

Supplementary Table I- Characteristics of non-cancer brain specimens as reference controls***(n=10)**

Control	Age (y)	Gender	Region	Side	Disorder	Preservation year
C1	47	Female	Temporo-parietal	Left	Multiple sclerosis	2014
C2	43	Male	Frontal	Left	Unspecified	2014
C3	56	Female	Frontal	Right	Adjacent normal tissues	2013
C4	62	Male	Temporo-parietal	Right	Cystic lesion	2010
C5	41	Male	Temporo-parietal	Right	Adjacent normal tissues	2013
C6	59	Female	Frontal	Left	Unspecified	2013
C7	39	Male	Temporal	Right	Adjacent normal tissues	2011
C8	55	Male	Occipital	Right	Hematoma	2012
C9	65	Male	Frontal	Central	Adjacent normal tissues	2014
C10	45	Male	Parietal	Left	Cystic lesion	2010

* All control samples were proved histologically to be non-cancer tissues.

Supplementary Table II- Raw data for GB patients

	Age (year)	Sex	Site	OS (mo)	DPS (mo)	Rec	IDH	MGMT	Casp3 (%)	p53 (%)	ROR (FC)
P1	45	F	FT	22	22	No	WT	Unme	30	44	47.85074
P2	51	M	Fr	17	17	No	WT	Unme	25	86	1.235154
P3	47	F	FT	16	16	No	WT	Unme	45	24	60.54769
P4	60	M	Fr	12	12	No	WT	Unme	30	2	66.25696
P5	60	M	Fr	10	6	Yes	WT	Unme	40	3	147.0334
P6	50	M	Fr	11	11	No	WT	Meth	90	0	155.4169
P7	56	M	TP	15	15	No	WT	Unme	25	0	11.63178
P8	85	M	TP	13	13	No	WT	Meth	50	0	86.84149
P9	49	M	Fr	9	9	No	WT	Meth	80	0	64.44516
P10	49	F	TP	25	25	No	WT	Meth	30	10	24.05418
P11	58	M	TP	16	16	No	WT	Meth	75	2	14.32040
P12	54	M	Fr	14	14	No	WT	Unme	0	0	138.7107
P13	40	M	Fr	22	19	Yes	WT	Unme	0	8	42.06963
P14	48	F	TP	8	8	No	WT	Unme	0	27	66.30450
P15	55	M	TP	15	11	Yes	WT	Unme	35	97	46.20573
P16	38	M	Fr	27	27	No	WT	Unme	0	20	173.6454
P17	49	F	TP	25	25	No	WT	Unme	0	90	10.78112
P18	50	M	TP	14	14	No	WT	Unme	25	0	891.6016
P19	50	M	Fr	12	12	No	WT	Unme	0	30	101.1253
P20	60	M	Fr	18	18	No	WT	Unme	0	80	305.698
P21	48	M	FT	11	8	Yes	WT	Unme	0	30	39.39662
P22	60	M	Fr	13	13	No	WT	Unme	25	25	1.328686
P23	47	F	FT	22	22	No	WT	Unme	0	23	136.2983
P24	53	F	Fr	26	26	No	WT	Meth	35	60	41.06963
P25	49	F	FT	21	21	No	WT	Meth	0	55	50.22208
P26	62	M	Fr	20	20	No	WT	Meth	0	64	1.341713
P27	62	M	Fr	16	11	Yes	WT	Unme	50	55	77.70847
P28	52	M	Fr	14	10	No	WT	Meth	50	0	135.3781
P29	58	M	TP	15	15	No	WT	Meth	50	0	23.04525
P30	56	M	TP	19	19	No	WT	Meth	50	80	2.028686
P31	51	M	Fr	17	17	No	WT	Meth	75	97	15.12530
P32	51	F	TP	13	13	No	WT	Meth	98	47	64.62781
P33	60	M	FT	29	27	No	WT	Meth	78	0	35.0174
P34	56	M	Fr	20	18	No	WT	Meth	68	90	41.05318
P35	42	M	Fr	18	14	Yes	WT	Meth	4	70	276.2824
P36	50	F	TP	26	23	No	WT	Unme	21	0	49.55249
P37	57	M	Fr	12	12	No	WT	Meth	0	60	2.158456
P38	40	M	Fr	19	15	No	WT	Meth	25	90	65.14516
P39	51	M	TP	29	26	No	WT	Unme	90	89	46.85074
P40	52	M	FT	29	28	No	WT	Meth	35	0	41.24731
P41	52	M	Fr	18	18	No	WT	Meth	70	50	66.35743
P42	62	F	TP	16	14	No	WT	Meth	60	35	2.125781
P43	50	F	FT	22	21	No	WT	Meth	30	25	47.42615
P44	60	M	Fr	13	13	No	WT	Meth	0	45	0.641713
P45	50	M	Fr	11	11	No	WT	Meth	0	0	487.7507

P46	56	M	TP	15	15	No	WT	Unme	10	4	9.781122
P47	54	M	TP	13	13	No	WT	Meth	0	0	170.6111
P48	49	M	Fr	9	9	No	WT	Meth	0	0	1.368632
P49	49	F	TP	25	25	No	WT	Unme	0	0	12.63178
P50	28	M	TP	16	16	No	WT	Meth	0	0	35.85672
P51	25	M	TP	10	10	No	WT	Meth	92	0	155.7641
P52	36	M	TP	10	6	Yes	WT	Unme	45	4	147.5187
P53	47	M	Fr	15	15	No	WT	Unme	25	0	11.84149
P54	54	M	Fr	13	13	No	WT	Meth	50	0	86.63178
P55	67	M	Fr	8	8	No	WT	Meth	75	0	64.12864
P56	59	F	TP	25	25	No	WT	Unme	0	0	12.24516
P57	58	M	TP	16	16	No	WT	Meth	0	0	65.63178

Age, age at biopsy sampling in years; OS, overall survival (months); DPS; disease progression-free survival (months); IDH, isocitrate dehydrogenase; MGMT, O⁶-methylguanine DNA methyltransferase; Casp3, caspase 3, apoptosis-related cysteine peptidase (expressed as percentage); p53, tumor protein 53 (expressed as percentage); ROR, Long Intergenic Non-Protein Coding RNA, Regulator Of Reprogramming (expressed as fold change compared to control samples using LIVAC method); P, patient number; F, female; M, male; Fr, frontal; FT, frontotemporal; TP, temporoparietal, WT, wild-type; Meth, methylated MGMT promoter; Unme, unmethylated MGMT promoter. Histopathological diagnosis of GB was established according to World Health Organization (WHO) published in 2016.

Supplementary Table III- Characteristics of glioblastoma patients according to their survival (n=57)

Variable	Total (n=57)	Low OS (n=26)	High OS (n=31)	P value	OR	95% CI
Age (years)						
≤50 years	24 (42.1)	10 (38.5)	14 (45.2)	0.788	0.75	(0.26-2.19)
>50 years	33 (57.9)	16 (61.5)	17 (54.8)			
Sex						
Female	14 (24.6)	2 (7.7)	12 (38.7)	0.012	0.13	(0.02-0.66)
Male	43 (75.4)	24 (92.3)	19 (61.3)			
Tumor site						
F	27 (47.4)	15 (57.7)	12 (38.7)	0.100	1.0	
FT	8 (14.0)	1 (3.8)	7 (22.6)		8.75	(0.94-81.2)
TP	22 (38.6)	10 (38.5)	12 (38.7)		1.50	(0.48-4.65)
MGMT promoter						
Unmethylated	26 (45.6)	12 (46.2)	14 (45.2)	1.00	1.04	(0.36-2.96)
Methylated	31 (54.4)	14 (53.8)	17 (54.8)			
Recurrence						
Non-recurrent	50 (87.7)	22 (84.6)	28 (90.3)	0.691	0.58	(0.11-2.91)
Recurrent	7 (12.3)	4 (15.4)	3 (9.7)			
DPS (mo)						
Prolonged DPS	27 (47.4)	0 (0.0)	27 (87.1)	<0.001	0.003	(0.00-0.063)
Short DPS	30 (52.6)	26 (100)	4 (12.9)			

Data are shown as number (percentage). F, frontal; FT, frontotemporal; TP, temporoparietal, MGMT; O-6-Methylguanine-DNA Methyltransferase, OS; overall survival (low OS ≤15 mo and high OS >15 mo), DPS; disease progression-free survival (short DPS ≤15 mo and prolonged DPS >15 mo), OR (95% CI); odds ratio (95% confidence interval). Chi-square and Fisher's exact tests were used. Bold values are statistically significant at P < 0.05.

Supplementary Table IV - Correlation matrix for clinical and pathological characteristics of GB samples

	Age	Sex	Site	Methylation	DPS	Recurrence	OS
Age		0.233 (0.081)	-0.114 (0.397)	0.159 (0.238)	-0.080 (0.553)	-0.112 (0.405)	-0.089 (0.510)
Sex			-0.498 (<0.001)	0.132 (0.327)	-0.398 (0.002)	0.213 (0.111)	-0.385 (0.003)
Site				-0.088 (0.515)	0.393 (0.003)	-0.146 (0.279)	0.352 (0.007)
Methylation					-0.033 (0.806)	-0.301 (0.023)	-0.062 (0.646)
DPS						-0.353 (0.007)	0.953 (<0.001)
Recurrence							-0.148 (0.271)
OS							

Data are presented as correlation coefficients (P values). Sex; female and male were scored as 1 and 2 respectively, Site; tumor site classified as frontal, frontotemporal, and temperoparietal [coded as 1,2,3], DPS; disease progression-free survival in months, OS; overall survival in months, Spearman's rho correlation test was used. Bold values are statistically significant at P < 0.05.

Supplementary Table V- Association of caspase 3, p53, and *LINC-ROR* expression with clinicopathological features in glioblastoma patients (n=57).

Variable	Caspase 3		P53		LINC-ROR	
	P _{Ass}	r (P _{corr})	P _{Ass}	r (P _{corr})	P _{Ass}	r (P _{corr})
Age (years)	0.039	0.209(0.118)	0.396	0.003(0.983)	0.036	-0.245(.066)
Sex	0.357	0.123(0.362)	0.340	-0.128(0.344)	0.481	0.094(0.486)
Tumor site	0.957	-0.029(0.832)	0.261	-0.151(0.264)	0.145	-0.188(0.161)
MGMT promoter	0.013	0.332 (0.012)	0.552	-0.079(0.557)	0.456	-0.100(0.461)
Recurrence	0.840	-0.028(0.835)	0.144	0.203(0.131)	0.124	0.208(0.121)
DPS (mo)	0.413	-0.080(0.555)	0.058	0.296(0.025)	0.020	-0.224(0.094)
OS (mo)	0.623	-0.119(0.337)	0.003	0.194(0.148)	0.049	-0.283(0.033)

Data is shown as p values of Mann-Whitney U and Kruskal Wallis tests (P_{Ass}) or correlation coefficient (R) of Spearman's Rank correlation test and its p value (P_{corr}). Bold values are statistically significant at P < 0.05. MGMT; O-6-Methylguanine-DNA Methyltransferase, OS; overall survival, DPS; disease progression-free survival.