Supplemental Tables

Table S1. Montreal Neurological Institute (MNI) locations of 22 nodes in the sensorimotor network

Regions of interesting	Modified Cyto-architectonic	Left hemisphere			Right hemisphere		
		X	Y	Z	X	Y	Z
A6m_L(R)	Medial area BA 6	5	36	38	6	38	35
A4hf_L(R)	Area BA 4 (head and face)	-49	-8	39	55	-2	33
A4ul_L(R)	Area BA 4 (upper limb)	-26	-25	63	34	-19	59
A4t_L(R)	Area BA 4 (trunk)	-13	-20	73	15	-22	71
A4tl_L(R)	Area BA 4 (tongue and larynx)	-52	0	8	54	4	9
A1_2_3ll_L(R)	Area BA 1/2/3 (lower limb)	-8	-38	58	10	-34	54
A4ll_L(R)	Area BA 4 (lower limb)	-4	-23	61	5	-21	61
A1_2_3ulhf_L(R)	Area BA 1/2/3 (upper limb and face)	-50	-16	43	50	-14	44
A1_2_3tonIa_L(R)	Area BA 1/2/3 (tongue and larynx)	-56	-14	16	56	-10	15
A2_L(R)	Area BA 2	-46	-30	50	48	-24	48
A1_2_3tru_L(R)	Area BA 1/2/3 (trunk)	-21	-35	68	20	-33	69

*BA = Brodmann area.

Table S2. Montreal Neurological Institute (MNI) locations of 22 nodes in the visual network.

Regions of interesting	Modified Cyto-architectonic	Left hemisphere			Right hemisphere		
		X	Y	Z	X	Y	Z
cLinG_L(R)	caudal lingual gyrus	-11	-82	-11	10	-85	-9
rCunG_L(R)	rostral cuneus gyrus	-5	-81	10	7	-76	11
cCunG_L(R)	caudal cuneus gyrus	-6	94	1	8	-90	12
rLinG_L(R)	rostral lingual gyrus	-17	-60	-6	18	-60	-7
vmPOS_L(R)	ventromedial parietal occipital sulcus	-13	-68	12	15	-63	12
mOccG_L(R)	middle occipital gyrus	-31	-89	11	34	-86	11
V5/MT+_L(R)	area V5/MT+	-46	-74	3	48	-70	-1
OPC_L(R)	occipital polar cortex	-18	-99	2	22	-97	4
iOccG_L(R)	inferior occipital gyrus	-30	-88	-12	32	-85	-12
msOccG_L(R)	medial superior occipital gyrus	-11	-88	31	16	-85	34
lsOccG_L(R)	lateral superior occipital gyrus	-22	-77	36	29	-75	36

*BA = Brodmann area.

Table S3. Montreal Neurological Institute (MNI) locations of 6 nodes in the auditory network.

Regions of interesting	Modified Cyto-architectonic	Left hemisphere			Right hemisphere		
		X	Y	Z	X	Y	Z
A41/42_R	BA 41/42	-54	-32	12	54	-24	11
TE_R	TE1.0 and TE1.2	-50	-11	1	51	-4	-1
A40rv_L(R)	rostroventral area 40 (PFop)	-53	-31	23	55	-26	26

*BA = Brodmann area.

Table S4. Montreal Neurological Institute (MNI) locations of 20 nodes in the right executive control network.

Regions of interesting	Modified Cyto-architectonic	Right hemisphere		
		X	Y	Z
A8dl_R	dorsolateral area BA 8	22	26	51
A9m_R	medial area BA 9	6	38	35
A9/46d_R	dorsal area BA 9/46	30	37	36
IFJ_R	inferior frontal junction	42	11	39
A46_R	area BA 46	28	55	17
A9/46v_R	ventral area BA 9/46	42	44	14
A8vl_R	ventrolateral area BA 8	42	27	39
A6vl_R	ventrolateral area BA 6	34	8	54
A10l_R	ventrolateral area BA 10	25	61	-4
IFS_R	inferior frontal sulcus	48	35	13
A45r_R	rostral area BA 45	51	36	-1
A12/47l_R	lateral area BA 12/47	40	39	-14
A21c_R	caudal area BA 21	65	-29	-13
A37vl_R	ventrolateral area BA 37	54	-57	-8
A20cl_R	caudal-lateral of area BA 20	61	-40	-17
A7ip_R	intraparietal area BA 7 (hIP3)	31	-54	53
A39c_R	caudal area 39 (PGp)	45	-71	20
A39rd_R	rostral dorsal area BA 39 (Hip3)	39	-65	44
A40c_R	caudal area BA 40 (PFm)	57	-44	38
A39rv_R	rostroventral area BA 39 (PGa)	53	-54	25

*BA = Brodmann area. Using this template to analysis patients with left prefrontal gliomas and healthy participants.

Table S5. Montreal Neurological Institute (MNI) locations of 20 nodes in the left executive control network.

Regions of interesting	Modified Cyto-architectonic	Left hemisphere		
		X	Y	Z
A8dl_L	dorsolateral area BA 8	-18	24	53
A9m_L	medial area BA 9	-5	36	38
A9/46d_L	dorsal area BA 9/46	-27	43	31
IFJ_L	inferior frontal junction	-42	13	36
A46_L	area BA 46	-28	56	12
A9/46v_L	ventral area BA 9/46	-41	41	16
A8vl_L	ventrolateral area BA 8	-33	23	45
A6vl_L	ventrolateral area BA 6	-32	4	55
A10l_L	ventrolateral area BA 10	-26	60	-6
IFS_L	inferior frontal sulcus	-47	32	14
A45r_L	rostral area BA 45	49	36	-3
A12/47l_L	lateral area BA 12/47	-41	32	-9
A21c_L	caudal area BA 21	-65	-30	-12
A37vl_L	ventrolateral area BA 37	-55	-60	-6
A20cl_L	caudal-lateral of area BA 20	-59	-42	-16
A7ip_L	intraparietal area BA 7 (hIP3)	-27	-59	54
A39c_L	caudal area 39 (PGp)	-34	-80	29
A39rd_L	rostral dorsal area BA 39 (Hip3)	-38	-61	46
A40c_L	caudal area BA 40 (PFm)	-56	-49	38
A39rv_L	rostroventral area BA 39 (PGa)	-47	-65	26

*BA = Brodmann area. Using this template to analysis patients with right prefrontal gliomas and healthy participants.

Table S6. Functional connections with significant group effects among the GRE, non-GRE, and health groups (gliomas in left hemisphere)

Connections	Functional connectivity (mean ± SEM)			*p* value (ANOVA test)	Bonferroni correction		
	GRE group	non-GRE group	Health group		GRE vs non-GRE	GRE vs healthy	non-GRE vs healthy
Am6_L and Acvl_L	0.025 ± 0.057	0.357 ± 0.055	0.399 ± 0.037	< 0.0001	< 0.0001	< 0.0001	> 0.9999
Acvl_L and A4tl_R	0.131 ± 0.047	0.356 ± 0.042	0.436 ± 0.040	0.0097	0.0583	0.0091	> 0.9999
Acvl_L and A1/2/3tonla_R	0.063 ± 0.061	0.279 ± 0.053	0.854 ± 0.058	0.0085	0.0850	0.0069	> 0.9999
Am6_R and Acvl_L	0.074 ± 0.064	0.281 ± 0.057	0.428 ± 0.043	0.0005	0.0682	0.0003	0.9596
Am6_L and Acvl_R	0.108 ± 0.050	0.336 ± 0.057	0.418 ± 0.047	0.0036	0.0503	0.0027	0.2716
A4ul_L and A4ul_R	0.431 ± 0.077	0.667 ± 0.074	0.812 ± 0.057	0.0014	0.0783	0.0009	0.3488

* BA = Brodmann area. Am6_L = medial BA 6 in the left hemisphere; Am6_R = medial BA 6 in the right hemisphere; Acvl_L = caudal ventrolateral BA 6 in the left hemisphere; Acvl_R = caudal ventrolateral BA 6 in the right hemisphere; A4tl_R = tongue and larynx region in the right hemisphere; A1/2/3tonla_R = tongue and larynx region of BA 1/2/3 in the right hemisphere; A4ul_L = upper limb region of BA 4 in the left hemisphere; A4ul_R = upper limb region of BA 4 in the right hemisphere. Threshold of Bonferroni correction was p value = 2.16×10^{-4}.

Table S7. Functional connections with significant group effects among the GRE, non-GRE, and health groups (gliomas in right hemisphere)

Connections	Functional connectivity (mean ± SEM)			*p* value (ANOVA test)	Bonferroni correction		
	GRE group	non-GER group	Health group		GRE vs non-GRE	GRE vs healthy	non-GRE vs healthy
Am6_R and Acvl_R	0.118 ± 0.048	0.437 ± 0.033	0.429 ± 0.048	0.0005	0.0002	< 0.0001	> 0.9999
Am6_R and A4hf_L	0.252 ± 0.042	0.626 ± 0.083	0.575 ± 0.050	0.0004	0.0007	0.0014	> 0.9999
A4ul_L and A1/2/3ulhf_R	0.359 ± 0.089	0.601 ± 0.080	0.691 ± 0.051	0.0055	0.0861	0.0042	> 0.9999

* BA = Brodmann area. Am6_R = medial BA 6 in the right hemisphere; Acvl_R = caudal ventrolateral BA 6 in the right hemisphere; A4ul_L = upper limb region of BA 4 in the left hemisphere; A4hf_L = head and face region of BA 4 in the left hemisphere; A1/2/3ulhf_R = upper limb, head and face region of BA 1/2/3 in the right hemisphere. Threshold of Bonferroni correction was p value = 2.16×10^{-4}.

Table S8. Topological properties compared between the patient and healthy groups (gliomas in the left hemisphere)

	GRE group	non-GRE group	Health group	One-way ANOVA (p value)	GRE vs non-GRE (p value)	GRE vs Health (p value)	non-GRE vs n Health (p value)
Global efficiency	0.430 ± 0.012	0.391 ± 0.009	0.416 ± 0.006	0.0118	0.0133	0.9000	0.0882
Local efficiency	0.573 ± 0.014	0.557 ± 0.012	0.554 ± 0.010	0.5375	-	-	-
Shortest path length	2.473 ± 0.079	2.747 ± 0.081	2.589 ± 0.047	0.0306	0.0292	0.7191	0.2553
Clustering coefficient	0.485 ± 0.014	0.479 ± 0.012	0.475 ± 0.009	0.8242	-	-	-
Gamma	1.691 ± 0.093	1.636 ± 0.113	1.684 ± 0.088	0.9144	-	-	-
Lambda	1.097 ± 0.021	1.140 ± 0.026	1.143 ± 0.016	0.3004	-	-	-
Sigma	1.533 ± 0.078	1.426 ± 0.078	1.474 ± 0.075	0.6734	-	-	-

* The global properties were calculated with one-way ANOVA test. If the results one-way ANOVA were significance, post-hoc analysis with least significant difference was subsequently applied.

Table S9. Topological properties compared between the patient and healthy groups (gliomas in the right hemisphere)

	GRE group	non-GRE group	Health group	One-way ANOVA (p value)	GRE vs non-GRE (p value)	GRE vs Health (p value)	non-GRE vs n Health (p value)
Global efficiency	0.522 ± 0.003	0.494 ± 0.007	0.416 ± 0.006	< 0.0001	0.0214	< 0.0001	< 0.0001
Local efficiency	0.662 ± 0.016	0.624 ± 0.012	0.554 ± 0.010	< 0.0001	0.2310	< 0.0001	0.0011
Shortest path length	1.959 ± 0.029	2.170 ± 0.044	2.589 ± 0.047	< 0.0001	0.0129	< 0.0001	< 0.0001
Clustering coefficient	0.548 ± 0.014	0.525 ± 0.009	0.475 ± 0.009	< 0.0001	0.6549	< 0.0001	0.0069
Gamma	1.464 ± 0.071	1.289 ± 0.067	1.684 ± 0.088	0.0118	0.7862	0.2927	0.0122
Lambda	1.029 ± 0.005	1.054 ± 0.014	1.143 ± 0.016	< 0.0001	> 0.9999	< 0.0001	0.0010
Sigma	1.415 ± 0.064	1.227 ± 0.067	1.478 ± 0.075	0.5387	-	-	-

* The global properties were calculated with one-way ANOVA test. If the results one-way ANOVA were significance, post-hoc analysis with least significant difference was subsequently applied.

Table S10. Nodal efficiency compared between the patients and healthy groups

Node name	Glioma grew in the left prefrontal lobe				Glioma grew in the right prefrontal lobe			
	GRE group	non-GRE group	Health group	One-way ANOVA (p value)	GRE group	non-GRE group	Health group	One-way ANOVA (p value)
A6m	0.320 ± 0.066	0.376 ± 0.041	0.368 ± 0.034	0.684	0.522 ± 0.014	0.492 ± 0.013	0.368 ± 0.034	0.104
A4hf	0.498 ± 0.032	0.441 ± 0.027	0.440 ± 0.038	0.468	0.458 ± 0.054	0.429 ± 0.059	0.440 ± 0.038	0.924
A4ul	0.450 ± 0.026	0.451 ± 0.032	0.484 ± 0.021	0.569	0.662 ± 0.016	0.624 ± 0.012	0.484 ± 0.021	0.661
A4t	0.480 ± 0.029	0.473 ± 0.029	0.470 ± 0.025	0.973	0.548 ± 0.014	0.525 ± 0.008	0.470 ± 0.025	0.349
A4tl	0.354 ± 0.050	0.295 ± 0.043	0.317 ± 0.035	0.663	0.463 ± 0.067	0.288 ± 0.064	0.317 ± 0.035	0.446
A1_2_3ll	0.474 ± 0.029	0.364 ± 0.036	0.353 ± 0.030	0.067	0.229 ± 0.004	0.354 ± 0.012	0.353 ± 0.030	0.507
A4ll	0.482 ± 0.018	0.457 ± 0.019	0.498 ± 0.024	0.401	0.417 ± 0.061	0.496 ± 0.064	0.498 ± 0.024	0.804
A1_2_3ulhf	0.473 ± 0.040	0.491 ± 0.023	0.468 ± 0.025	0.840	0.595 ± 0.018	0.550 ± 0.052	0.468 ± 0.025	0.163
A1_2_3tonIa	0.389 ± 0.052	0.409 ± 0.043	0.423 ± 0.026	0.835	0.546 ± 0.055	0.576 ± 0.036	0.423 ± 0.026	0.495
A2	0.453 ± 0.047	0.351 ± 0.044	0.412 ± 0.035	0.286	0.545 ± 0.029	0.577 ± 0.023	0.412 ± 0.035	0.620
A1_2_3tru	0.272 ± 0.045	0.294 ± 0.042	0.304 ± 0.035	0.862	0.456 ± 0.066	0.488 ± 0.068	0.304 ± 0.035	0.172
A6m	0.303 ± 0.036	0.239 ± 0.047	0.332 ± 0.030	0.214	0.504 ± 0.066	0.519 ± 0.032	0.332 ± 0.030	0.140
A4hf	0.171 ± 0.050	0.173 ± 0.040	0.241 ± 0.040	0.410	0.500 ± 0.051	0.430 ± 0.053	0.241 ± 0.040	0.176
A4ul	0.306 ± 0.047	0.211 ± 0.043	0.288 ± 0.037	0.265	0.573 ± 0.021	0.603 ± 0.025	0.288 ± 0.037	0.409
A4t	0.540 ± 0.025	0.545 ± 0.015	0.522 ± 0.022	0.730	0.477 ± 0.071	0.598 ± 0.022	0.522 ± 0.022	0.716
A4tl	0.567 ± 0.018	0.530 ± 0.013	0.542 ± 0.016	0.313	0.542 ± 0.046	0.514 ± 0.039	0.542 ± 0.016	0.100
A1_2_3ll	0.473 ± 0.021	0.341 ± 0.036	0.433 ± 0.029	0.194	0.514 ± 0.039	0.456 ± 0.060	0.433 ± 0.029	0.434
A4ll	0.416 ± 0.034	0.374 ± 0.041	0.456 ± 0.020	0.168	0.496 ± 0.029	0.347 ± 0.065	0.456 ± 0.020	0.082
A1_2_3ulhf	0.496 ± 0.021	0.459 ± 0.026	0.376 ± 0.031	0.156	0.477 ± 0.054	0.243 ± 0.059	0.376 ± 0.031	0.166

* The global properties were calculated with one-way ANOVA test. If the results one-way ANOVA were significance, post-hoc analysis with least significant difference was subsequently applied.

Table S11. Nodal local efficiency compared between the patients and healthy groups

Node name	Glioma grew in the left prefrontal lobe				Glioma grew in the right prefrontal lobe			
	GRE group	non-GRE group	Health group	One-way ANOVA (p value)	GRE group	non-GRE group	Health group	One-way ANOVA (p value)
A6m	0.434 ± 0.090	0.589 ± 0.064	0.476 ± 0.067	0.328	0.746 ± 0.040	0.658 ± 0.076	0.476 ± 0.067	0.281
A4hf	0.624 ± 0.054	0.582 ± 0.066	0.570 ± 0.062	0.835	0.634 ± 0.071	0.609 ± 0.080	0.570 ± 0.062	0.947
A4ul	0.744 ± 0.061	0.717 ± 0.064	0.705 ± 0.055	0.882	0.680 ± 0.080	0.748 ± 0.045	0.705 ± 0.055	0.761
A4t	0.697 ± 0.058	0.740 ± 0.050	0.711 ± 0.045	0.828	0.601 ± 0.098	0.639 ± 0.104	0.711 ± 0.045	0.360
A4tl	0.361 ± 0.080	0.400 ± 0.076	0.452 ± 0.069	0.704	0.507 ± 0.086	0.638 ± 0.071	0.452 ± 0.069	0.588
A1_2_3ll	0.529 ± 0.066	0.516 ± 0.078	0.430 ± 0.071	0.592	0.660 ± 0.083	0.568 ± 0.099	0.430 ± 0.071	0.479
A4ll	0.778 ± 0.037	0.707 ± 0.045	0.565 ± 0.059	0.082	0.832 ± 0.047	0.767 ± 0.028	0.565 ± 0.059	0.136
A1_2_3ulhf	0.700 ± 0.064	0.697 ± 0.054	0.559 ± 0.056	0.132	0.667 ± 0.099	0.801 ± 0.022	0.559 ± 0.056	0.465
A1_2_3tonIa	0.480 ± 0.100	0.591 ± 0.078	0.576 ± 0.066	0.643	0.690 ± 0.072	0.665 ± 0.088	0.576 ± 0.066	0.616
A2	0.588 ± 0.086	0.559 ± 0.076	0.564 ± 0.066	0.963	0.693 ± 0.097	0.615 ± 0.099	0.564 ± 0.066	0.775
A1_2_3tru	0.366 ± 0.100	0.440 ± 0.080	0.397 ± 0.068	0.816	0.725 ± 0.067	0.402 ± 0.114	0.397 ± 0.068	0.083
A6m	0.376 ± 0.080	0.320 ± 0.083	0.433 ± 0.070	0.567	0.662 ± 0.084	0.324 ± 0.112	0.433 ± 0.070	0.111
A4hf	0.233 ± 0.094	0.154 ± 0.059	0.325 ± 0.068	0.232	0.552 ± 0.117	0.444 ± 0.110	0.325 ± 0.068	0.274
A4ul	0.353 ± 0.088	0.192 ± 0.067	0.387 ± 0.076	0.178	0.346 ± 0.111	0.315 ± 0.111	0.387 ± 0.076	0.933
A4t	0.662 ± 0.039	0.780 ± 0.027	0.671 ± 0.041	0.064	0.694 ± 0.047	0.797 ± 0.032	0.671 ± 0.041	0.305
A4tl	0.677 ± 0.039	0.779 ± 0.027	0.674 ± 0.042	0.111	0.691 ± 0.080	0.758 ± 0.018	0.674 ± 0.042	0.382
A1_2_3ll	0.616 ± 0.079	0.531 ± 0.091	0.535 ± 0.064	0.729	0.741 ± 0.065	0.602 ± 0.064	0.535 ± 0.064	0.409
A4ll	0.611 ± 0.085	0.499 ± 0.081	0.606 ± 0.061	0.523	0.491 ± 0.101	0.570 ± 0.122	0.606 ± 0.061	0.338
A1_2_3ulhf	0.667 ± 0.035	0.639 ± 0.056	0.498 ± 0.071	0.123	0.650 ± 0.059	0.717 ± 0.053	0.498 ± 0.071	0.809

* The global properties were calculated with one-way ANOVA test. If the results one-way ANOVA were significance, post-hoc analysis with least significant difference was subsequently applied.