

Table S1. Stromal PD-L2 expression and cell densities of TILs in relation to clinicopathologic characteristics of PDAC.

	N	Stromal expression											
		PD-L2			Low	CD3		Low	CD8		Low	FOXP3	
		Negative	Positive	P		High	P		High	P		High	P
Sex													
Male	158	49	109	0.318	62	96	0.934	137	21	0.150	152	6	0.677
Female	147	38	109		57	90		135	12		140	7	
Age													
<60	106	30	76	0.950	39	67	0.561	92	14	0.327	103	3	0.366
≥60	199	57	142		80	119		180	19		189	10	
Location													
Head	181	50	131	0.897	83	98	0.952	162	19	0.500	176	5	0.060
Body	62	18	44		27	35		57	5		60	2	
Tail	62	19	43		28	34		53	9		56	6	
Grade													
Well	16	3	13	0.656	7	9	0.679	15	1	0.684	16	0	0.685
Moderate	175	50	125		71	104		154	21		167	8	
Low	114	34	80		41	73		103	11		109	5	
Tumor stage													
T1	51	21	30	0.072	21	30	0.922	44	7	0.071	51	0	0.203
T2	176	48	128		67	109		153	23		168	8	
T3	78	18	60		30	48		75	3		73	5	
Node stage													
N0	154	43	111	0.819	68	86	0.153	133	21	0.270	149	5	0.655
N1	108	30	78		35	73		99	9		102	6	

N2	43	14	29		16	27		40	3		41	2	
AJCC stage													
I	124	35	89	0.813	53	71	0.540	106	18	0.217	122	2	0.144
II	138	38	100		50	88		126	12		129	9	
III	43	14	29		16	27		40	3		41	2	

TILs tumor infiltrating lymphocytes, PDAC pancreatic ductal adenocarcinoma.

Table S2. Clinicopathologic characteristics of PD-L2 expression and cell densities of TILs of PDAC in validation set.

	Intratumoral expression												
	PD-L2				CD3			CD8			FOXP3		
	N	Low (0-1)	High (2-3)	<i>P</i>	Low	High	<i>P</i>	Low	High	<i>P</i>	Low	High	<i>P</i>
Sex													
Male	74	67	7	0.345	42	32	0.334	68	6	0.317	68	6	0.040
Female	76	65	11		49	27		66	10		61	15	
Age													
<60	53	44	9	0.165	36	17	0.179	46	7	0.456	44	9	0.437
≥60	97	88	9		55	42		88	9		85	12	
Grade													
Well	15	15	0	0.874	10	5	0.919	15	0	0.218	13	2	0.704
Moderate	98	83	15		58	40		87	11		85	13	
Low	37	34	3		23	14		32	5		31	6	
Tumor stage													
T1	38	37	1	0.065	19	19	0.113	37	1	0.108	36	2	0.008
T2	69	59	10		43	26		60	9		61	8	
T3	43	36	7		29	14		37	6		32	11	
Node stage													
N0	61	59	2	0.035	33	28	0.202	54	7	0.506	55	6	0.117
N1	68	55	13		44	24		60	8		58	10	
N2	21	18	3		14	7		20	1		16	5	
AJCC stage													
I	49	48	1	0.040	24	25	0.076	45	4	0.996	45	4	0.078
II	80	66	14		53	27		69	11		68	12	

III	21	18	3	14	7	20	1	16	5
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TILs tumor infiltrating lymphocytes, PDAC pancreatic ductal adenocarcinoma.

Table S3. Univariate and multivariate analysis of overall survival factors in validation set.

	N	Overall survival			
		Univariable analysis		Multivariable analysis	
		HR (95% CI)	<i>P</i>	HR (95% CI)	<i>P</i>
All	150				
Age (years)			0.599		
<60	54	Ref			
≥60	96	0.906 (0.629-1.307)			
Sex			0.378		
Male	74	Ref			
Female	76	1.173 (0.822-1.674)			
T stage			< 0.001		0.008
T1-2	107	Ref		Ref	
T3	43	2.281 (1.557-3.341)		1.724 (1.152-2.578)	
N stage			< 0.001		< 0.001
N0-1	128	Ref		Ref	
N2	22	2.417 (1.491-3.920)		3.484 (2.051-5.920)	
AJCC stage			< 0.001		< 0.001
I-II	128	Ref		Ref	
III	22	2.417 (1.491-3.920)		3.130 (1.859-5.269)	
Grade			< 0.001		< 0.001
Well and moderate differentiation	113	Ref		Ref	

Low differentiation	37	2.128 (1.425-3.177)	2.616 (1.712-3.996)	
Intratumoral PD-L2			< 0.001	< 0.001
Low expression	132	Ref	Ref	
High expression	18	4.635 (2.731-7.867)	4.591 (2.608-8.082)	
Intratumoral CD3			< 0.001	0.004
Low cell densities	91	Ref	Ref	
High cell densities	59	0.490 (0.335-0.717)	0.559 (0.375-0.833)	
Stromal CD3			0.142	
Low cell densities	74	Ref		
High cell densities	76	0.767 (0.538-1.093)		
Intratumoral CD8			0.057	0.012
Low cell densities	134	Ref	Ref	
High cell densities	16	1.695 (0.985-2.917)	2.198 (1.198-4.062)	
Stromal CD8			0.139	
Low cell densities	82	Ref		
High cell densities	68	0.763 (0.533-1.092)		
Intratumoral FOXP3			< 0.001	< 0.001
Low cell densities	129	Ref	Ref	
High cell densities	21	3.113 (1.909-5.078)	2.816 (1.681-4.716)	
Stromal FOXP3			< 0.001	0.06
Low cell densities	133	Ref	Ref	
High cell densities	17	2.562 (1.528-4.296)	1.707 (0.978-2.979)	
Risk score			< 0.001	0.001

Low score	82	Ref	Ref
High score	68	3.665 (2.331-5.761)	2.695 (1.519-4.781)

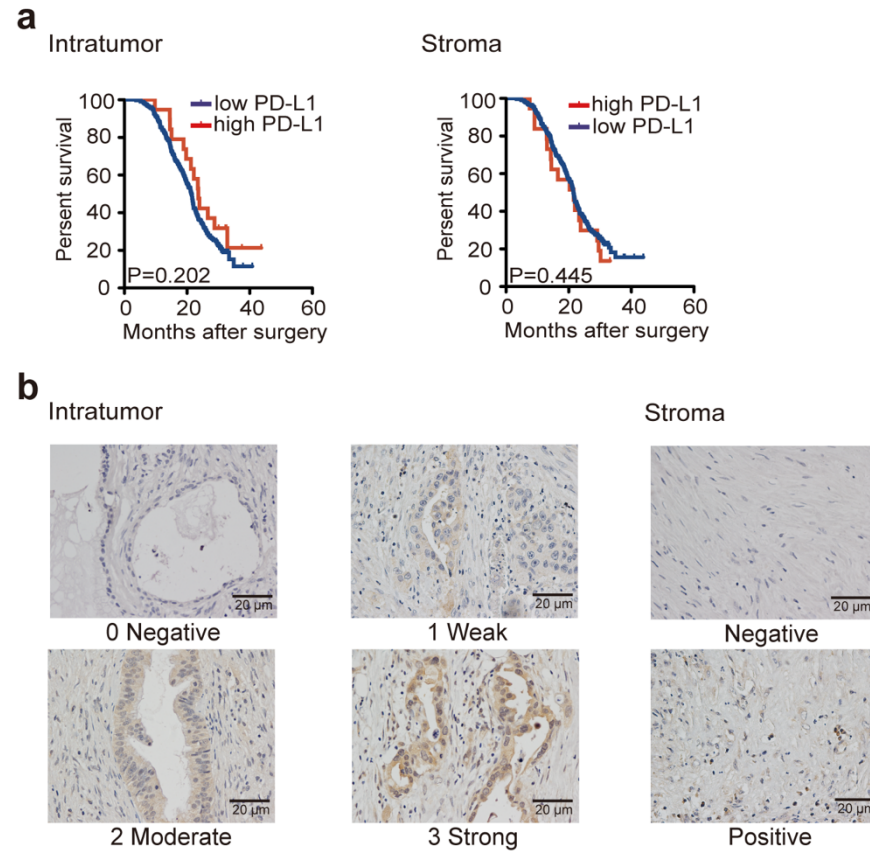
HR hazard ratios, Ref reference.

Covariates with $P < 0.1$ in univariable analysis were included in multivariable analysis. A $P < 0.05$ in multivariable analysis was considered significant.

Table S4. The correlation of TGF- β 2 expression and immune markers in PDAC using 2-tailed χ^2 test.

		TGF- β 2		<i>P</i>
		Negative-weak	Moderate-strong	
Intratumoral PD-L2	Negative-weak	177	61	< 0.001
	Moderate-strong	29	38	
Intratumoral CD3	Low	138	82	0.004
	High	68	17	
Stromal CD3	Low	84	35	0.363
	High	122	64	
Intratumoral CD8	Low	181	79	0.063
	High	25	20	
Stromal CD8	Low	180	92	0.144
	High	26	7	
Intratumoral FOXP3	Low	179	78	0.069
	High	27	21	
Stromal FOXP3	Low	200	92	0.092
	High	6	7	

Fig. S1 PD-L1 expression in PDAC.



a Log-rank test showing associations between OS and PD-L1 expression in the tumor and stroma. **b** Stratification of PD-L1 expression in PDAC cells (scales bar: 20 μ m) and in the stroma.