Figure S1 The heatmap of immune cell's biomarker and immune checkpoints with *TOP2A* level in HCC. (A) The heatmap of immune cell's biomarker with *TOP2A* level in HCC. (B) The heatmap of immune checkpoints with *TOP2A* level in HCC. *, P<0.05; **, P<0.01; ***, P<0.001.

Table S1 Correlation analysis between TOP2A and biomarkers of TIICs in HCC determined by GEPIA database

Immune cell	Biomarker	R value	P value
B cell	CD19	0.069	0.18
	CD79A	0.035	0.50
CD8^{+} T cell	CD8A	0.21	<0.001[†]
	CD8B	0.24	<0.001[†]
CD4^{+} T cell	CD4	0.095	0.067
M1 macrophage	NOS2	−0.61	0.24
	IRF5	0.27	<0.001[†]
	PTGS2	−0.014	0.79
M2 macrophage	CD163	0.19	<0.001[†]
	VSIG4	0.2	<0.001[†]
	MS4A4A	0.14	0.007[†]
Neutrophil	CEACAM8	0.017	0.74
	ITGAM	0.27	<0.001[†]
	CCR7	0.0024	0.96
Dendritic cell	HLA-DPB1	0.19	<0.001[†]
	HLA-DQB1	0.14	0.007[†]
	HLA-DRA	0.18	<0.001[†]
	HLA-DPA1	0.17	0.001[†]
	CD1C	0.12	0.021[†]
	NRP1	0.18	<0.001[†]
	ITGAX	0.17	0.001[†]

[†], these results are statistically significant.

Table S2 Correlation analysis between TOP2A and immune checkpoints in HCC determined by GEPIA database

Immune checkpoints	R value	P value
PDCD1 (PD-1)	0.2	<0.001[†]
CD274 (PD-L1)	0.2	<0.001[†]
PDCD1LG2 (PD-L2)	0.18	<0.001[†]
CTLA4	0.28	<0.001[†]
LAG3	0.26	<0.001[†]
CD27 (TNFRSF7)	0.18	<0.001[†]
HAVCR2 (TIM-3)	0.1	0.056
SIGLEC15	−0.05	0.34
IDO1	0.098	0.06

[†], these results are statistically significant.

Table S3 Univariate regression and multivariate survival method (disease-specific survival) of prognostic covariates in patients with HCC

Characteristics	Total (N)	Univariate analysis		Multivariate analysis	
		Hazard ratio (95% CI)	P value	Hazard ratio (95% CI)	P value
T stage (T3 & T4 *vs.* T1 & T2)	371	3.639 (2.328–5.688)	<0.001*	0.903 (0.097–8.422)	0.929
Pathologic stage (stage III & stage IV *vs.* stage I & stage II)	350	3.803 (2.342–6.176)	<0.001*	3.568 (0.370–34.437)	0.271
Tumor status (with tumor *vs.* tumor free)	355	775790759.389 (0.000–Inf)	0.99		
Gender (male *vs.* female)	374	0.813 (0.516–1.281)	0.37		
Age (>60 *vs.* ≤60)	373	0.846 (0.543–1.317)	0.45		
Residual tumor (R1 & R2 *vs.* R0)	345	1.678 (0.728–3.870)	0.22		
Child-Pugh grade (B & C *vs.* A)	241	2.560 (1.123–5.834)	0.025*	2.791 (1.103–7.060)	0.030*
Vascular invasion (yes *vs.* no)	318	1.277 (0.707–2.306)	0.41		
AC078846.1 (high *vs.* low)	373	1.616 (1.034–2.524)	0.035*	1.113 (0.545–2.276)	0.76
AC124798.1 (high *vs.* low)	373	1.595 (1.022–2.488)	0.040*	1.031 (0.501–2.122)	0.93
SNHG3 (high *vs.* low)	373	1.644 (1.053–2.565)	0.029*	2.144 (1.020–4.504)	0.044*

*, statistically significant.

Table S4 Univariate regression and multivariate survival method (progression-free interval) of prognostic covariates in patients with HCC

Characteristics	Total (N)	Univariate analysis		Multivariate analysis	
		Hazard ratio (95% CI)	P value	Hazard ratio (95% CI)	P value
T stage (T3 & T4 *vs.* T1 & T2)	371	2.177 (1.590–2.980)	<0.001*	0.493 (0.115–2.120)	0.34
Pathologic stage (stage III & stage IV *vs.* stage I & stage II)	350	2.201 (1.591–3.046)	<0.001*	2.644 (0.629–11.108)	0.18
Tumor status (with tumor *vs.* tumor free)	355	11.342 (7.567–17.000)	<0.001*	11.727 (7.460–18.434)	<0.001*
Gender (male *vs.* female)	374	0.982 (0.721–1.338)	0.90		
Age (>60 *vs.* ≤60)	373	0.960 (0.718–1.284)	0.78		
Residual tumor (R1 & R2 *vs.* R0)	345	1.513 (0.840–2.726)	0.16		
Child-Pugh grade (B & C *vs.* A)	241	1.395 (0.765–2.545)	0.27		
Vascular invasion (yes *vs.* no)	318	1.676 (1.196–2.348)	0.003*	1.587 (1.090–2.309)	0.016*
AC078846.1 (high *vs.* low)	373	1.426 (1.067–1.907)	0.017*	0.959 (0.657–1.400)	0.83
AC078846.1 (high *vs.* low)	373	1.138 (0.851–1.521)	0.38		
SNHG3 (high *vs.* low)	373	1.436 (1.073–1.921)	0.015*	1.219 (0.838–1.772)	0.30

*, statistically significant.