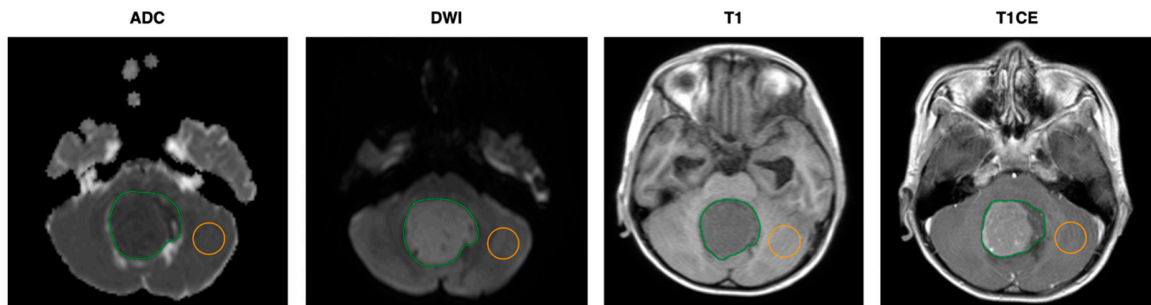
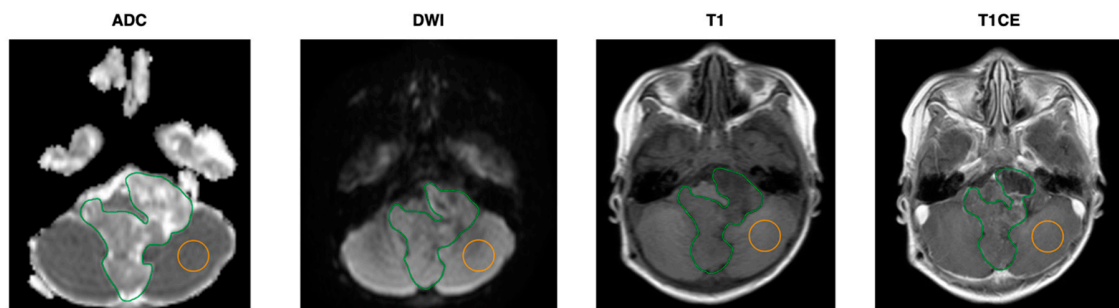


S1: Additional Figures

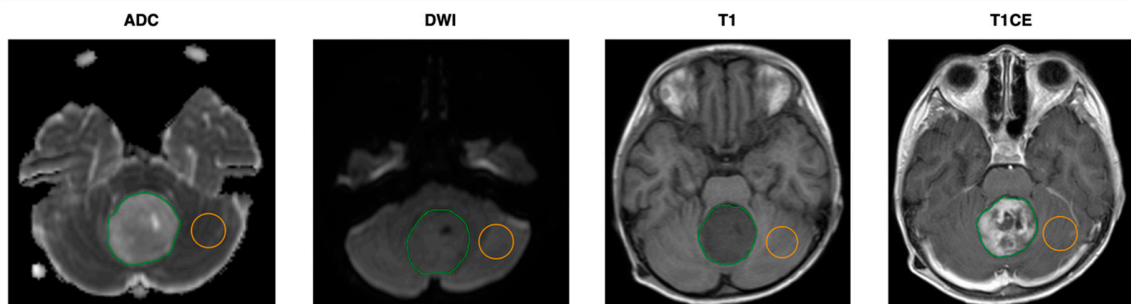
Medulloblastoma



Ependymoma



Pilocytic Astrocytoma



Brainstem Glioma

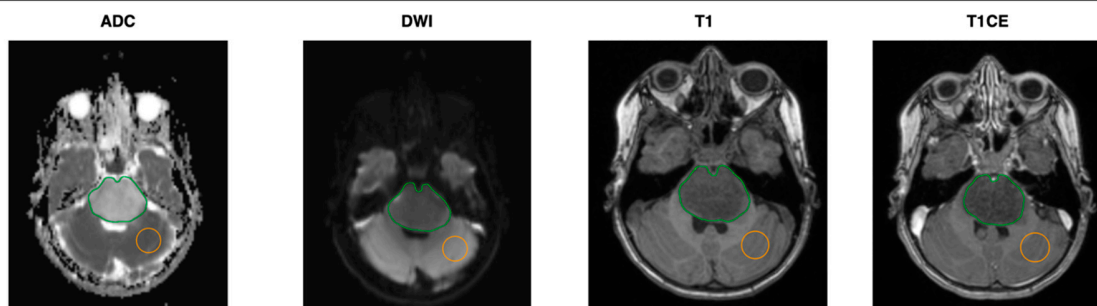


Figure S1: Examples of ROI delineations on a ADC, DWI, T1 and T1CE MRI.

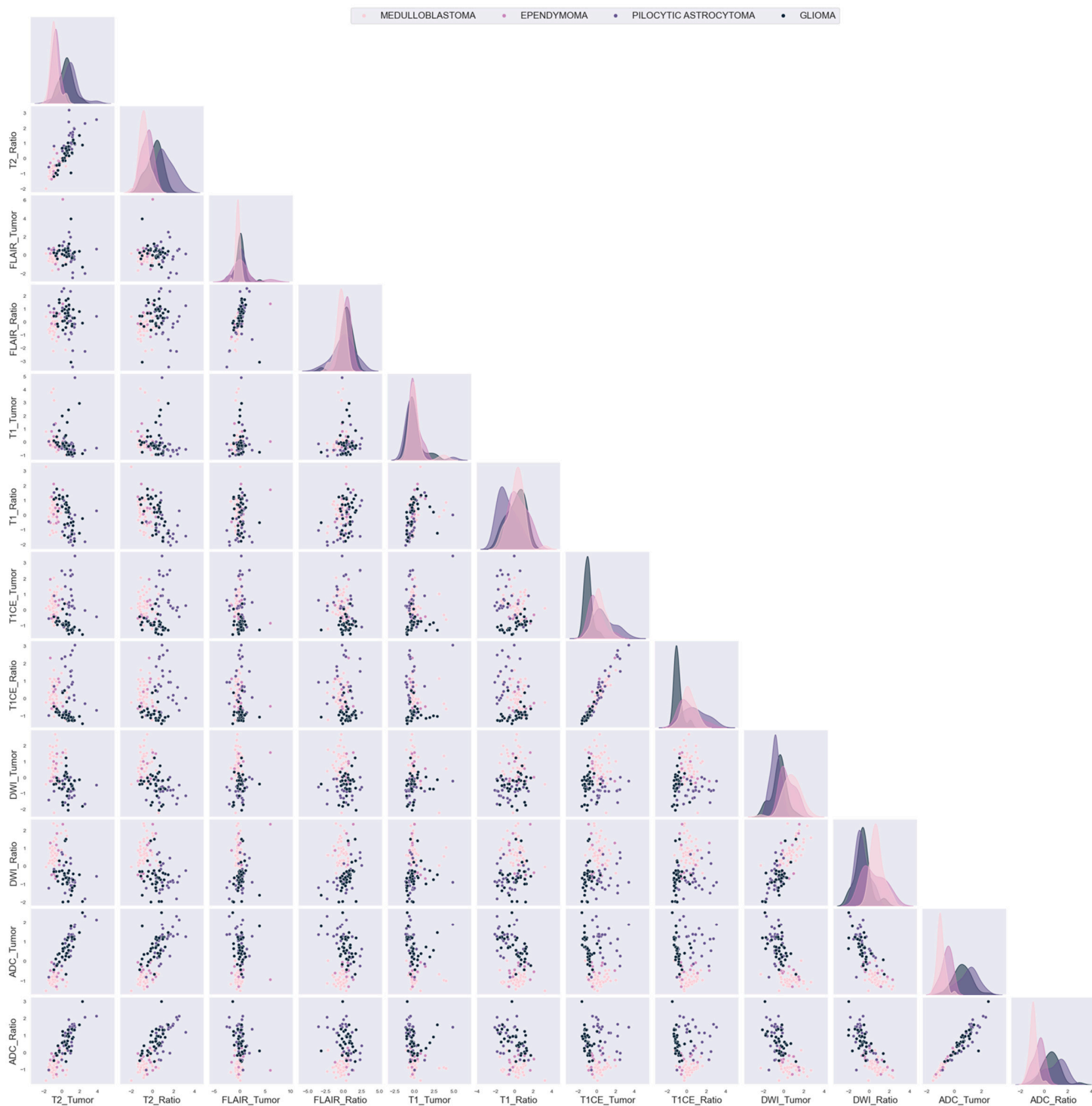


Figure S2: Pairwise plot with no parenchymas.

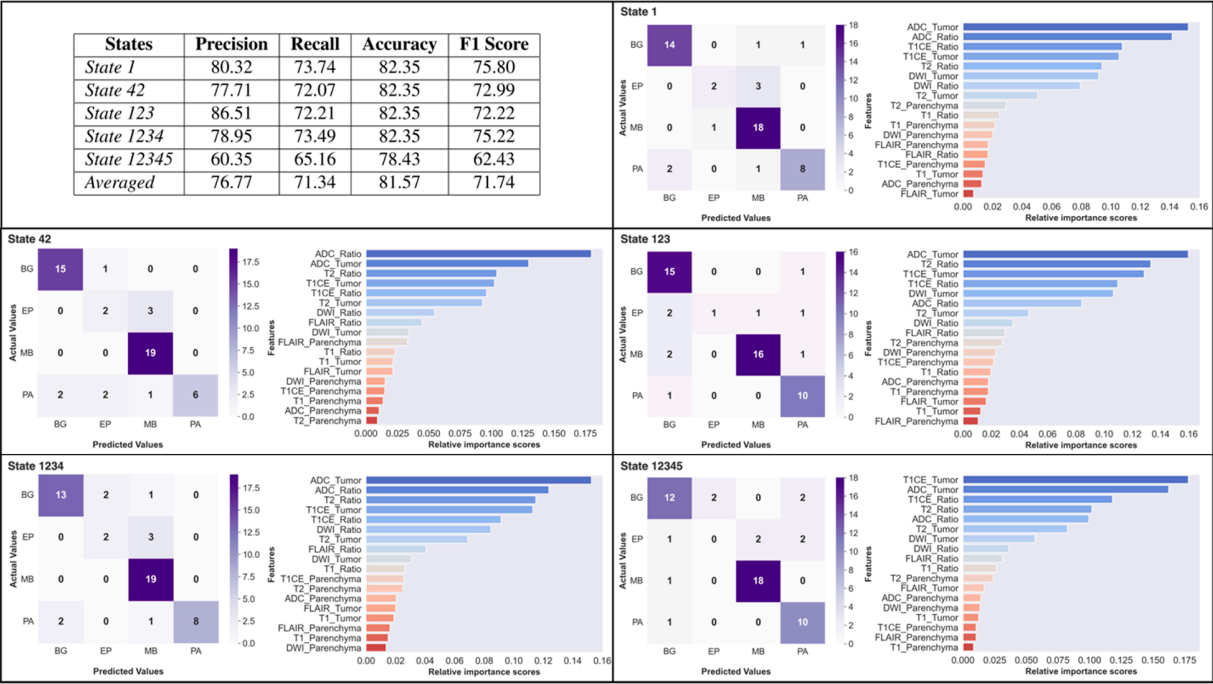


Figure S3: RF model analysis of MB, EP, PA, and BG with classification metrics, confusion matrices, and feature importance distributions for each stratified random sampling state.

High quality pdf version of figures can be found at our [GitHub repository](#).

S2: Differentiation scores of machine learning models for all tumor types.

Table S1. MB-EP

Models	Precision	Recall	Accuracy	F1_Score
CB	70.62 ± 28.33	56.00 ± 5.48	81.67 ± 2.28	54.82 ± 9.70
DT	67.36 ± 11.68	68.42 ± 13.09	73.33 ± 14.01	65.63 ± 12.70
GBM	64.99 ± 21.04	62.63 ± 14.72	75.83 ± 9.03	61.57 ± 15.21
LR	70.65 ± 4.55	68.21 ± 7.86	80.00 ± 3.49	67.70 ± 6.19
LSVM	65.93 ± 11.66	68.00 ± 13.76	75.00 ± 8.84	65.33 ± 11.55
RF	83.58 ± 12.02	62.95 ± 5.43	83.33 ± 2.95	65.38 ± 6.86
SVM	67.48 ± 11.11	69.05 ± 11.95	76.67 ± 6.97	66.47 ± 10.16
XGB	70.36 ± 24.08	58.84 ± 10.52	79.17 ± 7.80	60.08 ± 13.52

Table S2. MB-PA

Models	Precision	Recall	Accuracy	F1_Score
CB	94.67 ± 4.51	94.56 ± 5.94	94.84 ± 4.89	94.48 ± 5.36
DT	92.01 ± 3.19	92.46 ± 4.68	92.26 ± 3.68	91.86 ± 4.04
GBM	92.59 ± 2.98	92.98 ± 4.78	92.90 ± 3.53	92.50 ± 3.96
LR	96.60 ± 2.47	95.61 ± 4.78	96.13 ± 3.53	95.81 ± 3.98
LSVM	97.46 ± 1.57	97.28 ± 1.70	97.42 ± 1.44	97.28 ± 1.52
RF	93.90 ± 3.61	94.04 ± 5.43	94.19 ± 4.21	93.81 ± 4.66
SVM	94.96 ± 3.07	94.25 ± 3.28	94.84 ± 2.89	94.51 ± 3.10
XGB	91.37 ± 5.64	89.56 ± 7.47	90.97 ± 6.20	90.15 ± 6.91

Table S3. MB-BG

Models	Precision	Recall	Accuracy	F1_Score
CB	94.04 ± 3.61	93.42 ± 3.85	93.71 ± 3.73	93.62 ± 3.81
DT	93.59 ± 3.19	92.80 ± 3.37	93.14 ± 3.26	93.03 ± 3.33
GBM	94.04 ± 3.61	93.42 ± 3.85	93.71 ± 3.73	93.62 ± 3.81
LR	94.94 ± 2.38	94.77 ± 2.50	94.86 ± 2.39	94.81 ± 2.42
LSVM	94.47 ± 3.27	94.14 ± 3.73	94.29 ± 3.50	94.21 ± 3.59
RF	94.04 ± 3.61	93.42 ± 3.85	93.71 ± 3.73	93.62 ± 3.81
SVM	93.39 ± 3.09	92.89 ± 3.42	93.14 ± 3.26	93.05 ± 3.34
XGB	94.04 ± 3.61	93.42 ± 3.85	93.71 ± 3.73	93.62 ± 3.81

Table S4. EP-PA

Models	Precision	Recall	Accuracy	F1_Score
CB	91.45 ± 8.40	93.00 ± 6.47	91.76 ± 8.92	90.94 ± 9.04
DT	84.64 ± 9.39	89.17 ± 7.57	84.71 ± 10.69	83.99 ± 10.85
GBM	84.64 ± 9.39	89.17 ± 7.57	84.71 ± 10.69	83.99 ± 10.85
LR	95.90 ± 4.17	96.33 ± 4.11	96.47 ± 3.22	95.80 ± 3.85
LSVM	88.60 ± 7.09	91.33 ± 5.16	89.41 ± 7.67	88.37 ± 7.53
RF	92.62 ± 8.64	93.83 ± 5.82	92.94 ± 7.67	92.18 ± 8.15
SVM	90.98 ± 7.58	91.83 ± 5.93	91.76 ± 6.71	90.58 ± 7.21
XGB	83.81 ± 9.69	86.33 ± 7.21	82.35 ± 11.76	81.48 ± 11.35

Table S5. EP-BG

Models	Precision	Recall	Accuracy	F1_Score
CB	76.68 ± 11.87	73.75 ± 9.51	80.95 ± 6.73	73.34 ± 8.76
DT	76.88 ± 12.74	77.12 ± 12.45	81.90 ± 8.52	75.56 ± 12.02
GBM	77.21 ± 12.86	75.75 ± 11.90	81.90 ± 8.52	75.02 ± 11.74
LR	91.46 ± 7.58	87.50 ± 10.94	91.43 ± 6.21	87.48 ± 9.73
LSVM	84.88 ± 9.44	87.00 ± 12.25	88.57 ± 7.22	84.51 ± 11.02
RF	71.62 ± 21.29	71.62 ± 14.83	81.90 ± 6.21	69.96 ± 16.64
SVM	85.82 ± 5.24	84.25 ± 8.77	88.57 ± 2.61	83.76 ± 4.79
XGB	76.68 ± 11.87	73.75 ± 9.51	80.95 ± 6.73	73.34 ± 8.76

Table S6. PA-BG

Models	Precision	Recall	Accuracy	F1_Score
CB	89.95 ± 5.97	88.69 ± 6.86	89.63 ± 6.09	89.04 ± 6.50
DT	81.00 ± 5.36	78.92 ± 5.12	80.74 ± 4.83	79.48 ± 5.12
GBM	79.45 ± 6.44	77.67 ± 5.50	79.26 ± 5.62	78.08 ± 5.67
LR	84.07 ± 3.44	84.32 ± 2.77	84.44 ± 3.10	84.02 ± 3.05
LSVM	82.75 ± 3.54	82.50 ± 2.62	82.96 ± 3.31	82.40 ± 3.12
RF	89.38 ± 6.26	86.59 ± 7.56	88.15 ± 6.63	87.25 ± 7.15
SVM	84.40 ± 4.28	83.75 ± 3.42	84.44 ± 4.06	83.85 ± 3.92
XGB	90.41 ± 5.04	88.41 ± 5.24	89.63 ± 4.83	89.01 ± 5.19

Table S7. MB-EP-PA-BG

Models	Precision	Recall	Accuracy	F1_Score
CB	72.60 ± 9.38	68.82 ± 4.65	79.22 ± 2.97	69.31 ± 5.93
DT	70.54 ± 8.88	67.41 ± 4.85	76.86 ± 3.77	67.90 ± 6.37
GBM	62.98 ± 5.09	60.60 ± 2.59	71.76 ± 3.28	60.86 ± 2.99
LR	74.21 ± 11.20	67.98 ± 3.74	79.22 ± 3.28	68.03 ± 4.74
LSVM	66.61 ± 9.53	65.68 ± 2.74	77.25 ± 1.75	64.56 ± 4.14
RF	76.77 ± 9.78	71.34 ± 3.53	81.57 ± 1.75	71.74 ± 5.41
SVM	70.05 ± 6.38	64.94 ± 2.38	74.51 ± 2.77	65.21 ± 2.26
XGB	69.45 ± 3.09	67.29 ± 2.94	76.47 ± 2.40	67.28 ± 3.13