 3.13E-03 | 19% | 6.96E-03 | 17% | 4.74E-03 | 37% | **4.28E-03** | **49%** |
| PE P-38:7 | +H | 746.5119 | 2.18E-02 | 11% | 4.10E-02 | 5% | 2.64E-02 | 20% | 2.32E-02 | 33% | 2.22E-02 | 23% | **2.82E-02** | **32%** | 6.11E-03 | 48% | 3.68E-02 | 23% | 4.66E-03 | 39% | 2.20E-02 | 15% | **1.74E-02** | **82%** |
| PE 36:1 | +H | 746.5694 | 7.71E-03 | 48% | 1.22E-02 | 78% | 3.09E-02 | 6% | 8.81E-03 | 48% | 1.39E-02 | 70% | **1.65E-02** | **66%** | 1.81E-02 | 45% | 1.66E-02 | 90% | 7.87E-03 | 12% | 7.74E-03 | 6% | **1.26E-02** | **70%** |
| PE O-36:4 | +Na | 748.5252 | 8.38E-03 | 11% | 1.24E-02 | 19% | 5.21E-03 | 8% | 9.01E-03 | 27% | 1.24E-02 | 19% | **9.75E-03** | **37%** | 6.06E-03 | 47% | 1.37E-02 | 26% | 6.29E-03 | 6% | 1.24E-02 | 13% | **9.62E-03** | **43%** |
| PE P-38:6 | +H | 748.5276 | 8.38E-03 | 11% | 1.24E-02 | 19% | 5.21E-03 | 8% | 8.85E-03 | 26% | 1.24E-02 | 19% | **9.70E-03** | **37%** | 6.06E-03 | 47% | 1.37E-02 | 26% | 6.29E-03 | 6% | 1.39E-02 | 2% | **1.00E-02** | **45%** |
| PE P-38:5 | +H | 750.5432 | 2.21E-02 | 4% | 2.55E-02 | 12% | 1.52E-02 | 11% | 1.73E-02 | 16% | 2.44E-02 | 7% | **2.06E-02** | **25%** | 3.81E-02 | 38% | 1.41E-02 | 10% | 1.75E-02 | 78% | 9.92E-03 | 2% | **1.99E-02** | **71%** |
| PE 36:2 | +Na | 766.5357 | 7.97E-03 | 3% | 4.94E-03 | 13% | 1.24E-02 | 4% | 9.11E-03 | 5% | 4.78E-03 | 11% | **7.80E-03** | **43%** | 3.84E-03 | 41% | 8.20E-03 | 4% | 1.06E-02 | 13% | 1.08E-02 | 35% | **8.36E-03** | **41%** |
| PE 38:5 | +H | 766.5381 | 8.02E-03 | 3% | 4.95E-03 | 12% | 1.24E-02 | 4% | 9.10E-03 | 6% | 4.79E-03 | 11% | **7.80E-03** | **43%** | 3.85E-03 | 41% | 8.20E-03 | 10% | 1.06E-02 | 13% | 1.05E-02 | 37% | **8.30E-03** | **42%** |
| PE 36:1 | +Na | 768.5514 | 3.96E-02 | 24% | 4.44E-02 | 6% | 5.91E-02 | 28% | 3.54E-02 | 7% | 2.52E-02 | 49% | **4.10E-02** | **38%** | 1.78E-02 | 39% | 3.14E-02 | 8% | 1.99E-02 | 30% | 3.21E-02 | 24% | **2.53E-02** | **34%** |
| PE P-40:7 | +H | 774.5432 | 2.21E-02 | 9% | 4.21E-02 | 4% | 1.42E-02 | 16% | 2.35E-02 | 31% | 2.44E-02 | 18% | **2.61E-02** | **43%** | 2.06E-02 | 34% | 3.35E-02 | 36% | 1.47E-02 | 27% | 1.96E-02 | 12% | **2.21E-02** | **44%** |
| PE P-38:2 | +Na | 778.5721 | 5.70E-03 | 8% | 5.51E-03 | 2% | 1.39E-03 | 11% | 5.28E-03 | 14% | 4.75E-03 | 18% | **4.23E-03** | **43%** | 1.31E-02 | 24% | 5.03E-03 | 20% | 6.65E-03 | 38% | 3.80E-03 | 15% | **7.15E-03** | **58%** |
| PE P-40:5 | +H | 778.5745 | 5.80E-03 | 5% | 5.65E-03 | 2% | 1.36E-03 | 7% | 5.34E-03 | 17% | 4.76E-03 | 17% | **4.28E-03** | **44%** | 1.32E-02 | 24% | 5.32E-03 | 25% | 6.74E-03 | 40% | 3.83E-03 | 16% | **7.28E-03** | **57%** |
| PE 38:4 | +Na | 790.5357 | 1.97E-02 | 8% | 2.66E-02 | 10% | 3.04E-02 | 6% | 2.07E-02 | 18% | 1.56E-02 | 6% | **2.33E-02** | **27%** | 5.50E-03 | 52% | 1.61E-02 | 16% | 8.39E-03 | 16% | 1.80E-02 | 32% | **1.20E-02** | **52%** |
| PE 38:1 | +Na | 796.5827 | 9.15E-03 | 6% | 4.82E-03 | 8% | 8.58E-03 | 12% | 9.57E-03 | 12% | 8.31E-03 | 5% | **7.82E-03** | **25%** | 1.31E-02 | 9% | 7.22E-03 | 21% | 8.37E-03 | 8% | 8.05E-03 | 15% | **9.18E-03** | **28%** |
| PE P-40:6 | +Na | 798.5408 | 1.56E-02 | 25% | 1.46E-02 | 15% | 9.55E-03 | 18% | 2.13E-02 | 12% | 2.09E-02 | 8% | **1.66E-02** | **32%** | 1.59E-02 | 25% | 1.48E-02 | 13% | 1.88E-02 | 11% | 1.75E-02 | 22% | **1.68E-02** | **18%** |
| PE P-40:4 | +Na | 802.5721 | 4.27E-03 | 8% | 6.00E-03 | 1% | 9.03E-04 | 11% | 4.79E-03 | 35% | 3.18E-03 | 24% | **3.72E-03** | **58%** | 7.19E-03 | 23% | 4.87E-03 | 33% | 4.08E-03 | 48% | 2.66E-03 | 18% | **4.70E-03** | **46%** |
| PE 40:6 | +Na | 814.5357 | 2.68E-03 | 4% | 7.62E-04 | 9% | 1.13E-04 | 49% | 7.41E-03 | 51% | 1.89E-03 | 13% | **2.54E-03** | **134%** | 8.47E-04 | 53% | 7.32E-04 | 48% | 1.48E-03 | 10% | 2.14E-03 | 78% | **1.30E-03** | **74%** |
| SM 42:4; O2 | +H | 809.6531 | 1.78E-02 | 5% | 4.99E-02 | 6% | 1.96E-02 | 21% | 3.11E-02 | 44% | 3.53E-02 | 11% | **3.40E-02** | **38%** | 4.89E-03 | 12% | 5.05E-03 | 51% | 4.94E-03 | 27% | 4.36E-03 | 46% | **4.81E-03** | **32%** |
| SM 43:4; O2 | +H | 823.6688 | 4.26E-03 | 6% | 9.66E-03 | 3% | 3.55E-03 | 19% | 5.96E-03 | 42% | 5.22E-03 | 14% | **6.10E-03** | **43%** | 6.63E-03 | 2% | 1.04E-03 | 56% | 2.19E-03 | 35% | 1.17E-03 | 22% | **2.76E-03** | **88%** |
| ST 42:2; O2 | +H | 890.6386 | 1.69E-04 | 19% | - | - | - | - | 3.43E-06 | 101% | 8.68E-07 | 173% | **1.08E-06** | **203%** | 7.52E-04 | 14% | 2.68E-06 | 173% | 2.73E-04 | 77% | - | - | **2.57E-04** | **131%** |

**\*Average peak area after on-fiber normalization**

CV – coefficient of variation; HGG – high grade glioma; m/z – mass to charge ratio; MEN -meningioma; QC – quality control; RT – retention time

**Table S2.** The list of lipid species identified with the use of MS/MS mode

|  |  |  |  |
| --- | --- | --- | --- |
| **m/z** | **RT** | **adduct** | **Lipid Species Shorthand** |
| 620.5976 | 4.98 | +H | Cer 40:2;O2 |
| 666.6395 | 4.96 | +H | Cer 42:1;O3 |
| 646.6133 | 4.64 | +H | Cer 42:3;O2 |
| 662.6446 | 2.93 | +H | Cer 43:2;O2 |
| 674.6446 | 4.83 | +H | Cer 44:3;O2 |
| 728.6035 | 3.01 | +H | HexCer 36:1;O2 |
| 726.5878 | 5.31 | +H | HexCer 36:2;O2 |
| 756.6348 | 3.2 | +H | HexCer 38:1;O2 |
| 800.6610 | 4.92 | +H | HexCer 40:1;O3 |
| 782.6504 | 4.93 | +H | HexCer 40:2;O2 |
| 798.6817 | 2.89 | +H | HexCer 41:1;O2 |
| 814.6767 | 4.99 | +H | HexCer 41:1;O3 |
| 796.6661 | 4.85 | +H | HexCer 41:2;O2 |
| 794.6504 | 5.16 | +H | HexCer 41:3;O2 |
| 812.6974 | 2.77 | +H | HexCer 42:1;O2 |
| 828.6923 | 4.95 | +H | HexCer 42:1;O3 |
| 810.6817 | 3.02 | +H | HexCer 42:2;O2 |
| 810.6817 | 4.93 | +H | HexCer 42:2;O2 |
| 826.6767 | 4.68 | +H | HexCer 42:2;O3 |
| 808.6661 | 4.74 | +H | HexCer 42:3;O2 |
| 842.7080 | 4.87 | +H | HexCer 43:1;O3 |
| 824.6974 | 2.62 | +H | HexCer 43:2;O2 |
| 838.7130 | 2.57 | +H | HexCer 44:2;O2 |
| 836.6974 | 4.92 | +H | HexCer 44:3;O2 |
| 862.6250 | 8.25 | +H | LacCer 34:1;O2 |
| 972.7346 | 7.92 | +H | LacCer 42:2;O2 |
| 496.3398 | 8.57 | +H | LPC 16:0 |
| 482.3605 | 8.65 | +H | LPC O-16:0 |
| 480.3449 | 8.13 | +H | LPC P-16:0 |
| 494.3241 | 8.27 | +H | LPC 16:1 |
| 524.3711 | 8.24 | +H | LPC 18:0 |
| 508.3762 | 8.56 | +H | LPC P-18:0 |
| 522.3554 | 8.38 | +H | LPC 18:1 |
| 520.3398 | 8.16 | +H | LPC 18:2 |
| 518.3217 | 8.65 | +H | LPC 18:3 |
| 544.3374 | 8.41 | +H | LPC 20:4 |
| 460.2798 | 9.7 | +Na | LPE P-16:0 |
| 634.4806 | 8.16 | +H | PC 26:1 |
| 728.5201 | 6.39 | +Na | PC 30:0 |
| 756.5514 | 6.39 | +Na | PC 32:0 |
| 754.5357 | 6.11 | +Na | PC 32:1 |
| 782.5670 | 6.65 | +Na | PC 34:1 |
| 744.5902 | 5.9 | +H | PC P-34:1 |
| 780.5514 | 6.24 | +Na | PC 34:2 |
| 756.5538 | 6.76 | +H | PC 34:3 |
| 738.5432 | 6.96 | +H | PC P-34:4 |
| 810.5983 | 6.46 | +Na | PC 36:1 |
| 808.5827 | 6.59 | +Na | PC 36:2 |
| 806.5670 | 6.27 | +Na | PC 36:3 |
| 804.5514 | 5.88 | +Na | PC 36:4 |
| 832.5827 | 6.27 | +Na | PC 38:4 |
| 830.5670 | 5.94 | +Na | PC 38:5 |
| 742.5357 | 7.25 | +Na | PE 34:0 |
| 718.5381 | 7.10 | +H | PE 34:1 |
| 740.5201 | +Na |
| 702.5432 | 7.25 | +H | PE P-34:1 |
| 724.5252 | +Na |
| 716.5225 | 7.35 | +H | PE 34:2 |
| 738.5044 | +Na |
| 700.5276 | 7.14 | +H | PE P-34:2 |
| 716.5589 | 7.12 | +H | PE P-35:1 |
| 746.5694 | 7.20 | +H | PE 36:1 |
| 768.5514 | +Na |
| 744.5538 | 7.16 | +H | PE 36:2 |
| 764.5201 | 7.08 | +Na | PE 36:3 |
| 748.5252 | 6.79 | +Na | PE O-36:4 |
| 724.5276 | 7.05 | +H | PE P-36:4 |
| 746.5095 | 6.78 | +Na | PE O-36:5 |
| 766.5721 | 6.99 | +Na | PE P-37:1 |
| 796.5827 | 7.05 | +Na | PE 38:1 |
| 756.5902 | 6.88 | +H | PE P-38:2 |
| 778.5721 | 7.41 | +Na | PE O-38:3 |
| 768.5538 | 6.90 | +H | PE 38:4 |
| 790.5357 | +Na |
| 752.5589 | 6.98 | +H | PE P-38:4 |
| 752.5565 | 6.89 | +H | PE P-38:4 |
| 766.5357 | 6.93 | +H | PE 38:5 |
| 766.5381 | 7.01 | +H | PE 38:5 |
| 788.5201 | +Na |
| 774.5408 | 7.00 | +Na | PE O-38:5 |
| 750.5432 | 7.01 | +H | PE P-38:5 |
| 786.5044 | 7.12 | +Na | PE 38:6 |
| 772.5252 | 7.02 | +Na | PE O-38:6 |
| 772.5252 | 6.83 | +Na | PE O-38:6 |
| 748.5276 | 6.87 | +H | PE P-38:6 |
| 770.5097 | +Na |
| 746.5119 | 6.80 | +H | PE P-38:7 |
| 784.6215 | 6.87 | +H | PE P-40:2 |
| 804.5878 | 6.84 | +Na | PE O-40:4 |
| 780.5902 | 6.95 | +H | PE P-40:4 |
| 802.5721 | +Na |
| 816.5514 | 6,89 | +Na | PE 40:5 |
| 778.5745 | 6.67 | +H | PE P-40:5 |
| 792.5538 | 6.95 | +H | PE 40:6 |
| 800.5565 | 6.74 | +Na | PE O-40:6 |
| 798.5408 | 6.85 | +Na | PE P-40:6 |
| 774.5432 | 6.69 | +H | PE P-40:7 |
| 806.6058 | 6.87 | +H | PE P-42:5 |
| 809.6531 | 7.42 | +H | SM 32:4;O2 |
| 835.6688 | 7.27 | +H | SM 34:5;O2 |
| 725.5592 | 7.59 | +H | SM 36:4;O2 |
| 753.5905 | 7.41 | +H | SM 38:4;O2 |
| 781.6218 | 7.52 | +H | SM 40:4;O2 |
| 801.6844 | 7.21 | +H | SM 41:1;O2 |
| 799.6688 | 7.43 | +H | SM 41:2;O2 |
| 815.7001 | 7.11 | +H | SM 42:1;O2 |
| 811.6688 | 7.18 | +H | SM 42:3;O2 |
| 829.7157 | 7.11 | +H | SM 43:1;O2 |
| 827.7001 | 7.91 | +H | SM 43:2;O2 |
| 823.6663 | 7.4 | +H | SM 43:4;O2 |
| 841.7157 | 7.16 | +H | SM 44:2;O2 |
| 890.6386 | 2.37 | +H | ST 42:2;O2 |

m/z – mass to charge ratio; RT – retention time

**Table S3.** The lipidome composition of meningiomas and gliomas based on MS/MS confirmed groups of lipids.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Lipid group** | **Meningioma** | | **Glioma** | | **ratio [glioma: meningioma]** | **U Mann Whitney test** |
| **Average\*** | **CV** | **Average\*** | **CV** |
| Cer | 2,30E-05 | 332% | 1,16E-03 | 167% | 50,42 | **0,02** |
| HexCer | 1,98E-03 | 274% | 3,22E-02 | 150% | 16,25 | **0,02** |
| LacCer | 4,06E-04 | 147% | 3,47E-04 | 91% | 0,85 | 0,77 |
| LPC | 3,16E-02 | 114% | 2,13E-02 | 43% | 0,67 | 0,23 |
| LPE P-16:0 | 1,22E-03 | 37% | 3,80E-03 | 76% | 3,10 | **<0.01** |
| PC | 8,92E-02 | 10% | 7,39E-02 | 30% | 0,83 | **0,02** |
| PE | 1,60E-01 | 10% | 1,36E-01 | 17% | 0,85 | **<0.01** |
| SM | 4,24E-02 | 16% | 2,68E-02 | 36% | 0,63 | **<0.01** |
| ST 42:2; O2 | 2,61E-04 | 31% | 8,71E-05 | 98% | 0,33 | **<0.01** |

*\****Average peak area after on-fiber normalization**

*CV – coefficient of variation; Cer – ceramides; HexCer – hexosyl ceramides; HGG – high grade glioma; LacCer – lactosyl ceramides; LGG – low grade glioma; LPC – lysophosphatidylcholines; LPE – lysophosphatidylethanolamines; MEN – meningioma; PC – phosphatidylcholines; PE – phosphatidylethanolamines; QC – quality control; SM – sphingomyelins; ST – sulfatides*

**Table S4.** Parameters for Partial least squares-discriminant analysis (PLS-DA ).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Paramter** | **MEN vs glioma** | | **Glioma grade** | | **IDH mutation status** | |
| Classes | MEN | LGG+ | LGG | HGG | IDHm | IDHw |
| Variable inclusion paramters | VIP-score>1 | | p-value<0.05  VIP-score>1 | | p-value<0.05  VIP-score>1 | |
| Data preprocessing | Log10, Autoscale | | Log10, Autoscale | | Log10, Autoscale | |
| N | 18 | 19 | 7 | 12 | 10 | 9 |
| Number of LV | 5 | | 2 | | 2 | |
| RMSEC | 0.084 | 0.084 | 0.260 | 0.260 | 0.184 | 0.184 |
| RMSECV | 0.225 | 0.225 | 0.322 | 0.322 | 0.263 | 0.263 |
| R2(calibration) | 0.972 | 0.972 | 0.710 | 0.710 | 0.864 | 0.864 |
| R2(CV) | 0.811 | 0.811 | 0.570 | 0.570 | 0.736 | 0.736 |
| Permutation test | wilcoxon test – <0.05  significance test – <0.05  rand t-test – <0.05 | | wilcoxon test – <0.05  significance test – 0.056  rand t-test – <0.05 | | wilcoxon test – <0.05  significance test – <0.05  rand t-test – <0.05 | |

*CV – coefficient of variation; HGG – high grade glioma; IDHm – isocitrate dehydrogenase gene mutant; IDHw – isocitrate dehydrogenase gene wiltype; LGG – low grade glioma; LV – latent variables; MEN – meningioma; N – number of samples; RMSEC– root mean square error of calibration; RMSECV – root mean square error of cross-validation; VIP - Variable Importance in Projection*

**Table S5.** The list od significantly altered tentative lipids in differentiation of low and high grade gliomas (p<0.05). In italic were given tentative lipid groups for detected m/z.

|  |  |  |  |
| --- | --- | --- | --- |
| **m/z** | **Lipid Species Shorthand** | **HGG/LGG ratio** | **VIP>1** |
| 480.34485 | LPC P-16:0 | 2.66 | + |
| 502.32680 | *CerP, LPC* | 3.99 | - |
| 508.37615 | LPC P-18:0 | 2.38 | - |
| 520.33977 | LPC 18:2 | 2.64 | - |
| 718.57448 | *Cer, CerP, LPC, LPE, PC, PE* | 2.74 | - |
| 720.55378 | *CerP, PC, PE* | 1.55 | + |
| 745.55727 | *HexCer* | 0.66 | - |
| 748.58269 | *PC* | 1.68 | - |
| 773.53031 | *PG* | 0.75 | - |
| 781.61940 | *SM, CerP* | 0.37 | + |
| 794.60341 | *CerP, PC, PE* | 2.90 | - |
| 794.60582 | *PC* | 2.92 | - |
| 796.61906 | *CerP* | 4.53 | - |
| 796.62147 | *CerP* | 4.72 | - |
| 800.55646 | PE O-40:6 | 0.66 | - |
| 815.70005 | SM 42:1; O2 | 0.37 | + |
| 818.60341 | *CerP* | 10.38 | - |

*Cer – ceramides; CerP – ceramide phosphate; HexCer – hexosyl ceramides;* *HGG – high grade glioma; LGG – low grade glioma; LPC – lysophosphatidylcholines; LPE – lysophosphatidylethanolamines; m/z – mass to charge ratio; PC – phosphatidylcholines; PE – phosphatidylethanolamines; PG – phosphatidylglycerols; SM – sphingomyelins; VIP - Variable Importance in Projection*

**Table S6.** The list od significantly altered tentative lipids in differentiation of IDH mutant and wildtype gliomas (p<0.05). In italic were given tentative lipid groups for detected m/z.

|  |  |  |  |
| --- | --- | --- | --- |
| **m/z** | **Lipid Species Shorthand** | **IDHw/ IDHm ratio** | **VIP>1** |
| 438.2979 | *LPE* | 1.98 | - |
| 460.2798 | LPE P-16:0 | 0.56 | - |
| 482.36050 | LPC O-16:0 | 6.15 | + |
| 502.32680 | *CerP, LPC* | 2.96 | + |
| 508.37615 | LPC P-18:0 | 4.91 | - |
| 524.37107 | LPC 18:0 | 1.89 | - |
| 628.60271 | *Cholesterol ester* | 1.79 | + |
| 700.5275 | PE P-34:2 | 0.31 | - |
| 702.5432 | PE P-34:1 | 0.54 | - |
| 706.5381 | *CerP, PC, PE* | 0.62 | - |
| 716.5588 | PE P-35:1 | 0.27 | - |
| 717.59050 | *CerP, SM* | 1.80 | + |
| 718.5744 | *Cer, CerP, LPC, LPE, PC, PE* | 2.74 | - |
| 720.59017 | *Cer, CerP, LPC, PE,* | 2.46 | + |
| 723.5411 | *SM* | 1.93 | - |
| 724.5251 | PE P-34:1 | 0.39 | - |
| 724.5275 | PE P-36:4 | 0.43 | - |
| 725.53106 | *HexCer* | 1.96 | + |
| 728.52008 | PC 30:0 | 0.47 | - |
| 728.5224 | *CerP, PC, PE* | 0.48 | - |
| 729.5252 | *PG* | 0.46 | - |
| 729.59050 | *CerP, SM* | 2.78 | + |
| 734.5670 | *PC, PE* | 0.62 | - |
| 740.5200 | PE 34:1 | 2.21 | - |
| 742.5721 | *PC* | 3.11 | - |
| 742.5745 | *PC* | 3.05 | - |
| 744.5513 | *PC* | 0.33 | - |
| 745.55727 | *HexCer* | 0.39 | + |
| 746.5694 | PE 36:1 | 0.25 | - |
| 746.6057 | *Cer, CerP, LPC, LPE* | 2.49 | - |
| 747.6093 | *HexCer* | 2.49 | - |
| 748.52516 | PE O-36:4 | 0.36 | + |
| 750.5432 | PE O-38:5 | 0.47 | - |
| 751.57245 | *CerP, SM* | 2.55 | + |
| 754.53573 | PC 32:1 | 0.59 | - |
| 755.5408 | *PG* | 0.52 | - |
| 756.55138 | PC 32:0 | 0.51 | - |
| 765.5252 | *PG* | 0.59 | - |
| 766.5745 | *CerP, PC* | 3.10 | - |
| 768.55378 | PE 38:4 | 0.51 | + |
| 768.5877 | *CerP, PC, PE* | 4.08 | - |
| 768.59017 | *PC* | 4.01 | + |
| 774.5432 | PE P-40:7 | 0.53 | - |
| 778.5721 | PE O-38:3 | 3.38 | - |
| 785.65310 | *CerP, SM* | 2.03 | + |
| 786.5044 | PE 38:6 | 0.35 | - |
| 787.6687 | *CerP, SM* | 1.81 | - |
| 790.5721 | *PC* | 7.39 | - |
| 792.5877 | *PC, PE* | 3.97 | - |
| 792.5901 | *PC* | 3.98 | - |
| 794.5670 | *PC, PE* | 0.48 | - |
| 794.5694 | *PC, PE* | 0.47 | - |
| 794.6034 | *CerP, PC, PE* | 3.17 | - |
| 794.6058 | *PC* | 3.17 | - |
| 796.58508 | *PC,PE* | 0.53 | + |
| 796.6190 | *CerP* | 5.74 | - |
| 796.6214 | *CerP* | 5.97 | - |
| 800.55646 | PE O-40:6 | 0.78 | + |
| 810.59833 | PC 36:1 | 0.60 | - |
| 812.6163 | *PC* | 1.53 | - |
| 813.6191 | *PG* | 1.58 | - |
| 814.5344 | *ST* | 0.35 | - |
| 814.5357 | *PC* | 0.38 | - |
| 814.5381 | *PE* | 0.37 | - |
| 818.6034 | *CerP* | 8,19 | - |
| 823.66635 | SM 43:4; O2 | 1.92 | + |
| 972.73457 | LacCer 42:2; O2 | 7.52 | - |

*Cer – ceramides; CerP – ceramide phosphate; HexCer – hexosyl ceramides; LacCer – lactosyl ceramides;* *IDHm – isocitrate dehydrogenase gene mutant; IDHw – isocitrate dehydrogenase gene wiltype; LPC – lysophosphatidylcholines; LPE – lysophosphatidylethanolamines; m/z – mass to charge ratio; PC – phosphatidylcholines; PE – phosphatidylethanolamines; PG – phosphatidylglycerols; SM – sphingomyelins; ST – sulfatides; VIP - Variable Importance in Projection*

**Table S7.** The list od significantly altered tentative lipids in differentiation of tumors with 1p/19q co-deletion and withut this abberation (p<0.05). In italic were given tentative lipid groups for detected m/z.

|  |  |  |
| --- | --- | --- |
| **m/z** | **Lipid Species Shorthand** | **n-del/del ratio** |
| 438.2979 | *LPE* | 2.30 |
| 480.3448 | LPC P-16:0 | 4.62 |
| 482.3605 | LPC O-16:0 | 5.15 |
| 508.3761 | LPC P-18:0 | 4.79 |
| 524.3710 | LPC 18:0 | 2.08 |
| 700.5275 | PE P-34:2 | 0.56 |
| 701.5592 | *CerP, SM* | 2.11 |
| 706.5381 | *CerP, PC, PE* | 0.66 |
| 716.5588 | PE P-35:1 | 0.49 |
| 717.5905 | *CerP, SM* | 1.51 |
| 720.5901 | *Cer, CerP, LPC, PE,* | 2.15 |
| 723.5411 | *SM* | 2.31 |
| 728.5224 | *CerP, PC, PE* | 0.58 |
| 729.5252 | *PG* | 0.56 |
| 729.5905 | *CerP, SM* | 2.40 |
| 740.5200 | PE 34:1 | 2.09 |
| 742.5721 | *PC* | 2.43 |
| 742.5745 | *PC* | 2.38 |
| 744.5513 | *PC* | 0.52 |
| 746.5694 | PE 36:1 | 0.41 |
| 746.6057 | *Cer, CerP, LPC, LPE* | 1.79 |
| 747.6093 | *HexCer* | 1.79 |
| 748.5251 | PE O-36:4 | 0.59 |
| 751.5724 | *CerP, SM* | 2.06 |
| 768.5877 | *CerP, PC, PE* | 2.93 |
| 768.5901 | *PC* | 2.85 |
| 770.6034 | *LPC* | 2.33 |
| 787.6687 | *CerP, SM* | 1.71 |
| 792.5877 | *PC, PE* | 3.76 |
| 792.5901 | *PC* | 3.77 |
| 794.5670 | *PC, PE* | 0.59 |
| 794.6034 | *CerP, PC, PE* | 3.19 |
| 796.6190 | *CerP* | 4.77 |
| 796.6214 | *CerP* | 4.72 |
| 798.5408 | *CerP, PE* | 0.59 |
| 818.6034 | *CerP* | 11.25 |

*Cer – ceramides; CerP – ceramide phosphate; del – 1p/19q co-deleted samples; HexCer – hexosyl ceramides; LPC – lysophosphatidylcholines; LPE – lysophosphatidylethanolamines; m/z – mass to charge ratio; n-del- 1p/19q non co-delated samples; PC – phosphatidylcholines; PE – phosphatidylethanolamines; PG – phosphatidylglycerols; SM – sphingomyelins*

**Table S8.** Patients characteristics.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Type** | **Genetic Tests** | | **Final Diagnosis\*** | **Grade** | **2016 or 2021 WHO brain tumor classification** | **Age** | **Sex** | **Type of sampling** |
| **codeletion 1p/19q** | **IDH1/2 mutation** |
| 17 | HGG | N | N | Glioblastoma, NOS | IV | 2016 | 73 | M | Stored tissue |
| 36 | MEN | N | N | Meningioma | 1 | 2021 | 53 | F | Stored tissue |
| 39 | HGG | N | N | Glioblastoma, NOS | IV | 2016 | 72 | F | Stored tissue |
| 56 | MEN | N | N | Meningioma | 1 | 2021 | 80 | M | Stored tissue |
| 59 | MEN | N | N | Meningioma | 1 | 2021 | 62 | F | Stored tissue |
| 75 | MEN | N | N | Meningioma | 1 | 2021 | 55 | F | Stored tissue |
| 86 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 65 | F | Stored tissue |
| 87 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 67 | F | Stored tissue |
| 97 | MEN | N | N | Meningioma | 1 | 2021 | 44 | F | On-site sampling |
| 98 | MEN | N | N | Meningioma | 3 | 2021 | 72 | F | On-site sampling |
| 101 | MEN | N | N | Meningioma | 1 | 2021 | 59 | F | On-site sampling |
| 102 | LGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 2 | 2021 | 33 | F | On-site sampling |
| 103 | MEN | N | N | Meningioma | 1 | 2021 | 55 | F | On-site sampling |
| 104 | LGG | - | + | Astrocytoma, IDH-mutant | 2 | 2021 | 32 | M | On-site sampling |
| 105 | MEN | N | N | Meningioma | 1 | 2021 | 41 | F | On-site sampling |
| 106 | MEN | N | N | Meningioma | 1 | 2021 | 70 | F | On-site sampling |
| 107 | MEN | N | N | Meningioma | 1 | 2021 | 58 | M | On-site sampling |
| 108 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 52 | F | On-site sampling |
| 109 | MEN | N | N | Meningioma | 1 | 2021 | 64 | M | On-site sampling |
| 110 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 64 | M | On-site sampling |
| 111 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 71 | M | On-site sampling |
| 112 | LGG | - | + | Astrocytoma, IDH-mutant | 2 | 2021 | 40 | F | On-site sampling |
| 114 | MEN | N | N | Meningioma | 1 | 2021 | 64 | F | On-site sampling |
| 115 | MEN | N | N | Meningioma | 1 | 2021 | 75 | F | On-site sampling |
| 117 | HGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 3 | 2021 | 31 | M | On-site sampling |
| 118 | MEN | N | N | Meningioma | 1 | 2021 | 47 | M | On-site sampling |
| 119 | MEN | N | N | Meningioma | 1 | 2021 | 79 | F | On-site sampling |
| 120 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 50 | M | On-site sampling |
| 121 | MEN | N | N | Meningioma | 2 | 2021 | 42 | M | On-site sampling |
| 122 | LGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 2 | 2021 | 52 | F | On-site sampling |
| 123 | MEN | N | N | Meningioma | 1 | 2021 | 42 | F | On-site sampling |
| 125 | LGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 2 | 2021 | 59 | M | On-site sampling |
| 126 | MEN | N | N | Meningioma | 1 | 2021 | 51 | F | On-site sampling |
| 127 | MEN | N | N | Meningioma | 1 | 2021 | 66 | F | On-site sampling |
| 128 | LGG | - | - | Pilocytic astrocytoma | 1 | 2021 | 29 | F | On-site sampling |
| 129 | HGG | - | + | Astrocytoma, IDH-mutan | 4 | 2021 | 30 | F | On-site sampling |
| 130 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 69 | M | On-site sampling |
| 131 | LGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 2 | 2021 | 71 | F | On-site sampling |
| 132 | HGG | - | - | Posterior fossa ependymoma | 3 | 2021 | 24 | M | On-site sampling |
| 133 | HGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 3 | 2021 | 42 | M | On-site sampling |
| 134 | MEN | N | N | Meningioma | 1 | 2021 | 68 | F | On-site sampling |
| 135 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 78 | F | On-site sampling |
| 136 | HGG | - | - | Glioblastoma, IDH-wildtype | 4 | 2021 | 60 | M | On-site sampling |
| 137 | MEN | N | N | Meningioma | 1 | 2021 | 34 | F | On-site sampling |
| 138 | HGG | + | + | Oligodendroglioma, IDH-mutant, and 1p/19q codeleted | 3 | 2021 | 39 | F | On-site sampling |

**\*Tumor diagnoses were verified according to the 2021 WHO brain tumor classification. In some older cases before genetic testing was introduced into routine practice the 2016 WHO brain tumor classification was applied.**

F – female; M – male; MEN – meningioma; N – not known; NOS – not otherwise specified; HGG – high grade glioma; LGG – low grade glioma; “+” – present; “–“ – absent