

A Comparison of 7T MRSI and 3T MRF for Tumor Localization in Glioma Patients
Supplementary Material

Table S1. Cohort overlap with previous publications [6,7].

Cohort Overlap		
Patient ID		
This Study	Hangel 2020	Hangel 2022
1	3	-
2	4	2
3	5	3
4	6	4
5	-	5
6	7	-
7	-	6
8	12	8
9	17	-
10	20	13
11	-	15
12	-	16

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Table S2. An overview according to the minimum reporting standards in MR spectroscopy [25].

Minimum Reporting Standards in MR Spectroscopy - Overview	
Site	Vienna High Field MR Center
1. Hardware	
a. Field strength	7T
b. Manufacturer	Siemens
c. Model	Magnetom
d. RF coils: nuclei (transmit/ receive), number of channels, type, body part	1H, 32 ch, head, Nova Medical
e. Additional hardware	N/A
2. Acquisition	
a. Pulse sequence	FID-MRSI
b. Volume of interest (VOI) locations	Tumor, peritumoral, NAWM
c. Nominal VOI size	220×220×110 mm ³
d. Repetition time (TR), echo time (TE)	450 ms / 1.3 ms acquisition delay
e. Total number of excitations or acquisitions per spectrum	N/A, spatial-spectral encoding
In-time series for kinetic studies	N/A
i. Number of averaged spectra (NA) per time-point	N/A
ii. Averaging method (e.g., block-wise or moving average)	N/A
iii. Total number of spectra (acquired / in-time series)	N/A
f. Additional sequence parameters (spectral width in Hz, number of spectral points, frequency offsets); If STEAM: Mixing Time TM; If MRSI: 2D or 3D, FOV in all directions, matrix size, acceleration factors, sampling method	BW 2778 Hz, 1920 spectral points, MRSI: 3D, 220×220×133 mm ³ , 64×64×39, spatial-spectral encoding
g. Water suppression method	WET
h. Shimming method, reference peak, and thresholds for “acceptance of shim” chosen	Standard shim + manual adjustment, water peak < 50 Hz
i. Triggering or motion correction method	N/A
3. Data analysis methods and outputs	
a. Analysis software	LCModel 6.3-1
b. Processing steps deviating from quoted reference or product	N/A
c. Output measure	Ratio
d. Quantification references and assumptions, fitting model assumptions	Simulated in NMRScope-B, macromolecular background
4. Data Quality	
a. Reported variables (SNR, linewidth (with ref.	SNR and linewidths not reported

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peaks))	
b. Data exclusion criteria	tCr SNR <5; tCr FWHM >0.15 ppm; metabolite Cramér-Rao lower bounds (CRLB) >40 %
c. Quality measures of post processing model fitting	CRLB
d. Sample spectrum	See Supp. Fig. 4

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Table S3. MRF sequence parameters.

MRF Sequence Parameters	
Voxel Dimensions	1.0 × 1.0 mm ²
Matrix Size	256 × 256
Field of View	256 × 256 mm ²
Number of Slices	10–13
Slice Thickness	5 mm
TE	2 ms
TI	21 ms
TR	12.14–15.00 ms
TA	3:51–4:51 (min:sec)
Acceleration Factor	24 (inner k-space)
	48 (outer k-space)
RX Bandwidth	400 kHz
FA	0–74°
Fat Saturation	no

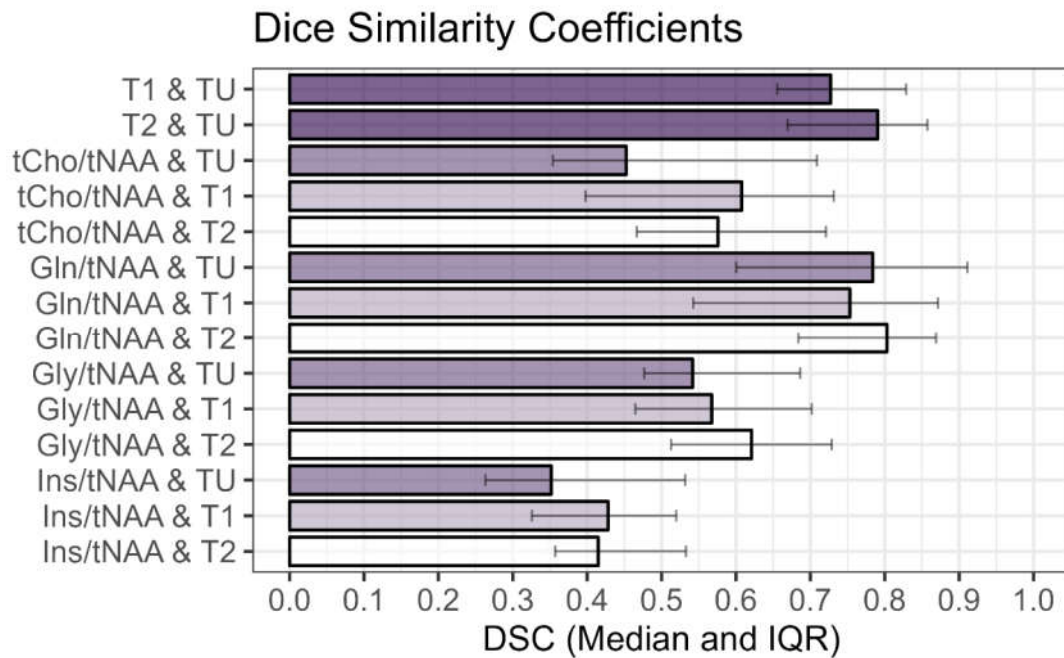


Figure S1. Sørensen-Dice Similarity Coefficients (DSCs) in the tumor segmentation between the segmentation (TU), the MRF's relaxation time hotspots (T1, T2), and MRSI's metabolite ratios (tCho/tNAA, Gln/tNAA, Gly/tNAA, Ins/tNAA). Gln/tNAA had the highest correspondence with the tumor segmentation and T1 and T2 hotspots.

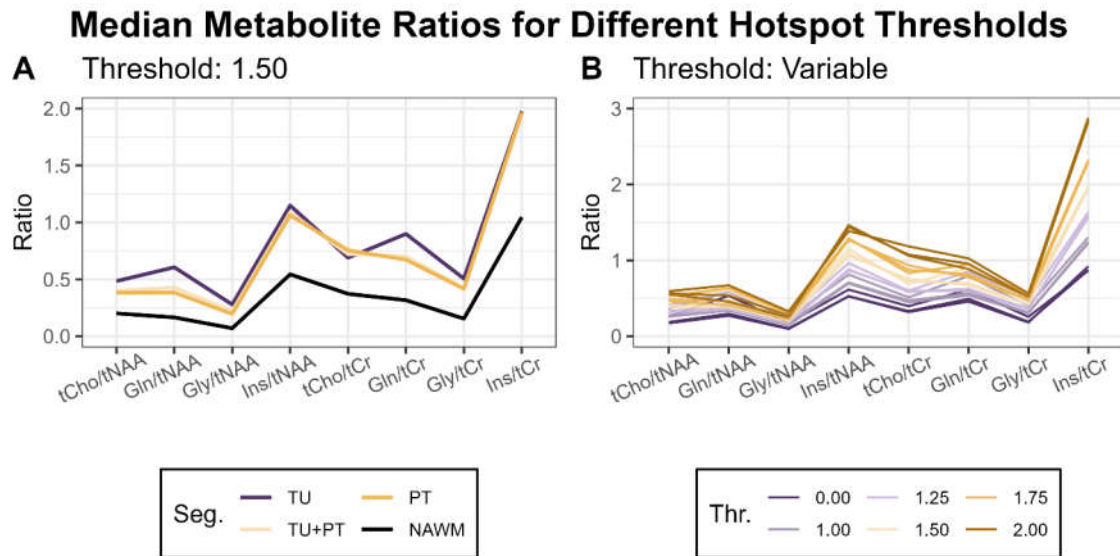


Figure S2. A: Metabolite ratios tCho/tNAA, Gln/tNAA, Gly/tNAA, and Ins/tNAA, as well as tCho/tCr, Gln/tCr, Gly/tCr, and Ins/tCr, for a hotspot threshold of 1.5, plotted separately for the tumor segmentation (TU), the tumor region and the peritumoral region (TU+PT), the peritumoral region alone (PT), and the normal-appearing white matter control region

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(NAWM). **B**: The same metabolite ratios for different hotspot thresholds, with one line each for TU, TU+PT, and PT.

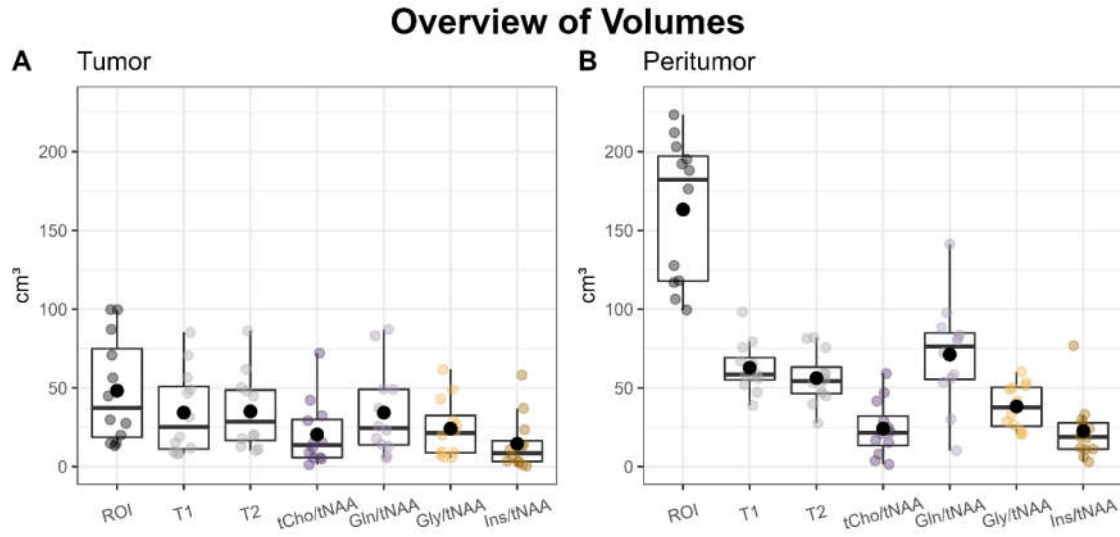


Figure S3. Overview of the volumes of the region of interest (ROI), the MRF hotspots (T1, T2), and the MRSI hotspots (tCho/tNAA, Gln/tNAA, Gly/tNAA, Ins/tNAA), in the tumor (**A**) and the peritumoral region (**B**).

Example Spectra of Patient 10

Female, 28, Grade 3 Anaplastic Astrocytoma

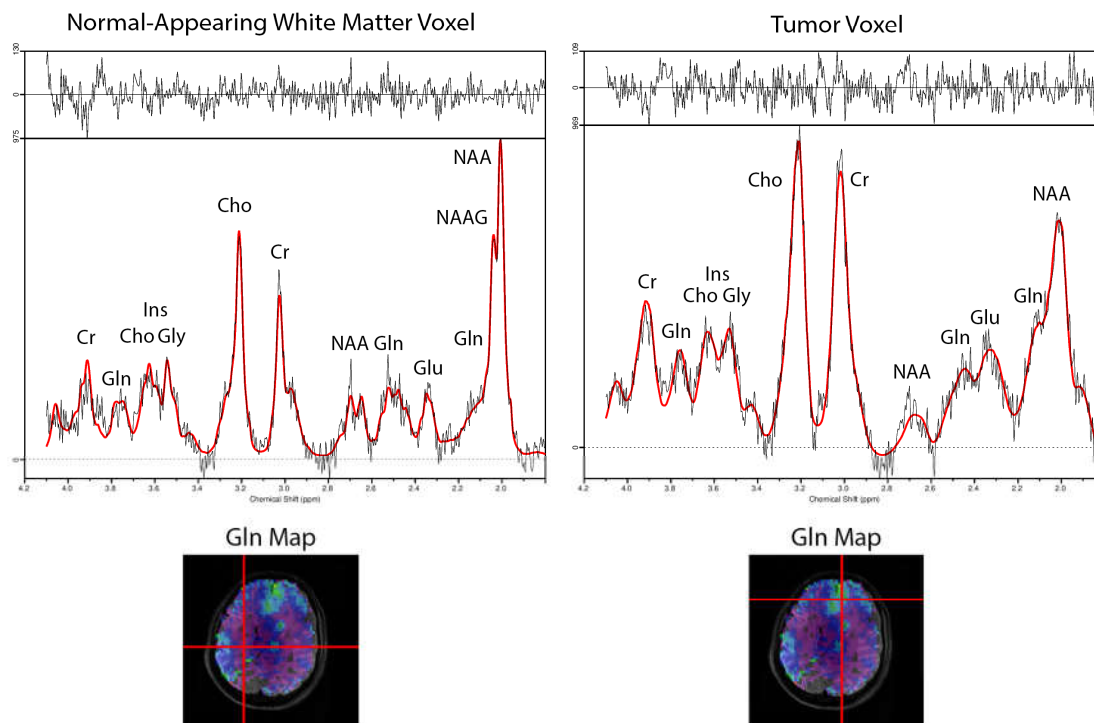


Figure S4. Example spectra of patient 10 (anaplastic astrocytoma, grade 3, female, 28 years of age). Normal appearing white matter spectrum (left) and tumor spectrum (right). Below, glutamine (Gln) maps overlaid with a T1w reference image are shown, and the voxel position is indicated.