

Table SI. Clinicopathological characteristics of 30 patients with papillary thyroid carcinoma.

Clinicopathological parameter	n	%
Age		
<55 years	22	73.33
≥55 years	8	26.67
Sex		
Male	11	36.67
Female	19	63.33
Maximum tumor diameter		
≤2 cm	13	43.33
>2 cm	17	56.67
TNM stage		
I-II	12	40.00
III-IV	18	60.00
Lymph node metastasis		
No (N0)	14	46.67
Yes (N1)	16	53.33
Histological subtype		
Classic	15	50.00
Follicular	12	40.00
Tall cell	3	10.00
BRAF V600E mutation		
No (wild-type)	9	30.00
Yes (mutant-type)	21	70.00

Table SII. shRNA target sequences used in the present study.

Gene	shRNA	Target sequence (5'-3')
PD-1 (PDCD1)	shPD-1	CCTCTGGACACTTCTGAAATC
PD-L1 (CD274)	shPD-L1	GCTCTGGTATCATCTCTGTAC
Scramble control	shNC	TTCTCCGAACGTGTCACGT

shRNA, short hairpin RNA; PD-1, programmed cell death protein 1; PD-L1, programmed death-ligand 1; NC, negative control (non-targeting scramble sequence).

Table SIII. Antibodies used in western blotting analysis.

Antibody	Supplier	Cat. no.	Clonality	Dilution
PD-1	Abcam	ab137132	Rabbit mAb	1:1,000
PD-L1	Abcam	ab205921	Rabbit mAb	1:1,000
NIS	Invitrogen; Thermo Fisher Scientific, Inc.	PA5-82263	Rabbit mAb	1:500
Bax	Abcam	ab32503	Rabbit mAb	1:1,000
Bcl-2	Abcam	ab182858	Rabbit mAb	1:1,000
Caspase-3	Abcam	ab184787	Rabbit mAb	1:1,000
Cleaved caspase-3	Abcam	ab32042	Rabbit mAb	1:500
E-cadherin	Abcam	ab40772	Rabbit mAb	1:10,000
N-cadherin	Abcam	ab76011	Rabbit mAb	1:1,000
Vimentin	Abcam	ab92547	Rabbit mAb	1:1,000
TGF- β 1	Abcam	ab215715	Rabbit mAb	1:1,000
p-Smad2 (S465/467)	Abcam	ab280888	Rabbit mAb	1:500
Smad2	Abcam	ab33875	Rabbit mAb	1:1,000
p-Smad3 (S423/425)	Abcam	ab52903	Rabbit mAb	1:500
Smad3	Abcam	ab40854	Rabbit mAb	1:1,000
GAPDH	Abcam	ab8245	Mouse mAb	1:10,000
Goat anti-Rabbit IgG (HRP)	Abcam	ab205718		1:5,000
Goat anti-Mouse IgG (HRP)	Abcam	ab205719		1:5,000

All primary antibodies were incubated overnight at 4°C. Secondary antibodies were incubated for 1 h at room temperature. Antibody dilutions were prepared in 5% BSA in TBST. HRP, horseradish peroxidase; mAb, monoclonal antibody; p-, phosphorylated; PD-1, programmed cell death protein 1; PD-L1, programmed death-ligand 1; NIS, sodium/iodine symporter.

Table SIV. Correlation between PD-1 and PD-L1 expression and clinicopathological characteristics of patients with papillary thyroid carcinoma.

Clinicopathological characteristics	n	PD-1 expression			PD-L1 expression		
		PD-1 high, n	PD-1 low, n	P-value	PD-L1 high, n	PD-L1 low, n	P-value
Total patients	30	24	6		24	6	
Age				0.645			>0.999
<55 years	22	18	4		17	5	
≥55 years	8	6	2		7	1	
Sex				0.641			>0.999
Male	11	8	3		9	2	
Female	19	16	3		15	4	
Tumor size				0.360			0.061
≤2 cm	13	9	4		8	5	
>2 cm	17	15	2		16	1	
TNM stage				0.184			0.358
I-II	12	8	4		11	1	
III-IV	18	16	2		13	5	
Lymph node metastasis				1.000			0.072
N0	14	11	3		9	5	

N1	16	13	3		15	1	
BRAF V600E				0.329			>0.999
Wild-type	9	6	3		7	2	
Mutant	21	18	3		17	4	

Associations between PD-1/PD-L1 expression and clinicopathological parameters were evaluated using the Fisher's exact test or the χ^2 test. P-values for age, sex and BRAF V600E were calculated with Fisher's exact test. P-values for tumor size, TNM stage and lymph node metastasis were calculated with Pearson's χ^2 test. P<0.05 was considered to indicate a statistically significant difference. High and low expression groups for PD-1 and PD-L1 were defined based on the median $2^{-\Delta\Delta C_q}$ value of reverse transcription-quantitative PCR from all 30 papillary thyroid carcinoma tissue samples; values above the median were classified as high expression, while those at or below the median were classified as low expression. PD-1, programmed cell death protein 1; PD-L1, programmed death-ligand 1.