# Supplementary Material

## Point-of-care mass spectrometry metabolomic analysis enabling intraoperative brain tumor diagnosis

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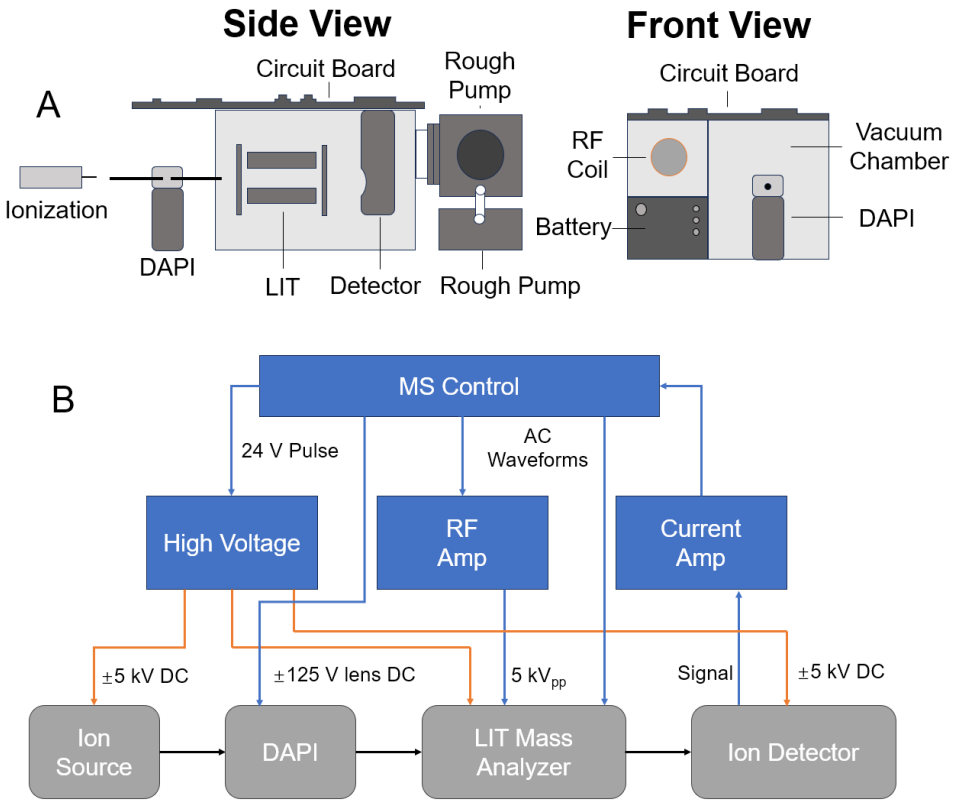


**Figure S1.** (A) Schematic of the miniature MS system. It consists of a discontinuous atmospheric pressure interface, a linear ion trap, electron multiplier detector and control electronics. (B) Schematic of the control electronics in the miniature MS system.

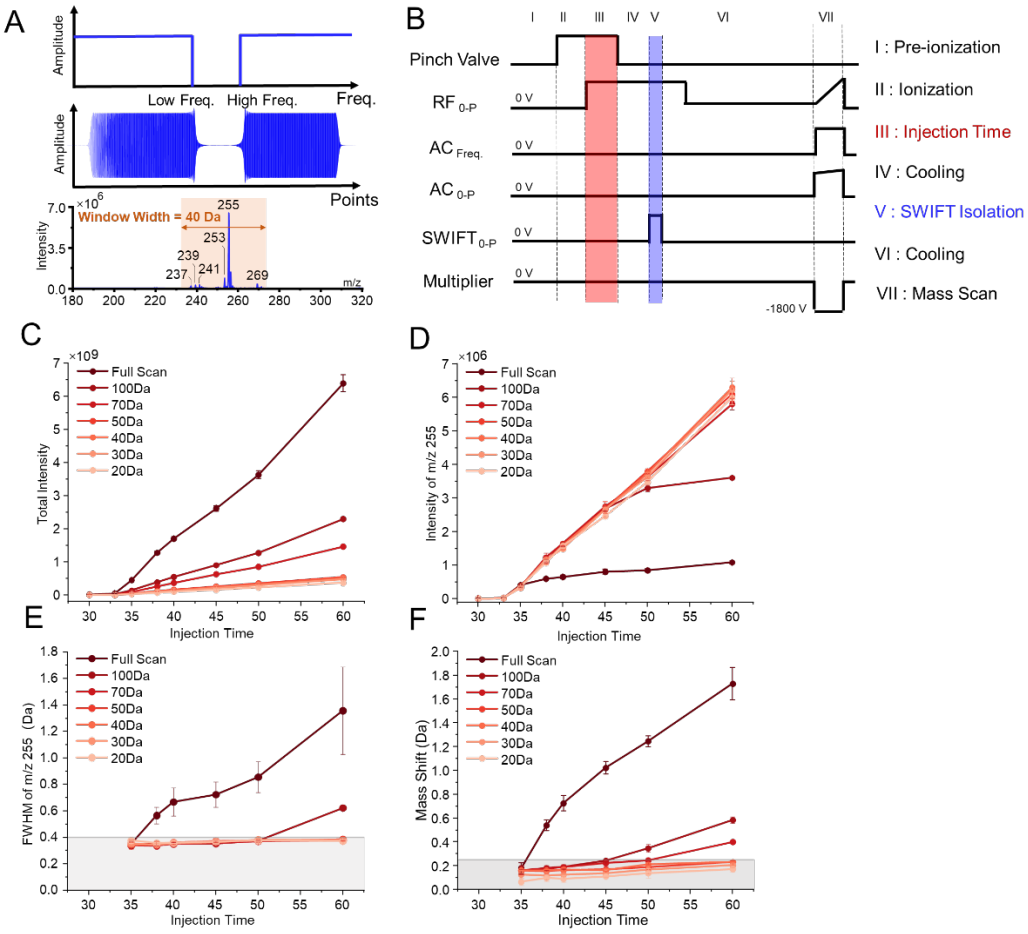


**Figure S2.** (A) Frequency domain graph (up) and time domain graph (middle) of SWIFT waveform for isolated a 40Da range ions centered on m/z 255. (B) Scan function for mass analysis using miniature mass spectrometer with injection control and SWIFT isolation. Effect of injection value on (C) total intensity, (D) intensity of m/z 255, (E) FWHM of m/z 255 and (F) mass shift of m/z 255 at different scan range centered on m/z 255.

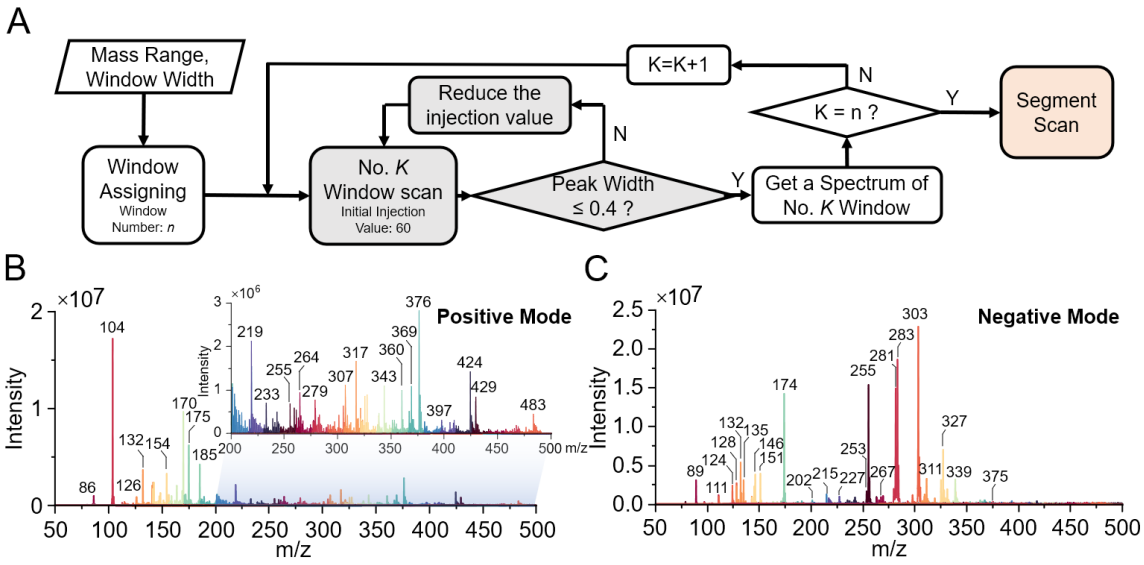


**Figure S3.** (A) Strategy implemented for injection control in segment scan workflow. Mass segment scan with 20 Da scan range spectra in (B) positive and (C) negative mode.

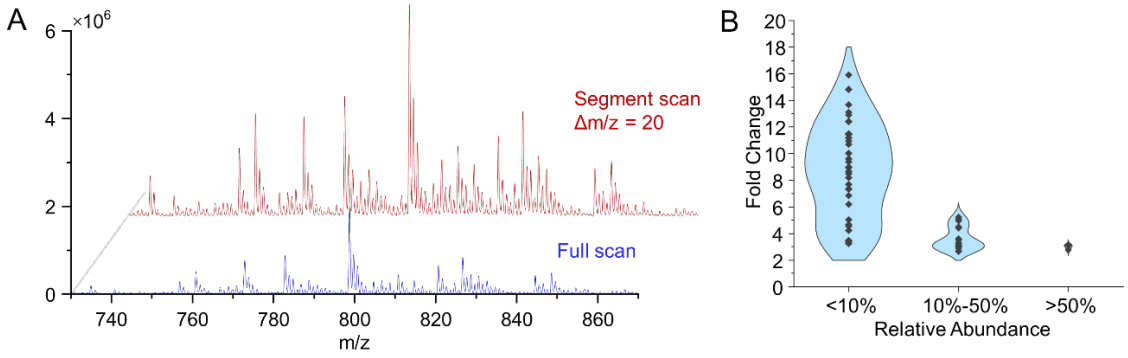


**Figure S4.** (A) Comparison of mass spectrum of lipid obtained by conventional full scan method and segment scan method at 20 Da window width. (B) Fold change of identified lipid peaks between segment scan and conventional full scan methods at different abundances.

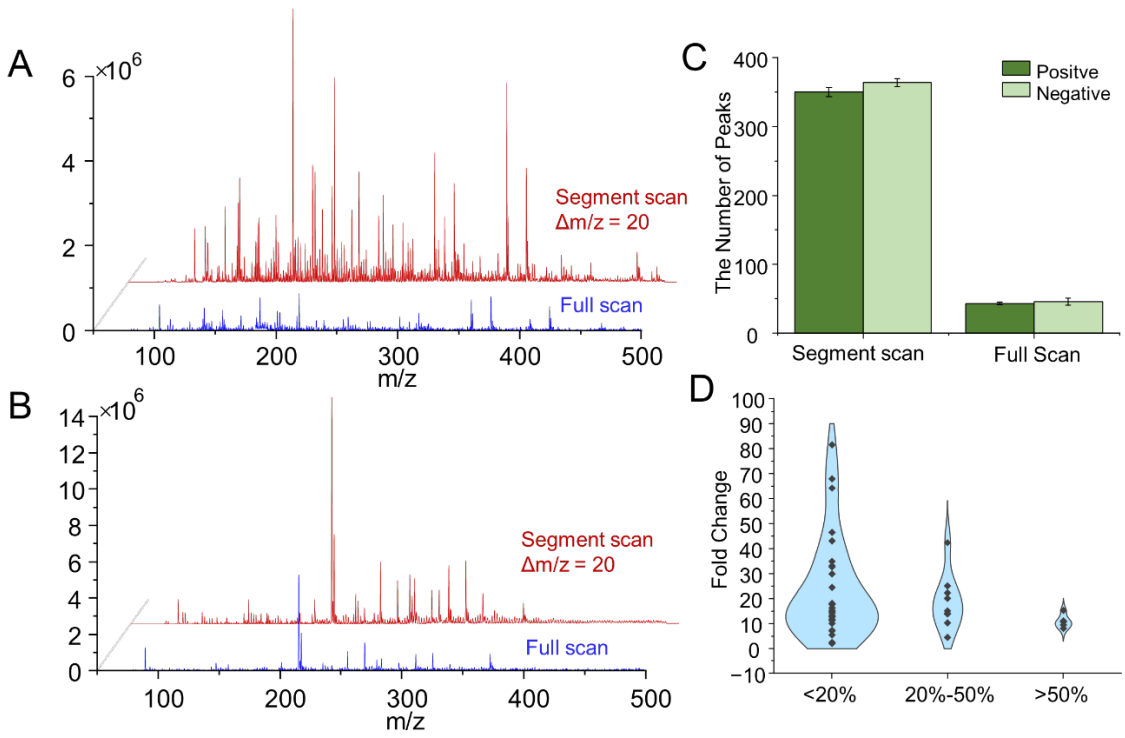


**Figure S5.** Comparison of mass spectrum of metabolites in whole blood obtained by conventional full scan method and segment scan method at 20 Da window width with (A) positive and (B) negative mode. (C) The number of identified peaks by conventional full scan method and segment scan method. (D) Fold change of identified lipid peaks between conventional full scan method and segment scan method at different relative abundance.

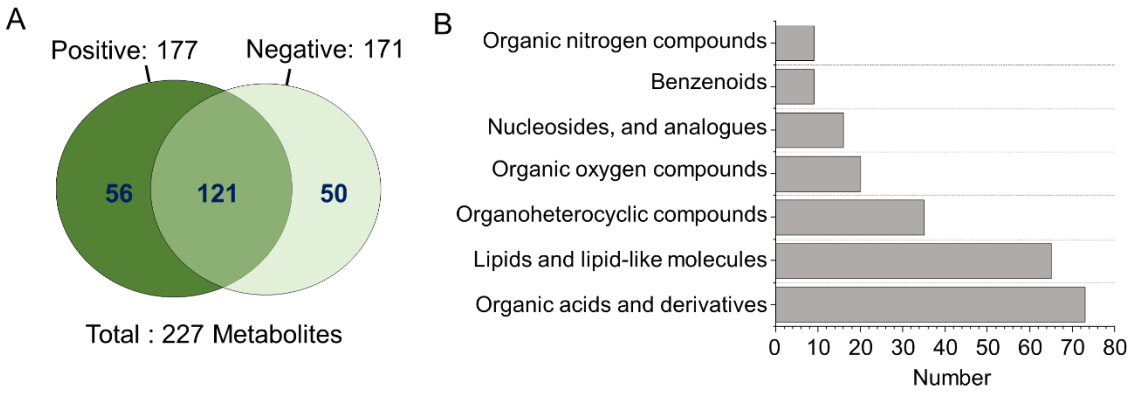


**Figure S6.** (A) Number of metabolites identified matching with HMDB database. (B) Number of identified metabolites in different classes.

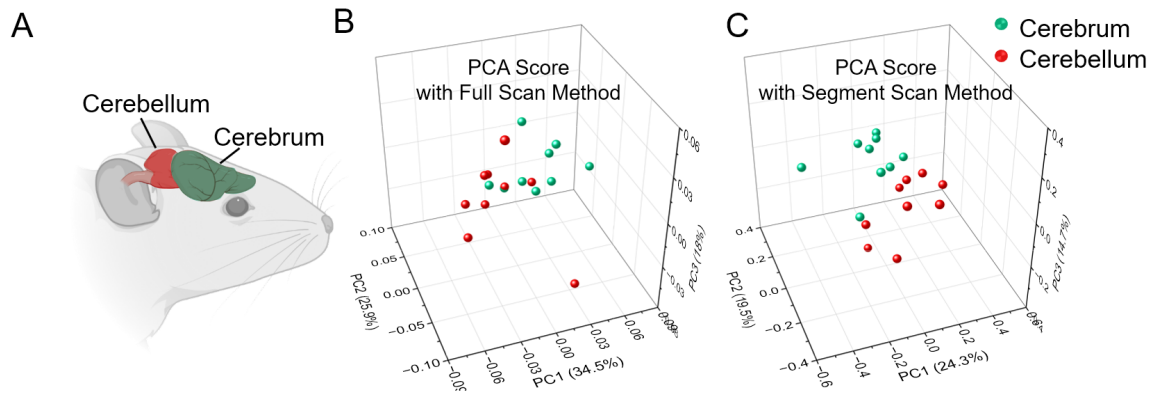


**Figure S7.** (A) Diagram of the location of the rat cerebrum and cerebellum. The three-dimensional PCA score map was obtained by using (B) conventional full scan and (C) segment scan methods.

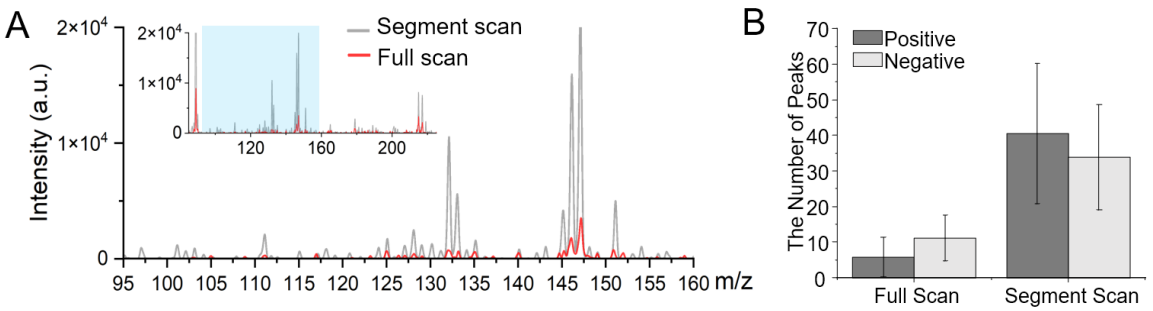


**Figure S8.** (A) Comparison of mass spectrum of metabolites in glioma tissue obtained by conventional full scan method and segment scan method. (B) Comparison of the number of identified peaks in all glioma samples with conventional full scan method and segment scan method at negative mode or positive mode.

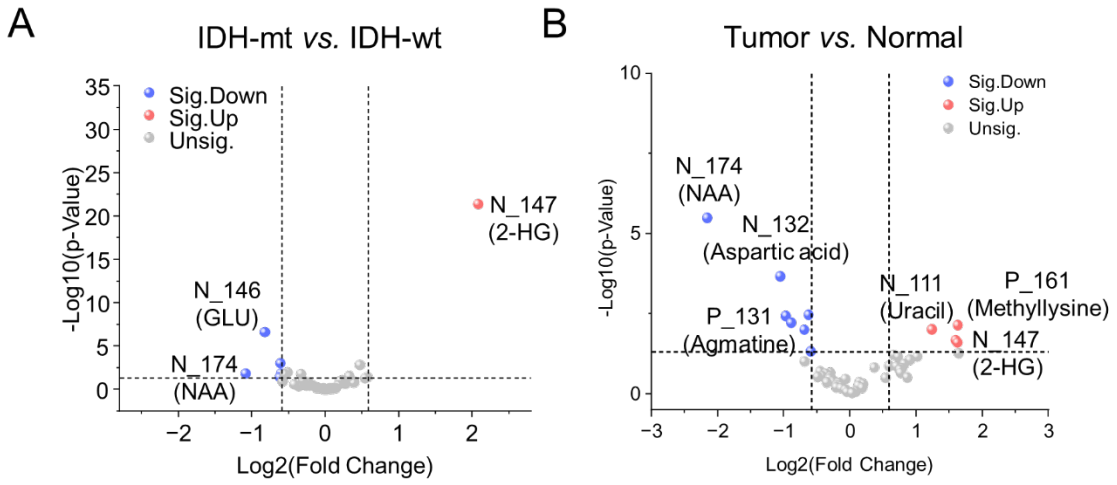


**Figure S9.** Volcanic plot and significantly differential metabolites that distinguish (A) IDH mutant and IDH Wildtype tissues, and (B) Glioma tumor and normal tissues using conventional full scan method.

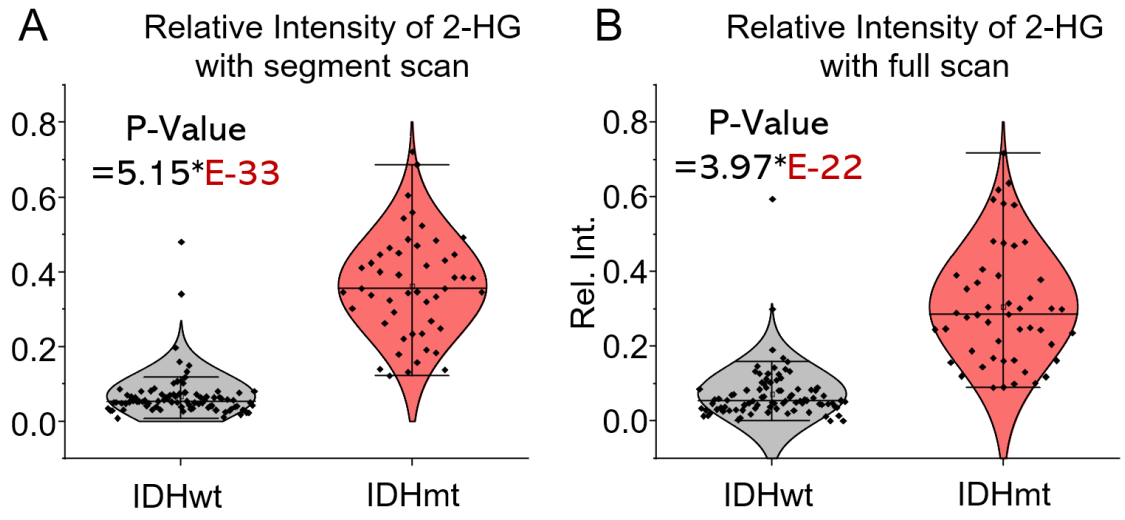


**Figure S10.** Comparison of the 2-HG difference in the determination of IDH mutation between (A) segment scan and (B) conventional full scan method.

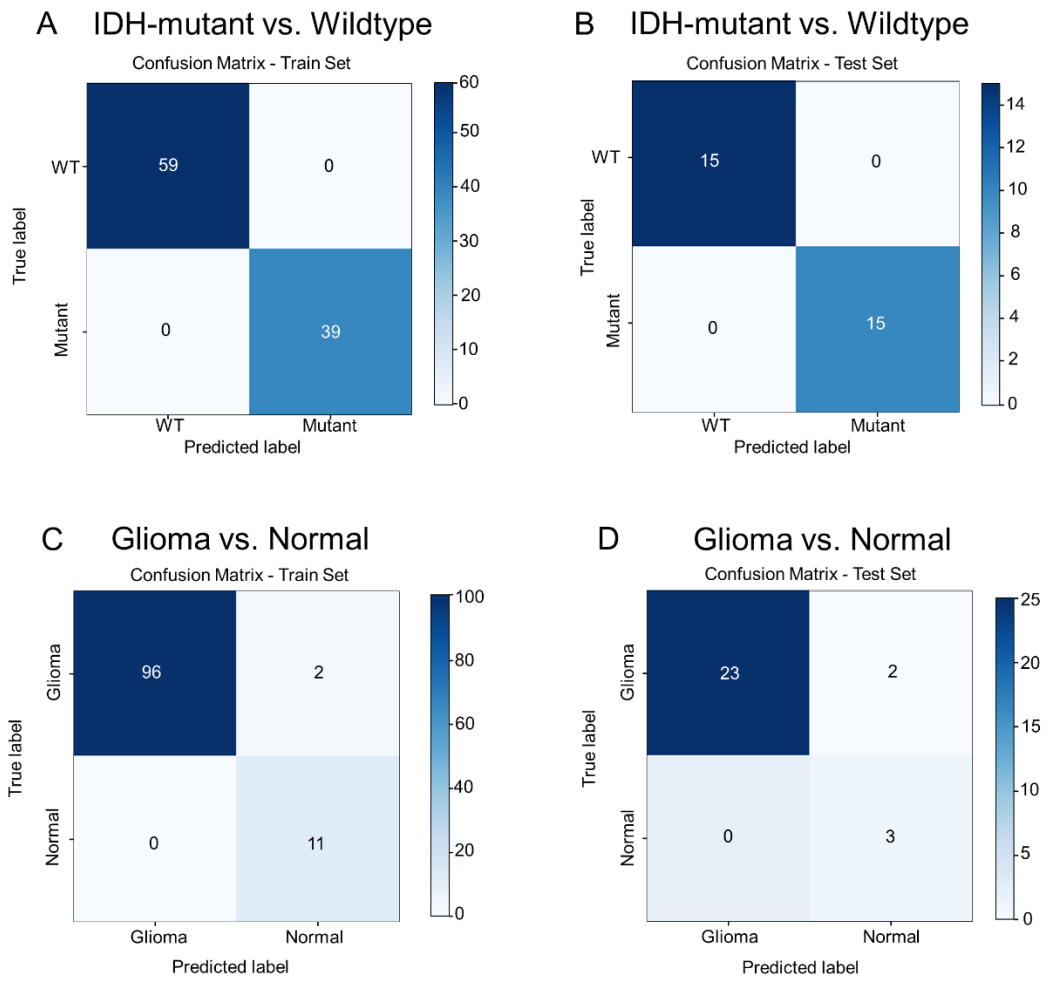


**Figure S11.** Confusion matrix of (A) train set and (B) test set in the classification model for IDH-mutant vs. wildtype. And (C) train set and (D) test set for glioma vs. normal.

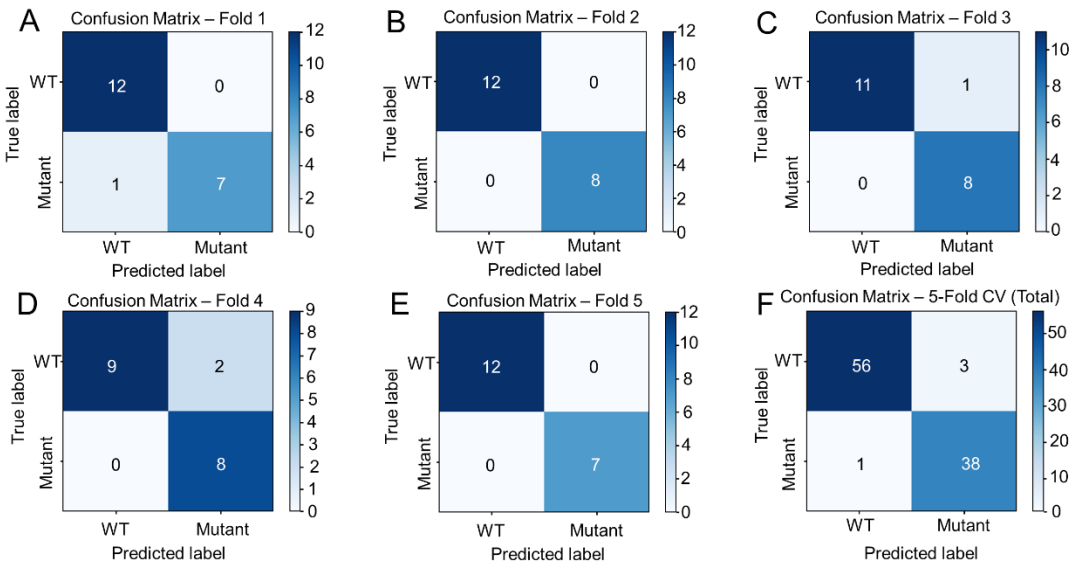


**Figure S12.** Confusion matrix of (A-E) Fold 1-Fold 5 and (D) average result for validation set in the 5-fold-cv for IDH-mutant vs. wildtype.

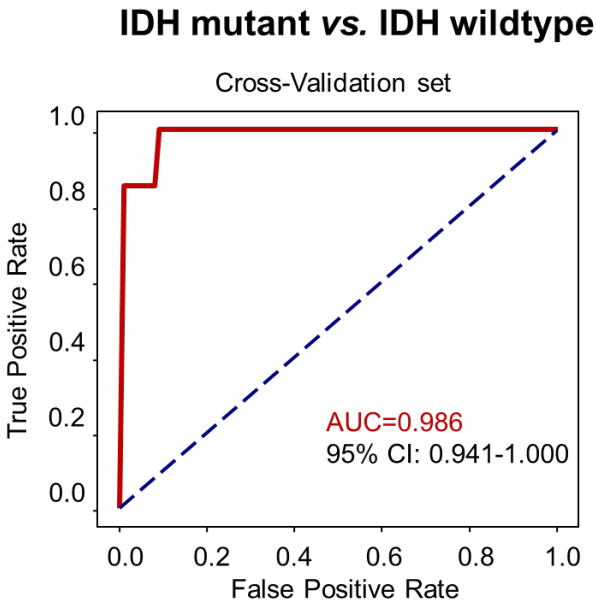


**Figure S13.** Mean ROC and AUC values for classification of IDH mutant versus IDH wildtype gliomas with cross-validation set.

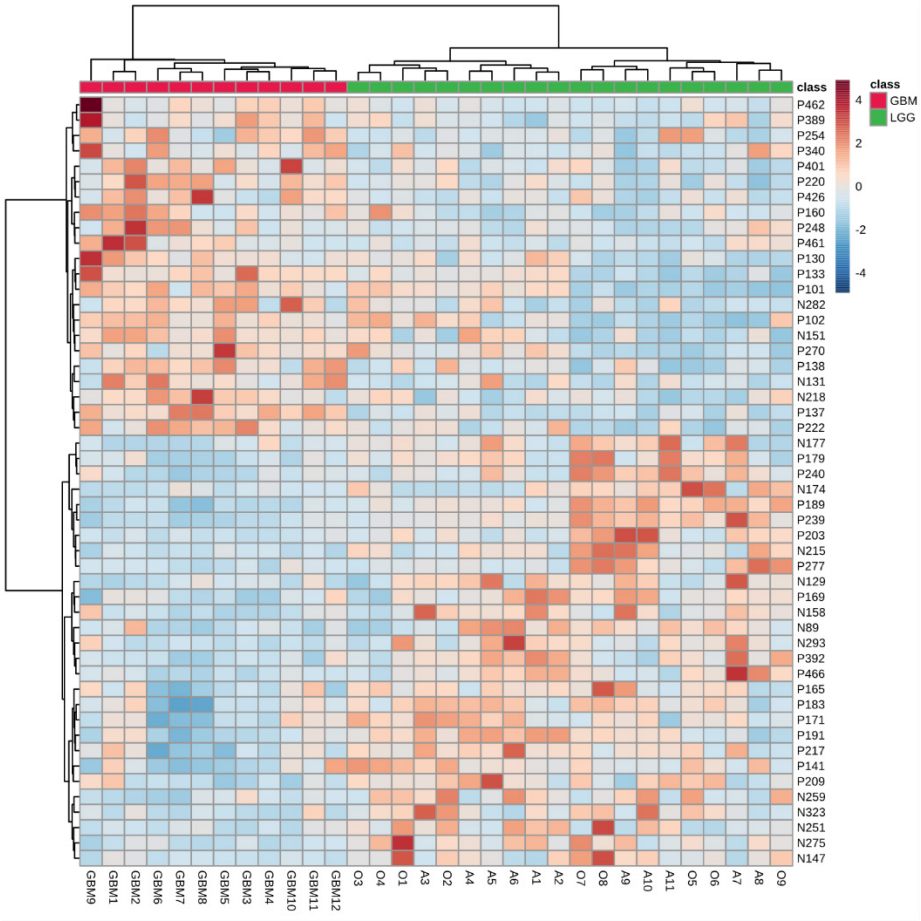


**Figure S14.** Hierarchical cluster analysis of GBM and LGG (Including astrocytoma and oligodendroglioma) using metabolites features.

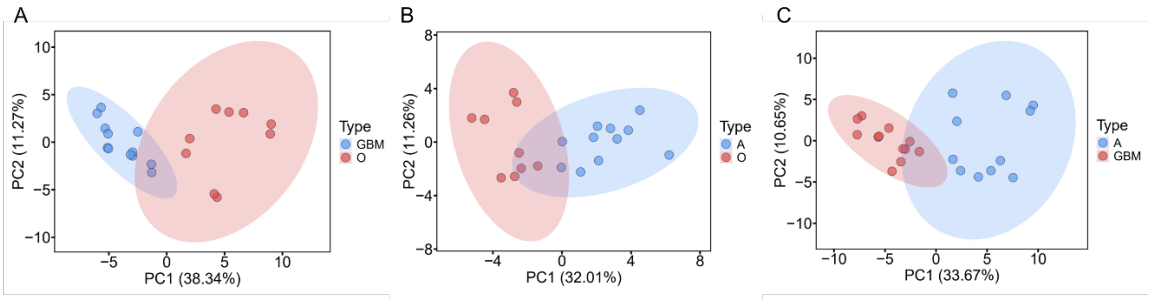


**Figure S15.** Principal component analysis (PCA) of (A) GBM vs. oligodendroglioma, (B) astrocytoma vs. oligodendroglioma, (C) GBM vs. astrocytoma using metabolomic features.

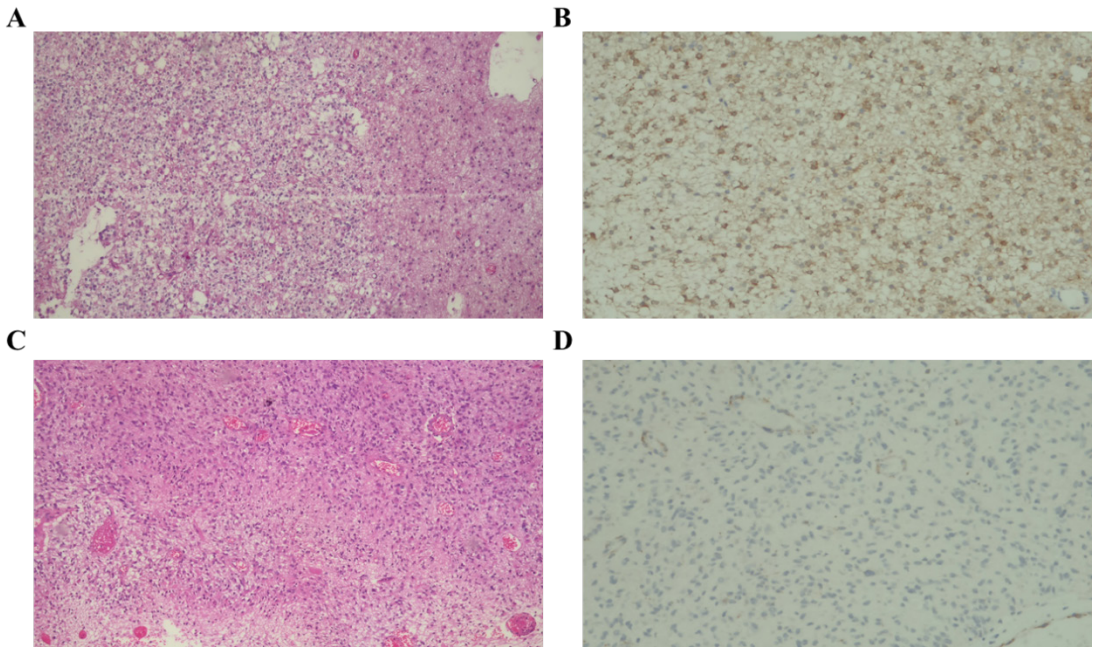


**Figure S16.** Postoperative histopathological validation of glioma subtypes and IDH status for the cases shown in Figure 6. (A, B) Case 1 (left frontal glioma): (A) Hematoxylin and eosin (HE) staining of the tumor core; (B) positive immunostaining for IDH R132H confirms IDH-mutant status. (C, D) Case 2 (right parietal tumor): (C) HE staining of the tumor core; (D) negative immunostaining for IDH R132H confirms IDH-wildtype status.

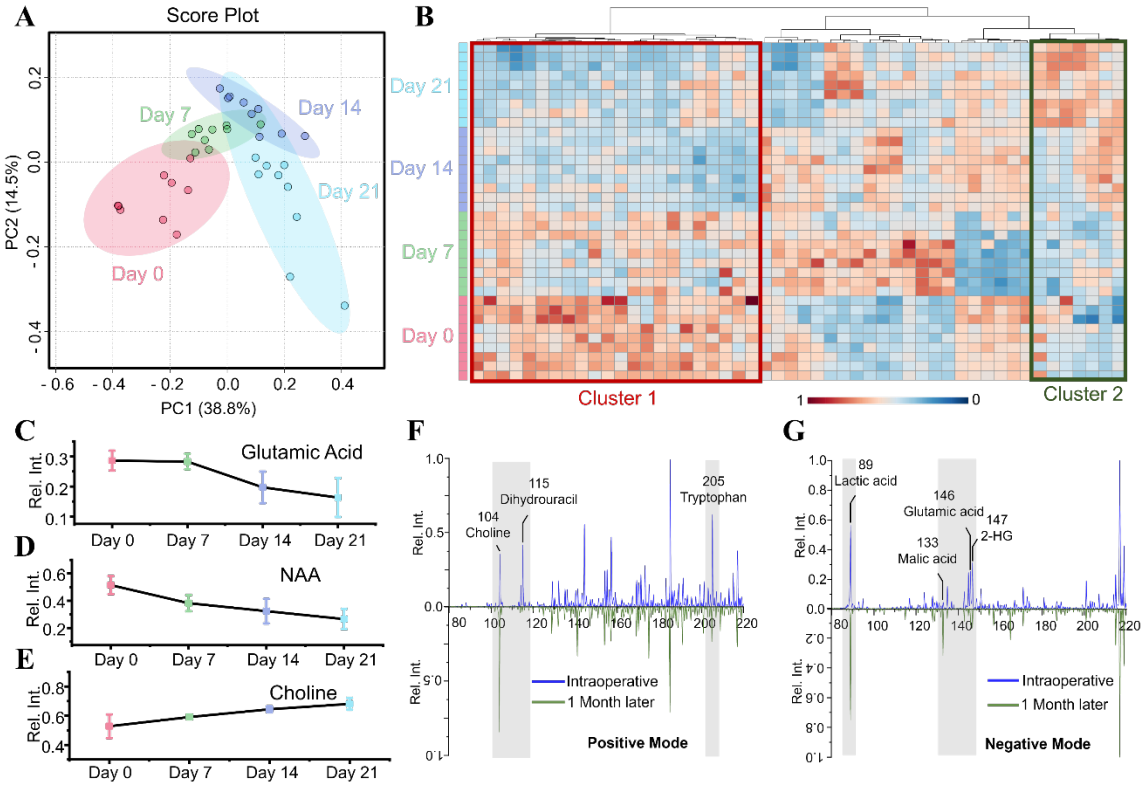


**Figure S17.** (A) Principal component analysis (PCA) of a same rat brain tissue in different weeks using metabolites features in positive and negative ion mode data. (B) Hierarchical cluster analysis of brain tissue in different weeks using metabolites features. Trend of relative intensity of (C) glutamic acid, (D) NAA and (E) choline in rat brain over 21 Days. Comparison of spectrum of a glioma tissue in (F) positive and (G) negative mode between intraoperative and 1 month ago analysis.

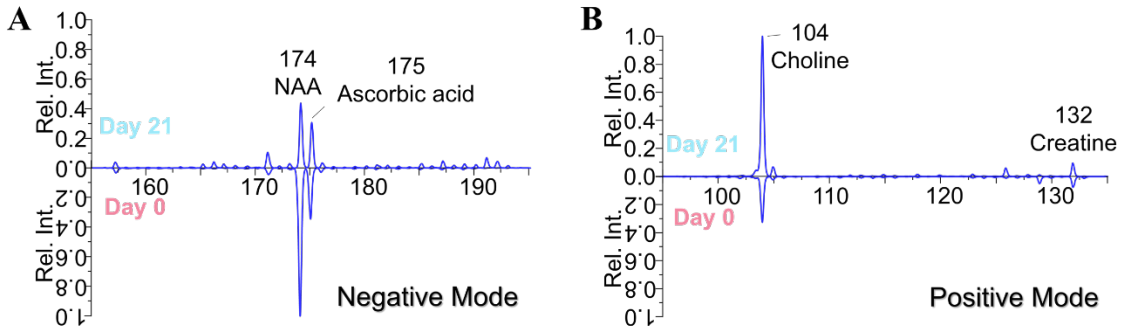


**Figure S18.** Comparison of spectrum of (A) NAA and (B) choline between analysis of Day 0 and Day 21 for glioma tissues.

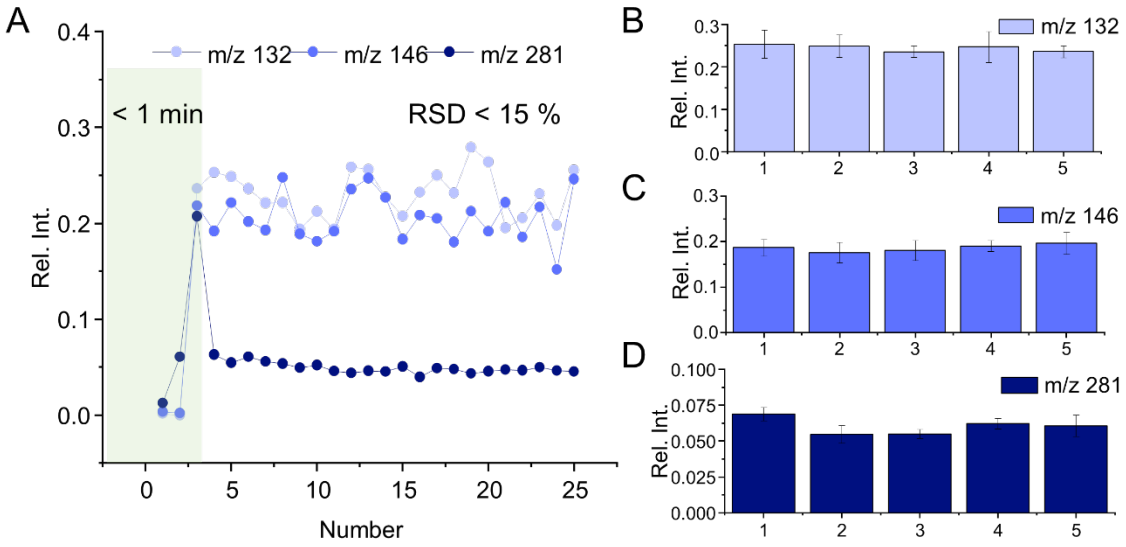


**Figure S19.** (A) Comparison of the results of multiple continuous injections with the same probe. Comparison of the consistency of results from five different probes with (B) m/z 132, (C) m/z 146 and (D) m/z 281.

**Table S1** Widow distribution of different spectra stitching width and the number of times within the range of m/z 70- m/z 500 with each spectra stitching strategy.

| Single Scan Range | Overlap Range | Number of Scan |
|---|---|---|
| 20 | 5 | 28 |
| 30 | 10 | 21 |
| 40 | 10 | 14 |
| 50 | 10 | 11 |
| 70 | 10 | 7 |
| 100 | 10 | 5 |
| Full Scan | 0 | 1 |

**Table S2:** The characteristics of patients in the glioma diagnosis cohort subjected to sequencing and pathological evaluation

| Subject# | Gender | Age | Diagnosis | Grade | biopsy# (subject) | Biopsy# (overall) | Tissue | IHC | PCRseq |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Male | 16 | Glioblastoma | 4 | 1 | 1 | Tumor tissue | - | Wildtype |
| 2 | Female | 32 | Astrocytoma | 2 | 1 | 2 | Tumor tissue | + | R132H |
| 3 | Female | 44 | Glioblastoma | 4 | 1 | 3 | Tumor tissue | - | Wildtype |
| 4 | Male | 60 | Glioblastoma | 4 | 1 | 4 | Tumor tissue | - | Wildtype |
| 5 | Male | 66 | Glioblastoma | 4 | 1 | 5 | Tumor tissue | - | Wildtype |
| 6 | Female | 56 | Glioblastoma | 4 | 1 | 6 | Tumor tissue | - | Wildtype |
| 7 | Female | 58 | Astrocytoma | 2 | 1 | 7 | Tumor tissue | - | Wildtype |
| | Female | 58 | Astrocytoma | 2 | 2 | 8 | Tumor tissue | - | Wildtype |
| | Female | 58 | Astrocytoma | 2 | 3 | 9 | Tumor tissue | - | Wildtype |
| 8 | Male | 55 | Astrocytoma | 3 | 1 | 10 | Tumor tissue | - | Wildtype |
| 9 | Male | 52 | Oligodendroglioma | 2 | 1 | 11 | Tumor tissue | + | R132H |
| | Male | 52 | Oligodendroglioma | 2 | 2 | 12 | Tumor tissue | + | R132H |
| 10 | Male | 30 | Astrocytoma | 4 | 1 | 13 | Tumor tissue | + | R132H |
| 11 | Female | 28 | Glioblastoma | 4 | 1 | 14 | Tumor tissue | - | Wildtype |
| 12 | Female | 25 | Astrocytoma | 2 | 1 | 15 | Tumor tissue | - | Wildtype |
| | Female | 25 | Astrocytoma | 2 | 2 | 16 | Tumor tissue | - | Wildtype |
| 13 | Male | 34 | Glioblastoma | 4 | 1 | 17 | Tumor tissue | - | Wildtype |
| 14 | Male | 60 | Glioblastoma | 4 | 1 | 18 | Tumor tissue | - | Wildtype |
| 15 | Male | 45 | Astrocytoma | 3 | 1 | 19 | Tumor tissue | - | Wildtype |
| 16 | Male | 42 | Astrocytoma | 2 | 1 | 20 | Tumor tissue | + | R132H |
| | Male | 42 | Astrocytoma | 2 | 2 | 21 | Tumor tissue | + | R132H |
| 17 | Female | 35 | Oligodendroglioma | 3 | 1 | 22 | Tumor tissue | + | R132H |
| 18 | Female | 50 | Oligodendroglioma | 3 | 1 | 23 | Tumor tissue | + | R132H |
| 19 | Female | 28 | Oligodendroglioma | 3 | 1 | 24 | Tumor tissue | +- | R132H |
| 20 | Female | 69 | Astrocytoma | 3 | 1 | 25 | Tumor tissue | - | Wildtype |
| 21 | Male | 70 | Glioblastoma | 4 | 1 | 26 | Tumor tissue | -+ | Wildtype |
| | Male | 70 | Glioblastoma | 4 | 2 | 27 | Tumor tissue | -+ | Wildtype |
| 22 | Female | 34 | Astrocytoma | 2 | 3 | 28 | Tumor tissue | + | R132H |
| 23 | Male | 44 | Astrocytoma | 2 | 1 | 29 | Tumor tissue | - | R132H |
| 24 | Male | 66 | Glioblastoma | 4 | 1 | 30 | Tumor tissue | - | Wildtype |
| 25 | Male | 80 | Glioblastoma | 4 | 1 | 31 | Tumor tissue | - | Wildtype |
| 26 | Female | 30 | Astrocytoma | 2 | 1 | 32 | Tumor tissue | - | Wildtype |
| 27 | Male | 22 | Astrocytoma | 3 | 1 | 33 | Tumor tissue | + | R132H |
| 28 | Male | 47 | Glioblastoma | 4 | 1 | 34 | Tumor tissue | - | Wildtype |
| 29 | Male | 64 | Glioblastoma | 4 | 1 | 35 | Tumor tissue | - | Wildtype |

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|---|---|---|---|---|---|---|---|---|---|
| 30 | Female | 47 | Glioblastoma | 4 | 1 | 36 | Tumor tissue | - | Wildtype |
| 31 | Male | 50 | Glioblastoma | 4 | 1 | 37 | Tumor tissue | - | Wildtype |
| 32 | Female | 23 | Astrocytoma | 2 | 1 | 38 | Tumor tissue | - | Wildtype |
| 33 | Male | 47 | Glioblastoma | 4 | 1 | 39 | Tumor tissue | - | Wildtype |
| 34 | Male | 45 | Glioblastoma | 4 | 1 | 40 | Tumor tissue | - | Wildtype |
| 35 | Male | 43 | Astrocytoma | 2 | 1 | 41 | Tumor tissue | + | R132H |
| 36 | Female | 53 | Astrocytoma | 2 | 1 | 42 | Tumor tissue | - | R132H |
| 37 | Female | 32 | Astrocytoma | 3 | 1 | 43 | Tumor tissue | + | R132H |
| 38 | Male | 68 | Glioblastoma | 4 | 1 | 44 | Tumor tissue | - | Wildtype |
| 39 | Female | 65 | Glioblastoma | 4 | 1 | 45 | Tumor tissue | - | Wildtype |
| 40 | Male | 55 | Glioblastoma | 4 | 1 | 46 | Tumor tissue | - | Wildtype |
| 41 | Female | 47 | Pilocyticastrocytoma | 1 | 1 | 47 | Tumor tissue | - | Wildtype |
| 42 | Male | 24 | Astrocytoma | 2 | 1 | 48 | Tumor tissue | - | Wildtype |
| 43 | Male | 42 | Glioblastoma | 4 | 1 | 49 | Tumor tissue | - | Wildtype |
| 44 | Male | 59 | Glioblastoma | 4 | 1 | 50 | Tumor tissue | - | Wildtype |
| 45 | Male | 36 | Oligodendroglioma | 2 | 1 | 51 | Tumor tissue | -+ | R132H |
| 46 | Male | 33 | Astrocytoma | 2 | 1 | 52 | Tumor tissue | +- | Wildtype |
| | Male | 33 | Astrocytoma | 2 | 2 | 53 | Tumor tissue | +- | Wildtype |
| 47 | Female | 63 | Glioblastoma | 4 | 1 | 54 | Tumor tissue | - | Wildtype |
| 48 | Male | 15 | Glioblastoma | 4 | 1 | 55 | Tumor tissue | - | Wildtype |
| 49 | Male | 65 | Glioblastoma | 4 | 1 | 56 | Tumor tissue | - | Wildtype |
| 50 | Male | 41 | Astrocytoma | 2 | 1 | 57 | Tumor tissue | - | Wildtype |
| 51 | Female | 60 | Glioblastoma | 4 | 1 | 58 | Tumor tissue | - | Wildtype |
| 52 | Female | 60 | Astrocytoma | 3 | 1 | 59 | Tumor tissue | - | Wildtype |
| 53 | Male | 53 | Astrocytoma | 3 | 1 | 60 | Tumor tissue | - | Wildtype |
| 54 | Female | 55 | Oligodendroglioma | 2 | 1 | 61 | Tumor tissue | + | R132H |
| 55 | Female | 50 | Glioblastoma | 4 | 1 | 62 | Tumor tissue | - | Wildtype |
| 56 | Female | 32 | Astrocytoma | 4 | 1 | 63 | Tumor tissue | + | R132H |
| 57 | Male | 47 | Oligodendroglioma | 3 | 1 | 64 | Tumor tissue | + | R132H |
| 58 | Male | 47 | Astrocytoma | 4 | 1 | 65 | Tumor tissue | + | R132H |
| 59 | Female | 45 | Oligodendroglioma | 2 | 1 | 66 | Tumor tissue | + | R132H |
| 60 | Male | 36 | Astrocytoma | 2 | 1 | 67 | Tumor tissue | + | R132H |
| | Male | 36 | Astrocytoma | 2 | 2 | 68 | Tumor tissue | + | R132H |
| | Male | 36 | Astrocytoma | 2 | 3 | 69 | Tumor tissue | + | R132H |
| 61 | Male | 48 | Astrocytoma | 2 | 1 | 70 | Tumor tissue | - | R172K |
| 62 | Female | 22 | Pilocyticastrocytoma | 1 | 1 | 71 | Tumor tissue | - | Wildtype |
| 63 | Female | 34 | Astrocytoma | 2 | 1 | 72 | Tumor tissue | + | R132H |
| | Female | 34 | Astrocytoma | 2 | 2 | 73 | Tumor tissue | + | R132H |
| 64 | Male | 56 | Glioblastoma | 4 | 1 | 74 | Tumor tissue | - | Wildtype |
| 65 | Male | 25 | Astrocytoma | 2 | 1 | 75 | Tumor tissue | - | R172K |

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|---|---|---|---|---|---|---|---|---|---|
| 66 | Female | 34 | Astrocytoma | 4 | 1 | 76 | Tumor tissue | + | R132H |
| | Female | 34 | Astrocytoma | 4 | 2 | 77 | Tumor tissue | + | R132H |
| 67 | Female | 32 | Oligodendroglioma | 3 | 1 | 78 | Tumor tissue | + | R132H |
| 68 | Male | 61 | Glioblastoma | 4 | 1 | 79 | Tumor tissue | - | Wildtype |
| 69 | Female | 77 | Glioblastoma | 4 | 1 | 80 | Tumor tissue | - | Wildtype |
| 70 | Male | 38 | Glioblastoma | 4 | 1 | 81 | Tumor tissue | - | Wildtype |
| 71 | Male | 50 | Oligodendroglioma | 2 | 1 | 82 | Tumor tissue | + | R132H |
| | Male | 50 | Oligodendroglioma | 2 | 2 | 83 | Tumor tissue | + | R132H |
| 72 | Female | 43 | Astrocytoma | 2 | 1 | 84 | Tumor tissue | + | R132H |
| 73 | Male | 48 | Glioblastoma | 4 | 1 | 85 | Tumor tissue | - | Wildtype |
| 74 | Male | 59 | Oligodendroglioma | 3 | 1 | 86 | Tumor tissue | + | R132H |
| | Male | 57 | Oligodendroglioma | 2 | 2 | 87 | Tumor tissue | + | R132H |
| 75 | Male | 53 | Oligodendroglioma | 2 | 1 | 88 | Tumor tissue | + | R132H |
| 76 | Male | 43 | Oligodendroglioma | 2 | 1 | 89 | Tumor tissue | - | R132H |
| 77 | Female | 74 | Glioblastoma | 4 | 1 | 90 | Tumor tissue | - | Wildtype |
| 78 | Male | 41 | Astrocytoma | 2 | 1 | 91 | Tumor tissue | - | R132H |
| 79 | Male | 44 | Oligodendroglioma | 3 | 1 | 92 | Tumor tissue | -+ | R132H |
| 80 | Male | 45 | Glioblastoma | 4 | 1 | 93 | Tumor tissue | - | Wildtype |
| 81 | Female | 33 | Glioblastoma | 4 | 1 | 94 | Tumor tissue | - | Wildtype |
| 82 | Male | 62 | Glioblastoma | 4 | 1 | 95 | Tumor tissue | - | Wildtype |
| 83 | Female | 20 | Glioblastoma | 4 | 1 | 96 | Tumor tissue | - | Wildtype |
| | Female | 20 | Glioblastoma | 4 | 2 | 97 | Tumor tissue | - | Wildtype |
| | Female | 20 | Glioblastoma | 4 | 3 | 98 | Tumor tissue | - | Wildtype |
| 84 | Male | 15 | Astrocytoma | 3 | 1 | 99 | Tumor tissue | - | Wildtype |
| 85 | Male | 33 | Glioblastoma | 4 | 1 | 100 | Tumor tissue | - | Wildtype |
| 86 | Female | 38 | Oligodendroglioma | 2 | 1 | 101 | Tumor tissue | + | R132H |
| 87 | Female | 54 | Oligodendroglioma | 3 | 1 | 102 | Tumor tissue | + | R132H |
| 88 | Male | 36 | Oligodendroglioma | 3 | 1 | 103 | Tumor tissue | + | R132H |
| 89 | Female | 44 | Astrocytoma | 3 | 1 | 104 | Tumor tissue | -+ | R132H |
| 90 | Male | 54 | Glioblastoma | 4 | 1 | 105 | Tumor tissue | - | Wildtype |
| 91 | Male | 51 | Astrocytoma | 3 | 1 | 106 | Tumor tissue | + | R132H |
| 92 | Female | 26 | Oligodendroglioma | 2 | 1 | 107 | Tumor tissue | + | R132H |
| 93 | Male | 37 | Oligodendroglioma | 2 | 1 | 108 | Tumor tissue | + | R132H |
| 94 | Male | 39 | Glioblastoma | 4 | 1 | 109 | Tumor tissue | - | Wildtype |
| 95 | Male | 50 | Glioblastoma | 4 | 1 | 110 | Tumor tissue | - | Wildtype |
| 96 | Male | 39 | Glioblastoma | 4 | 1 | 111 | Tumor tissue | - | Wildtype |
| 97 | Male | 68 | Glioblastoma | 4 | 1 | 112 | Tumor tissue | - | Wildtype |
| | Male | 68 | Glioblastoma | 4 | 2 | 113 | Tumor tissue | - | Wildtype |
| 98 | Male | 50 | Astrocytoma | 2 | 1 | 114 | Tumor tissue | -+ | R132H |
| 99 | Female | 61 | Glioblastoma | 4 | 1 | 115 | Tumor tissue | - | Wildtype |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Female | 61 | Glioblastoma | 4 | 2 | 116 | Tumor tissue | - | Wildtype |
| | Female | 61 | Glioblastoma | 4 | 3 | 117 | Tumor tissue | - | Wildtype |
| | Female | 61 | Glioblastoma | 4 | 4 | 118 | Tumor tissue | - | Wildtype |
| | Female | 61 | Glioblastoma | 4 | 5 | 119 | Para-tumor brain tissue | - | Wildtype |
| 100 | Male | 47 | Oligodendroglioma | 3 | 1 | 120 | Tumor tissue | - | R132H |
| 101 | Male | 64 | Glioblastoma | 4 | 1 | 121 | Tumor tissue | - | Wildtype |
| 102 | Female | 69 | Glioblastoma | 4 | 1 | 122 | Tumor tissue | - | Wildtype |
| 103 | Male | 64 | Astrocytoma | 3 | 1 | 123 | Tumor tissue | - | Wildtype |
| 104 | Male | 42 | Glioblastoma | 4 | 1 | 124 | Tumor tissue | - | Wildtype |
| 105 | Female | 56 | Meningioma | 1 | 1 | 125 | Normal brain tissue | - | Wildtype |
| | Female | 35 | Meningioma | 1 | 1 | 126 | Normal brain tissue | - | Wildtype |
| 106 | Female | 35 | Meningioma | 1 | 2 | 127 | Normal brain tissue | - | Wildtype |
| | Female | 35 | Meningioma | 1 | 3 | 128 | Normal brain tissue | - | Wildtype |
| | Female | 35 | Meningioma | 1 | 4 | 129 | Normal brain tissue | - | Wildtype |
| | Female | 56 | Neurilemmoma | 1 | 1 | 130 | Normal brain tissue | - | Wildtype |
| 107 | Female | 56 | Neurilemmoma | 1 | 2 | 131 | Normal brain tissue | - | Wildtype |
| | Female | 56 | Neurilemmoma | 1 | 3 | 132 | Normal brain tissue | - | Wildtype |
| | Male | 57 | Astrocytoma | 2 | 1 | 133 | Normal brain tissue | - | Wildtype |
| 108 | Male | 57 | Astrocytoma | 2 | 2 | 134 | Para-tumor brain tissue | - | Wildtype |
| | Male | 57 | Astrocytoma | 2 | 3 | 135 | Para-tumor brain tissue | - | Wildtype |
| 109 | Female | 53 | Meningioma | 1 | 1 | 136 | Normal brain tissue | - | Wildtype |
| | Female | 53 | Meningioma | 1 | 2 | 137 | Normal brain tissue | - | Wildtype |

**Table S3:** The characteristics of patients in the intraoperative subtype classification cohort subjected to sequencing and pathological evaluation.

| Subject# | Gender | Age | Diagnosis | Grade | IHC | PCRseq |
|---|---|---|---|---|---|---|
| 1 | Male | 43 | Astrocytoma | 3 | + | R132H |
| 2 | Male | 53 | Astrocytoma | 3 | + | R132H |
| 3 | Male | 43 | Astrocytoma | 2 | + | R132H |
| 4 | Female | 37 | Astrocytoma | 3 | + | R132H |
| 5 | Male | 52 | Astrocytoma | 2 | + | R132H |
| 6 | Male | 57 | Astrocytoma | 2 | + | R132H |
| 7 | Male | 58 | Glioblastoma | 4 | - | Wildtype |
| 8 | Male | 66 | Glioblastoma | 4 | - | Wildtype |
| 9 | Female | 67 | Glioblastoma | 4 | - | Wildtype |
| 10 | Female | 47 | Glioblastoma | 4 | - | Wildtype |
| 11 | Female | 72 | Glioblastoma | 4 | - | Wildtype |
| 12 | Female | 64 | Glioblastoma | 4 | - | Wildtype |
| 13 | Female | 40 | Oligodendroglioma | 3 | + | R132H |
| 14 | Female | 36 | Oligodendroglioma | 2 | + | R132H |
| 15 | Male | 32 | Oligodendroglioma | 3 | + | R132H |
| 16 | Male | 42 | Oligodendroglioma | 3 | + | R132H |
| 17 | Male | 54 | Oligodendroglioma | 3 | + | R132H |

**Table S4:** Evaluation results of classification models for IDH-mutant vs. wildtype and glioma vs. normal.

| | **IDH-mutant vs. Wildtype** | | **Glioma vs. Normal** | |
|---|---|---|---|---|
| | Train Set | Test Set | Train Set | Test Set |
| Accuracy | 1.000 | 1.000 | 0.982 | 0.929 |
| Error Rate | 0.000 | 0.000 | 0.018 | 0.071 |
| Sensitivity (Recall) | 1.000 | 1.000 | 1.000 | 1.000 |
| Specificity | 1.000 | 1.000 | 0.980 | 0.920 |
| Precision | 1.000 | 1.000 | 0.846 | 0.600 |
| F1 Score | 1.000 | 1.000 | 0.917 | 0.750 |
| AUC | 1.000 (CI: 1.000 - 1.000) | 1.000 (CI: 1.000 - 1.000) | 0.998 (CI: 0.992 - 1.000) | 0.960 (CI: 0.852 - 1.000) |

**Table S5:** Evaluation results of 5-fold-cv for IDH-mutant vs. wildtype.

| | **IDH-mutant vs. Wildtype （5-fold-cross validation）** | | | | | |
|---|---|---|---|---|---|---|
| | Fold 1 | Fold 2 | Fold 3 | Fold 4 | Fold 5 | Mean |
| Accuracy | 0.850 | 0.900 | 1.000 | 1.000 | 0.947 | 0.959 |
| Sensitivity (Recall) | 0.875 | 1.000 | 1.000 | 1.000 | 1.000 | 0.975 |
| Specificity | 1.000 | 1.000 | 0.917 | 0.818 | 1.000 | 0.946 |
| Precision | 1.000 | 1.000 | 0.889 | 0.800 | 1.000 | 0.937 |
| F1 Score | 0.933 | 1.000 | 0.941 | 0.889 | 1.000 | 0.952 |
| AUC | 0.990 (CI: 0.939-1.000) | 1.000 (CI: 1.000 - 1.000) | 0.979 (CI: 0.901-1.000) | 0.966 (CI: 0.864-1.000) | 1.000 (CI: 1.000-1.000) | 0.986 (CI: 0.941-1.000) |