

Supplementary Table 1.Details of primary antibodies and immunohistochemistry dilutions.

Antigen	Clone	Catalogue	Dilution	Vendor
VISTA	D1L2G	64953	1:200	Cell Signalling Technology, United States of America
CD3	LN10	PA0553	Prediluted	Leica Microsystems, Shanghai of China
CD4	4B12	PA0427	Prediluted	Leica Microsystems, Shanghai of China
CD8	4B11	PA0183	Prediluted	Leica Microsystems, Shanghai of China
CD19	EP169	ZA-0569	Prediluted	Zhongshan Golden Bridge Biotechnology CO.LTD, Beijing of China

SupplementaryTable 2. The 139 TNBC patients ID from The Cancer Genome Atlas Provisional dataset.

PATIENT_ID	PATIENT_ID	PATIENT_ID	PATIENT_ID	PATIENT_ID
TCGA-AC-A7	TCGA-E9-A5	TCGA-C8-A2	TCGA-HN-A2	TCGA-A2-A0
TCGA-E2-A57	TCGA-OL-A9	TCGA-AN-A	TCGA-D8-A1	TCGA-GM-A
TCGA-A7-A4	TCGA-E2-A1	TCGA-E2-A1	TCGA-A7-A2	TCGA-AN-A
TCGA-GI-A2C	TCGA-BH-A0	TCGA-A7-A6	TCGA-OL-A6	TCGA-AO-A
TCGA-E2-A1L	TCGA-D8-A2	TCGA-EW-A	TCGA-E2-A1	TCGA-GM-A
TCGA-BH-A1	TCGA-BH-A0	TCGA-OL-A6	TCGA-BH-A0	TCGA-E2-A1
TCGA-AQ-A5	TCGA-B6-A4	TCGA-C8-A3	TCGA-GM-A	TCGA-E2-A1
TCGA-A7-A5	TCGA-AN-A0	TCGA-AO-A	TCGA-A7-A4	TCGA-C8-A1
TCGA-AO-A0	TCGA-D8-A2	TCGA-A2-A0	TCGA-A8-A0	TCGA-BH-A
TCGA-A8-A07	TCGA-E2-A1	TCGA-AR-A1	TCGA-D8-A1	TCGA-AR-A
TCGA-AC-A2	TCGA-C8-A1	TCGA-A1-A0	TCGA-AR-A1	TCGA-S3-AA
TCGA-A7-A0	TCGA-A2-A3	TCGA-EW-A	TCGA-BH-A0	TCGA-AR-A
TCGA-AO-A1	TCGA-AR-A0	TCGA-E2-A1	TCGA-BH-A0	TCGA-OL-A
TCGA-BH-A0	TCGA-A2-A0	TCGA-D8-A1	TCGA-BH-A0	TCGA-D8-A2
TCGA-E2-A15	TCGA-A2-A0	TCGA-A2-A0	TCGA-A7-A6	TCGA-EW-A
TCGA-AR-A1	TCGA-A2-A1	TCGA-A7-A6	TCGA-LL-A7	TCGA-AQ-A
TCGA-B6-A40	TCGA-OL-A5	TCGA-GM-A	TCGA-A2-A3	TCGA-OL-A
TCGA-E2-A1L	TCGA-EW-A	TCGA-A8-A0	TCGA-AO-A1	TCGA-A2-A0
TCGA-AR-A2	TCGA-AO-A0	TCGA-BH-A0	TCGA-A2-A3	TCGA-EW-A
TCGA-A2-A3	TCGA-E2-A1	TCGA-E2-A1	TCGA-GM-A	TCGA-AR-A
TCGA-LL-A74	TCGA-AR-A0	TCGA-AN-A	TCGA-E2-A5	TCGA-EW-A
TCGA-A2-A0	TCGA-D8-A1	TCGA-EW-A	TCGA-AR-A2	TCGA-A2-A0
TCGA-EW-A1	TCGA-B6-A4	TCGA-C8-A2	TCGA-BH-A0	TCGA-E2-A1
TCGA-AO-A1	TCGA-C8-A1	TCGA-A2-A0	TCGA-GM-A	TCGA-LL-A5
TCGA-AN-A0	TCGA-A1-A0	TCGA-E2-A1	TCGA-AO-A1	TCGA-S3-AA
TCGA-A2-A0	TCGA-D8-A1	TCGA-D8-A1	TCGA-A2-A0	TCGA-EW-A
TCGA-A7-A0	TCGA-EW-A	TCGA-E2-A1	TCGA-C8-A2	TCGA-LL-A4
TCGA-AN-A0	TCGA-AC-A2	TCGA-AC-A6	TCGA-BH-A0	

TNBC, triple-negative breast cancer.

SupplementaryTable 3.Details of statistical methods used in tables and figures.

Statistical methods	Corresponding tables or figures
Chi-square test	Table 1. Table 2. Supplementary Table 4. Supplementary Table 5.
Spearman's correlation test	Supplementary Table 6.
Person's correlation test	Figure2. Supplementary Table 7.
Kaplan-Meier method with log-rank tests	Figure 3. Figure 5. Supplementary Table 8.
Cox regression models analysis	Table 3. Table 4.

SupplementaryTable 4.VISTA on tumor cells and clinicopathological characteristics in TNBC.

Parameters			VISTA on tumor cells				
			Negative		Positive		p value
	N	%	N	%	N	%	
Age							0.786
<50 years	145	57.1	119	57.5	26	55.3	
≥50 years	109	42.9	88	42.5	21	44.7	
Tumor stage							0.272
pT1	120	47.2	103	49.8	17	36.2	
pT2	120	47.2	94	45.4	26	55.2	
pT3	9	3.5	7	3.4	2	4.3	
pT4	5	2.1	3	1.4	2	4.3	
Lymph node							0.792
pN0	146	57.5	117	56.5	29	61.7	
pN1	55	21.7	46	22.2	9	19.1	
pN2	23	9.1	18	8.7	5	10.6	
pN3	30	11.7	26	12.6	4	8.6	
AJCC stage							0.326
I	83	32.7	71	34.3	12	25.5	
II	116	45.7	90	43.5	26	55.3	
III	55	21.6	46	22.2	9	19.2	
Ki 67							0.090
<14%	39	15.4	28	13.5	11	23.4	
≥14%	215	84.6	179	86.5	36	76.6	
Differentiatio							0.307
Well	2	0.8	1	0.5	1	2.1	
Moderate	67	26.4	52	25.1	15	31.9	
Poor	185	72.8	154	74.4	31	66.0	
Basal like							0.533
Yes	223	87.8	183	88.4	40	85.1	
No	31	12.2	24	11.6	7	14.9	
VISTA on IC							0.423
Positive	143	56.3	119	57.5	24	51.1	
Negative	111	43.7	88	42.5	23	48.9	

VISTA, V-domain Ig suppressor of T-cell activation; TNBC, triple-negative breast cancer; AJCC, American Joint Committee on Cancer; IC, immune cell

SupplementaryTable 5.Correlation of VISTA on tumor cells and other immune markers in TNBC.

Markers			VISTA on tumor cells				
			Negative		Positive		p value
	N	%	N	%	N	%	
TILs							0.861
<5%	143	56.3	116	56.0	27	57.4	
≥5%	111	43.7	91	44.0	20	42.6	
CD3							0.491
<20%	125	49.2	104	50.2	21	44.7	
≥20%	129	50.8	103	49.8	26	55.3	
CD8							0.653
<10%	121	47.6	100	48.3	21	44.7	
≥10%	133	52.4	107	51.7	26	55.3	
CD4							0.683
<10%	104	40.9	86	41.5	18	38.3	
≥10%	150	59.1	121	58.5	29	61.7	
CD19							0.165
<1%	115	45.3	98	47.3	17	36.2	
≥1%	139	54.7	109	52.7	30	63.8	

VISTA, V-domain Ig suppressor of T-cell activation; TNBC, triple-negative breast cancer;

TIL, tumor-infiltrating lymphocyte.

SupplementaryTable 6. Correlation between percentage of VISTA-positve ICs and TILs by Spearman's correlation analyses in TNBC.

Variables (%)	VISTA on ICs	VISTA on TCs	CD3+TILs	CD4+TILs	CD8+TILs	CD19+TILs	TILs
VISTA on ICs	1						
VISTA on TCs	0.013	1					
CD3+TILs	0.222*	0.101	1				
CD4+TILs	0.423*	0.067	0.670*	1			
CD8+TILs	0.214*	0.075	0.918*	0.632*	1		
CD19+TILs	0.465*	0.049	0.474*	0.549*	0.487*	1	
TILs	0.266*	0.014	0.667*	0.531*	0.649*	0.601*	1

*P<0.001

VISTA, V-domain Ig suppressor of T-cell activation; IC, immune cell; TC, tumor cell; TIL, tumor-infiltrating lymphocyte; TNBC, triple-negative breast cancer.

SupplementaryTable 7. Correlation between VISTA mRNA and CD3, CD4, CD8 and CD19 mRNA by Person's correlation analyses in 139 TNBC from the The Cancer Genome Atlas Provisional dataset.

Variables	VISTA	CD3	CD4	CD8	CD19
VISTA	1				
CD3	0.497*	1			
CD4	0.764*	0.709*	1		
CD8	0.579*	0.839*	0.689*	1	
CD19	0.573*	0.732*	0.621*	0.711*	1

*P<0.001

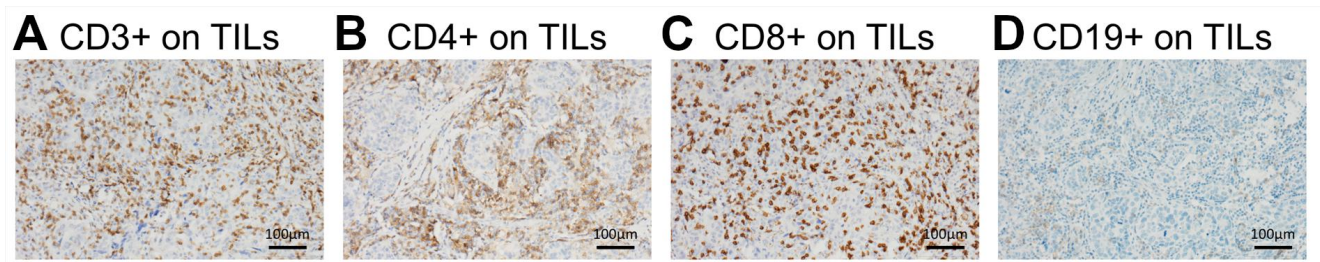
VISTA, V-domain Ig suppressor of T-cell activation; TNBC, triple-negative breast cancer.

SupplementaryTable 8.Relationships between VISTA expression on ICs and 5-year RFS/OS in TNBC.

Characteristics		5-year Relapse-free survival (%)			5-year Overall survival (%)		
		VISTA on ICs Negative	VISTA on ICs Positive	p	VISTA on ICs Negative	VISTA on ICs Positive	p
Whole group		64.6	79.0	0.011	72.0	90.0	<0.001
Basal like		63.6	78.8	0.020	70.9	90.5	<0.001
T1-2N0		73.1	86.8	0.038	82.7	95.6	0.022
Tumor stage	T1	75.0	83.8	0.189	78.6	94.1	0.032
	T2	57.1	77.9	0.017	69.2	89.7	0.005
	T3	-	-	-	-	-	-
	T4	-	-	-	-	-	-
Lymph node	N0	71.7	86	0.030	81.1	94.6	0.020
	N1	68.2	78.8	0.381	72.4	93.9	0.103
	N2	61.5	-	-	73.7	-	-
	N4	41.2	38.5	0.901	41.2	69.2	0.120
AJCC stage	I	79.4	88.6	0.295	86.7	98.1	0.107
	II	62.2	81.7	0.031	73.3	91.5	0.020
	III	51.7	42.1	0.473	58.3	68.4	0.443

VISTA, V-domain Ig suppressor of T-cell activation; AJCC, American Joint Committee on Cancer; IC, immune cell; RFS, relapse-free survival; DSS, disease-specific survival; TNBC, triple-negative breast cancer.

Supplementary Figure 1. Representative immunohistochemical staining of (a) CD3, (b)CD4, (c)CD8 and (d) CD19 in tumor-infiltrating lymphocytes (TILs) in triple-negative breast cancer.



Supplementary Figure 2. High expression of VISTA mRNA (C10orf54) correlated with favorable (a)relapse-free survival (RFS) and (b)overall survival(OS) in basal-like breast cancer. High expression of VISTA mRNA (C10orf54) and CD4(CD4) using multigene classifier showed prolonged (c) RFS and (d) OS.

