

Supplementary Materials for

Mesoscale connectomics detects survival-relevant white matter

substructures in glioblastoma patients

Supplemental Results

Table S1. Patient Subgroups regarding tumor location with demographic and clinical information.

Tumor Localization	N	Age [years]	Sex	EOR GTR > 90%	OS [days]
Whole Brain	498	63.4 ± 11.8 20.7 – 88.5	199 f 299 m	288 yes 172 no	387 [365, 425] 3 – 2951
Left Hemisphere	280	63.9 ± 11.6 20.7 – 88.0	102 f 178 m	180 yes 100 no	376 [349, 419] 3 – 2694
Left Central	28	60.0 ± 11.9 22.8 – 78.7	10 f 18 m	15 yes 13 no	260 [136, 427] 21 – 2694
Left Frontal	67	63.3 ± 13.8 20.7 – 85.7	27 f 40 m	40 yes 27 no	303 [215, 429] 13 – 2516
Left Occipital	45	64.8 ± 11.9 28.8 – 87.6	16 f 29 m	29 yes 16 no	483 [393, 616] 3 – 1565
Left Parietal	67	63.8 ± 9.9 39.6 – 88.0	31 f 36 m	42 yes 25 no	376 [360, 445] 20 – 2048
Left Temporal	73	65.7 ± 10.5 41.2 – 83.6	18 f 55 m	54 yes 19 no	384 [282, 509] 14 – 2307
Right Hemisphere	218	62.7 ± 12.1 22.0 – 88.5	97 f 121 m	140 yes 78 no	404 [351, 479] 12 – 2951
Right Central	33	60.9 ± 9.8 33.4 – 80.5	14 f 19 m	18 yes 15 no	316 [149, 518] 24 – 2578
Right Frontal	48	61.4 ± 13.0 22.0 – 88.5	26 f 22 m	33 yes 15 no	404 [325, 490] 16 – 2021
Right Occipital	32	64.9 ± 11.9 25.6 – 82.4	15 f 17 m	22 yes 10 no	429 [284, 582] 46 – 2838
Right Parietal	43	64.7 ± 10.7 40.0 – 86.6	20 f 23 m	27 yes 16 no	411 [270, 622] 30 – 1730
Right Temporal	62	62.1 ± 13.3 24.0 – 86.6	22 f 40 m	40 yes 22 no	486 [351, 693] 12 – 2951

N is the number of patients in the respective patient subgroup. The age of the patients is given as mean ± standard deviation and age range in parentheses. Sex of the patients: f, females; m, males. EOR, extent of resection: GTR, gross total resection > 90% of the MRI visible tumor volume. OS, overall survival: The overall survival of the patients is given as median with the 95% confidence interval in square brackets and the OS interval below.

Table S2. Major WM pathways and their Subclusters that correlated with OS for tumor localizations in the different brain lobes.

Tumor Loc.	Major WM pathways	%	Subclusters	%
Left Central	Projection, Basal Ganglia	98.3	Thalamic Radiation, Anterior, left	98.3
	Projection, Brainstem	1.7	Reticular Tract, left	1.7
Left Frontal	Projection, Basal Ganglia	2.4	Corticostriatal Tract, Anterior, left	2.4
	Commissure	97.6	Corpus Callosum, Body	86.9
			Corpus Callosum, Forceps Minor	10.7
Left Occipital	Projection, Basal Ganglia	39.0	Thalamic Radiation, Posterior, left	21.6
			Optic Radiation, left	17.4
	Projection, Brainstem	8.2	Corticopontine Tract, Occipital, left	8.2
			Corpus Callosum, Forceps Major	8.0
	Commissure	15.6	Corpus Callosum, Tapetum	7.6
			Inferior Fronto-Occipital Fasciculus, left	20.4
			Inferior Longitudinal Fasciculus, left	16.8
Left Parietal	Projection, Basal Ganglia	16.1	Optic Radiation, left	9.2
			Corticostriatal Tract, Posterior, left	6.9
	Commissure	14.5	Corpus Callosum, Body	14.5
	Association	69.4	Superior Longitudinal Fasciculus II, left	42.0
			Arcuate Fasciculus, left	27.4
Left Temporal	Commissure	7.4	Corpus Callosum, Tapetum	7.4
	Association	92.6	Inferior Fronto-Occipital Fasciculus, left	50.0
			Inferior Longitudinal Fasciculus, left	38.4
			Uncinate Fasciculus, left	4.2
Right Central	Projection, Basal Ganglia	100	Thalamic Radiation, Anterior, right	100
Right Frontal	Projection, Brainstem	3.4	Corticostriatal Tract, Anterior, right	3.4
	Projection, Basal Ganglia	1.6	Thalamic Radiation, Superior, right	1.6
			Corpus Callosum, Body	87.8
			Corpus Callosum, Forceps Minor	7.2
Right Occipital	Projection, Basal Ganglia	22.7	Thalamic Radiation, Posterior, right	13.1
			Optic Radiation, right	9.6
	Commissure	51.4	Corpus Callosum, Forceps Major	43.4
			Corpus Callosum, Tapetum	8.0
	Association	25.9	Inferior Longitudinal Fasciculus, right	21.4
			Inferior Fronto-Occipital Fasciculus, right	4.5
Right Parietal	Projection, Basal Ganglia	10.1	Corticostriatal Tract, Superior, right	10.1
	Projection, Brainstem	6.6	Corticospinal Tract, right	6.6
	Commissure	43.5	Corpus Callosum, Body	43.5
	Association	39.8	Superior Longitudinal Fasciculus II, right	39.8
Right Temporal	Projection, Basal Ganglia	8.6	Corticostriatal Tract, Posterior, right	8.6
	Commissure	3.2	Anterior Commissure	3.2
	Association	88.2	Inferior Fronto-Occipital Fasciculus, right	73.3
			Inferior Longitudinal Fasciculus, right	7.9
			Extreme Capsule, right	3.7
			Uncinate Fasciculus, right	3.3

Percentage values indicate the proportion of the reconstructed total fiber volume that correlated with OS.

Table S3. Correlation Coefficients between Overall Survival and mean FA values in reconstructed fiber tracts.

Tumor Loc.	Linear	Exponential	AIC for	AIC for	AIC
	Correlation, r (p)	Correlation, r (p)	linear	exponential	difference
			model	model	
Whole Brain	0.306 (< 0.001)	0.356 (< 0.001)	-2944	-5088	2144**
Left Hemisphere	0.304 (< 0.001)	0.339 (< 0.001)	-1643	-2784	1141**
Right Hemisphere	0.324 (< 0.001)	0.371 (< 0.001)	-1188	-2035	847**
Left Central	0.146 (0.459)	0.152 (0.191)	-138	-142	4*
Left Frontal	0.430 (< 0.001)	0.445 (< 0.001)	-108	-190	82**
Left Occipital	0.324 (0.030)	0.350 (< 0.021)	-196	-311	115**
Left Parietal	0.257 (0.036)	0.265 (< 0.031)	-300	-561	261**
Left Temporal	0.171 (0.147)	0.173 (0.128)	-310	-550	240**
Right Central	0.438 (0.011)	0.471 (0.003)	-130	-251	121**
Right Frontal	0.184 (0.209)	0.257 (0.078)	-227	-380	153**
Right Occipital	0.492 (0.004)	0.527 (0.001)	-146	-243	97**
Right Parietal	0.252 (0.104)	0.344 (0.024)	-187	-322	135**
Right Temporal	0.063 (0.629)	0.205 (0.110)	-267	-487	220**

AIC is the Akaike Information Criterion: a difference in AIC < 2 indicates no meaningful difference between models; an AIC difference of 2 – 10 indicates moderate support for the model with the lower AIC, indicated with *; and an AIC difference > 10 indicates strong support for the model with the lower AIC, indicated with **.