

Table S1 Details of MRI parameters

Parameter	T1w	T2w	FLAIR	APT
Repetition time/echo time (ms)	400/2.2	3,000/80	8,000/128	3,000/6.7
Time of inversion (ms)	–	–	2,400	–
Field of view (mm ²)	230×189	230×189	230×189	230×185
Resolution (mm ²)	0.7×0.8	0.7×0.8	0.7×0.8	2.2×2.2
Slice thickness (mm)	6	6	6	6
No. of slices	18	18	18	1
Imaging time (min:s)	2:08	2:24	3:12	3:13
Offset frequency (only for APT)	0, ± 0.25 , ± 0.5 , ± 0.75 , ± 1 , ± 1.5 , ± 2 (2), ± 2.5 (2), ± 3 (2), ± 3.25 (2), ± 3.5 (6), ± 3.75 (2), ± 4 (2), ± 4.5 , ± 5 , ± 6 , 10, 20, 30, 40, 50, 60, 70, 80, and 1,565 ppm. The numbers in the parentheses represent the number of repetitions			

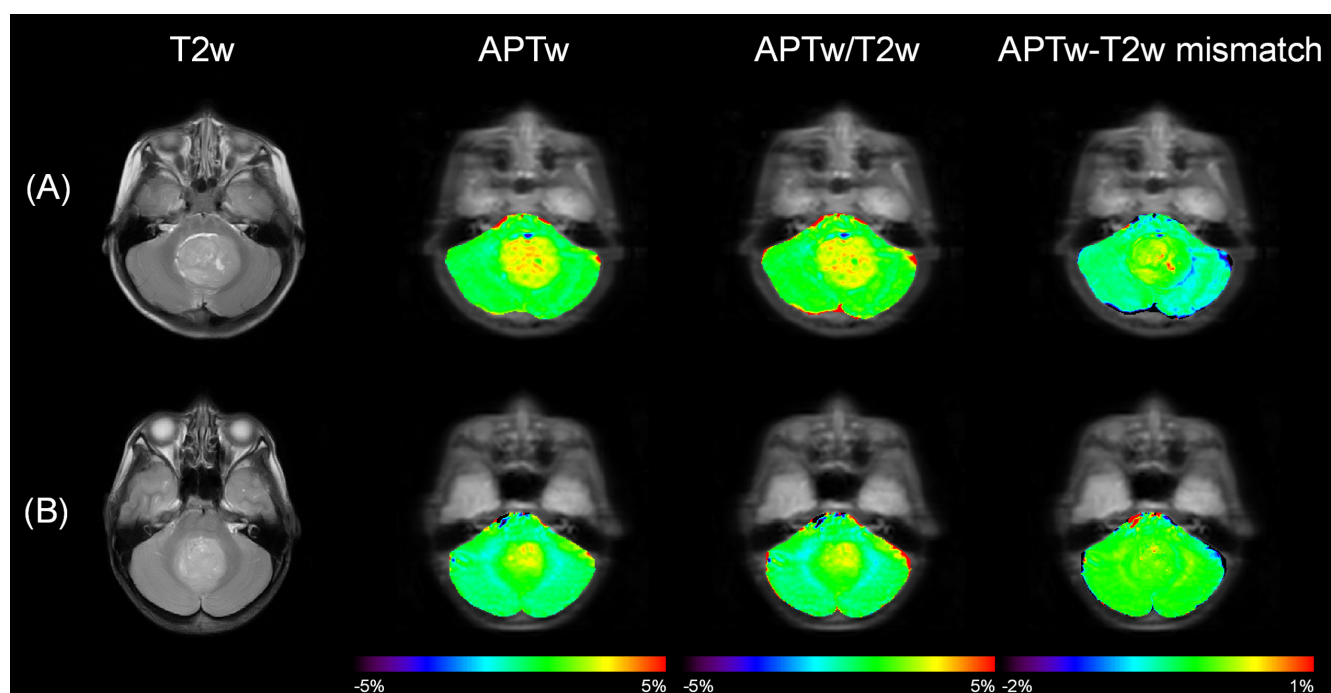


Figure S1 Images for representative two patients with Group 4 medulloblastoma. They have (A) and do not have (B) APTw-T2w mismatch signs, respectively. Column 1 displays conventional structural T2w images. Columns 2–4 show APTw, APTw/T2w, and APTw-T2w mismatch images overlaid on the APT source image, respectively.

Table S2 Accuracies, specificities, and sensitivities of the mean values within shrunken ROIs of APTw, APTw-T2w mismatch, and APTw-FLAIR mismatch images for distinguishing four molecular subgroups at the optimal histogram cutoff levels

Metrics	Accuracy	Specificity	Sensitivity	Histogram cutoff
WNT vs. non-WNT				
APTw	0.93	0.95	0.8	63%
APTw-T2w mismatch	0.93	1	0.4	61%
APTw-FLAIR mismatch	0.93	0.97	0.6	3%
SHH vs. non-SHH				
APTw	0.76	0.97	0.23	86%
APTw-T2w mismatch	0.71	0.91	0.23	99%
APTw-FLAIR mismatch	0.72	0.91	0.23	99%
G3 vs. non-G3				
APTw	0.78	0.97	0	2%
APTw-T2w mismatch	0.78	0.97	0	99%
APTw-FLAIR mismatch	0.78	0.97	0	9%
G4 vs. non-G4				
APTw	0.61	0.93	0.16	1%
APTw-T2w mismatch	0.69	0.81	0.52	66%
APTw-FLAIR mismatch	0.72	0.81	0.58	3%

Table S3 Performance of the mean values within shrunken ROIs of APTw, APTw-T2w mismatch, and APTw-FLAIR mismatch images for distinguishing four molecular subgroups at the optimal histogram cutoff levels

Metrics	AUC	Specificity	Sensitivity	Histogram cutoff
WNT vs. non-WNT				
APTw	0.95	1	0.5	23%
APTw-T2w mismatch	0.75	1	0.5	92%
APTw-FLAIR mismatch	0.88	0.91	0.5	15%
SHH vs. non-SHH				
APTw	0.69	0.57	0.71	96%
APTw-T2w mismatch	0.79	0.71	0.85	25%
APTw-FLAIR mismatch	0.74	1	0.43	8%
Group 3 vs. non-group 3				
APTw	0.83	0.75	1	0%
APTw-T2w mismatch	0.95	1	0.5	16%
APTw-FLAIR mismatch	0.92	0.91	0.5	2%
Group 4 vs. non-group 4				
APTw	0.67	0.91	0	98%
APTw-T2w mismatch	0.7	0.91	0	69%
APTw-FLAIR mismatch	0.82	0.64	1	68%

The results were obtained from a separate hold-out set of 14 additional cases from the same center, including 2 WNT, 7 SHH, 2 Group 3, and 3 Group 4 cases.