

Supplementary 1. Detailed clinical information of patients with BLCA.

ID	Sex	Start date of follow-up	End date of follow-up	Survival time (days)	Status (0=alive,1=dead)	Histological status	MIBC(0=no,1=yes)	T	N	M	Grade	Stage (AJC C)	Intensity scores of STC1	Percentage scores of STC1	IRS of STC1	TPS of PDL1(%)	TIL of CD3+ T cells (%)
A1	Male	2007/4/1	2012/11/1	2041	0	urothelial carcinoma	1	T2	0	0	High	2	2	4	8	25	50
A3	Male	2007/5/1	2009/7/6	797	1	urothelial carcinoma	1	T2	1	0	High	4	2	4	8	1	1
A5	Male	2007/10/1	2012/11/1	1858	0	urothelial carcinoma	0	Tis	0	0	High	0	1	1	1	0	8
A7	Male	2008/6/1	2010/2/20	629	1	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	0	5
A9	Male	2008/10/1	2014/3/1	1977	0	urothelial carcinoma	1	T2	0	0	High	2	1	3	3	0	10
A11	Male	2008/11/1	2014/3/1	1946	0	urothelial carcinoma	1	T2	0	0	High	2	2	4	8	5	20
B1	Male	2008/12/1	2014/3/1	1916	0	urothelial carcinoma	1	T3	0	0	High	3	0	0	0	0	5
B3	Male	2009/1/1	2014/3/1	1885	0	urothelial carcinoma	1	T2	0	0	High	2	1	3	3	10	2
B5	Male	2009/6/1	2010/1/15	228	1	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	95	5
B7	Male	2009/10/1	2010/3/9	159	1	urothelial carcinoma	1	T3	0	0	High	3	1	4	4	40	1
B9	Male	2009/11/18	2014/3/1	1564	0	urothelial carcinoma	1	T2	0	0	High	2	1	4	4	0	1

B11	Male	2009/11/1	2010/3/12	131	1	urothelial carcinoma	1	T4a	0	0	High	3	3	4	12	0	5
C1	Male	2009/12/1	2014/3/1	1551	0	urothelial carcinoma	1	T3	0	0	High	3	1	4	4	0	5
C3	Male	2010/12/1	2014/3/1	1186	0	urothelial carcinoma	1	T2	0	0	High	2	2	3	6	80	20
C5	Male	2010/12/1	2012/11/1	701	0	urothelial carcinoma	0	T1	N A	0	High	NA	0	0	0	25	20
C7	Male	2011/6/8	2011/8/12	65	1	urothelial carcinoma	1	T2	0	0	Low	2	1	4	4	0	5
C9	Male	2007/1/1	2009/8/16	958	0	urothelial carcinoma	1	T3	1	0	High	4	2	4	8	0	2
C10	Male	2007/1/1	2007/2/17	47	1	squamous cell carcinoma	1	T4a	1	0	High	4	3	4	12	0	5
C11	Male	2007/5/1	2014/3/1	2496	0	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	0	2
C12	Female	2007/5/1	2009/8/20	842	1	urothelial carcinoma	1	T2	0	0	High	2	1	4	4	0	5
D1	Female	2007/6/1	2008/5/28	362	1	urothelial carcinoma	1	T2	0	0	High	2	2	4	8	5	0
D2	Male	2007/9/1	2008/1/31	152	1	urothelial carcinoma	1	T2	1	0	High	4	2	4	8	5	0
D3	Male	2007/9/1	2009/8/27	726	1	urothelial carcinoma	0	T1	N A	0	High	NA	2	4	8	0	1

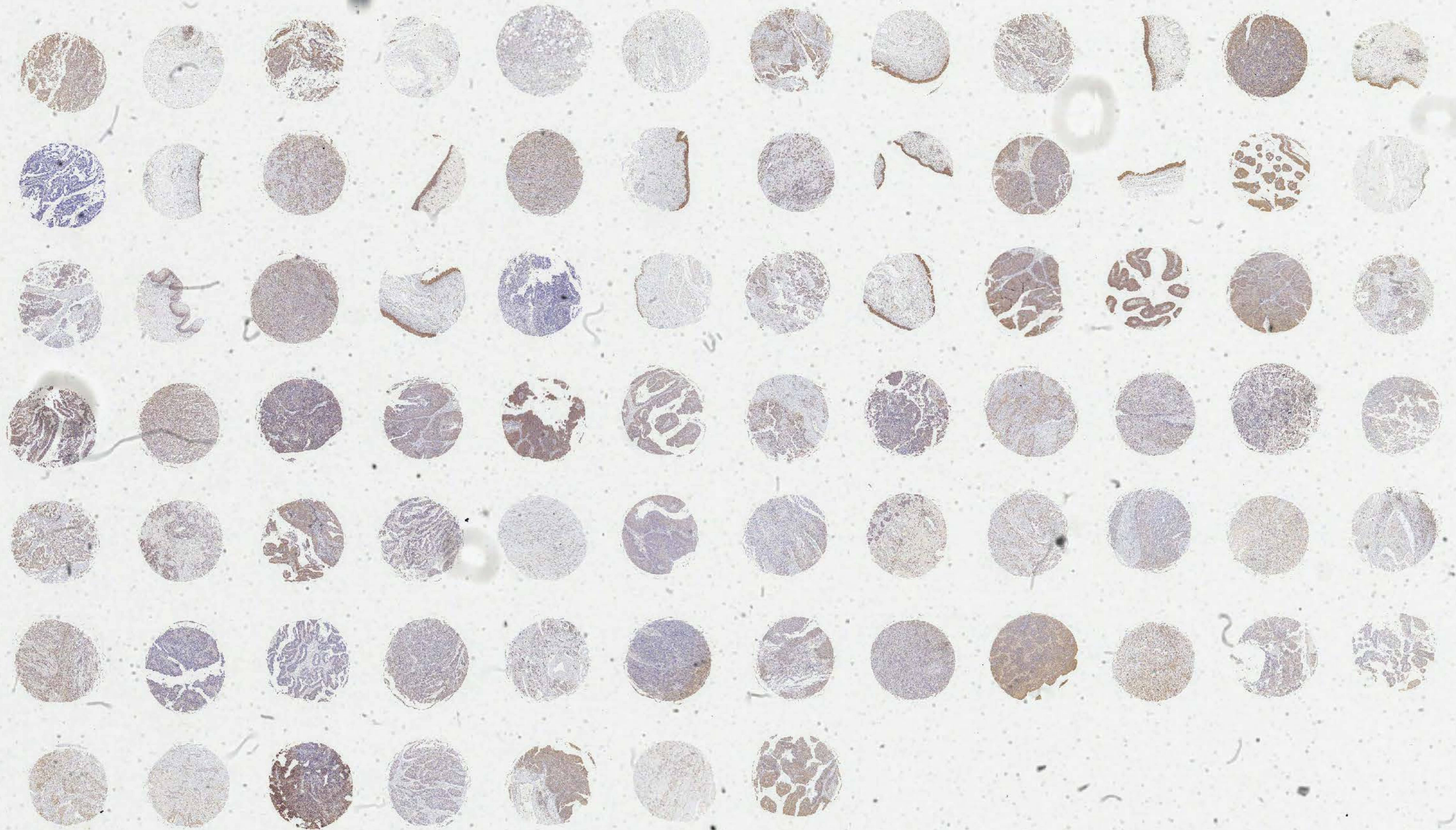
D4	Male	2007/10/1	2008/6/3	246	1	urothelial carcinoma	0	T1	N A	0	High	NA	2	3	6	0	5
D5	Male	2007/11/1	2008/2/15	106	1	urothelial carcinoma	1	T3	0	0	High	3	3	4	12	0	0
D6	Male	2007/12/1	2013/7/22	2060	1	urothelial carcinoma	0	T1	0	0	High	1	1	4	4	0	5
D7	Female	2007/12/1	2009/4/18	504	1	urothelial carcinoma	1	T3	0	0	High	3	2	3	6	0	2
D8	Male	2008/3/1	2009/9/16	564	1	urothelial carcinoma	0	T1	N A	0	High	NA	1	3	3	3	15
D9	Female	2008/4/1	2009/5/16	410	0	squamous cell carcinoma	1	T3	0	0	High	3	2	4	8	75	1
D10	Male	2008/5/1	2014/3/1	2130	0	urothelial carcinoma	1	T2	0	0	High	2	1	3	3	40	1
D11	Male	2008/6/1	2009/3/23	295	1	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	0	10
D12	Male	2008/8/1	2012/11/1	1553	0	urothelial carcinoma	0	T1	0	0	Low	1	1	2	2	0	8
E1	Male	2008/12/1	2014/3/1	1916	0	urothelial carcinoma	1	T3	0	0	High	3	2	3	6	0	15
E2	Male	2008/12/1	2009/8/12	254	1	urothelial carcinoma	1	T3	1	0	High	4	2	3	6	35	5
E3	Male	2009/2/1	2012/11/1	1369	0	urothelial carcinoma	0	Tis	0	0	High	0	3	4	12	0	15

E4	Male	2009/3/1	2010/5/3	428	1	urothelial carcinoma	0	T1	N A	0	High	NA	1	2	2	0	5
E5	Male	2009/4/1	2014/3/2	1796	1	urothelial carcinoma	0	T1	0	0	High	1	1	3	3	0	1
E6	Female	2009/6/25	2014/3/1	1710	0	urothelial carcinoma	NA	N A	N A	0	Low	NA	1	1	1	0	0
E7	Female	2009/8/1	2014/3/1	1673	0	urothelial carcinoma	1	T3	0	0	High	3	1	1	1	3	8
E8	Male	2009/8/24	2011/9/15	752	1	urothelial carcinoma	1	T4 a	N A	0	NA	3-4	1	4	4	0	5
E9	Male	2009/11/1	2013/6/25	1332	1	urothelial carcinoma	1	T3	0	0	High	3	1	4	4	0	0
E10	Male	2009/12/1	2012/11/1	1066	0	urothelial carcinoma	1	T3	0	0	High	3	1	2	2	0	2
E11	Male	2009/12/1	2014/3/1	1551	0	urothelial carcinoma	1	T3	0	0	High	3	1.5	4	6	75	5
E12	Male	2009/12/1	2010/5/7	157	1	urothelial carcinoma	1	T3	1	0	High	4	2	4	8	0	10
F1	Male	2010/1/1	2012/3/29	818	1	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	0	15
F2	Male	2010/1/1	2014/3/1	1520	0	urothelial carcinoma	0	T1	0	0	High	1	1	2	2	0	0
F3	Male	2010/1/1	2012/11/1	1035	0	urothelial carcinoma	0	Tis	0	0	High	0	1	1	1	0	5
F4	Female	2010/1/12	2011/3/3	415	1	urothelial carcinoma	NA	N A	N A	0	NA	NA	1	3	3	0	0

F5	Female	2010/2/1	2011/4/21	444	1	urothelial carcinoma	1	T3	N A	0	High	3-4	2	4	8	0	25
F6	Male	2010/2/1	2014/3/1	1489	0	urothelial carcinoma	0	T1	0	0	High	1	1	2	2	0	0
F7	Male	2010/2/1	2013/5/11	1195	1	urothelial carcinoma	0	T1	0	0	Low	1	1	4	4	0	0
F8	Male	2010/6/1	2012/11/1	884	0	urothelial carcinoma	0	Tis	0	0	High	0	2	3	6	45	60
F9	Female	2010/7/22	2014/3/1	1318	0	urothelial carcinoma	NA	N A	0	0	Low	NA	2	4	8	0	0
F10	Male	2010/10/1	2012/9/21	721	1	urothelial carcinoma	1	T3	0	0	High	3	3	4	12	15	0
F11	Male	2010/11/1	2014/3/1	1216	0	urothelial carcinoma	1	T2	1	0	High	4	1	4	4	0	1
F12	Male	2010/12/1	2014/3/1	1186	0	urothelial carcinoma	0	Tis	0	0	Low	0	1	3	3	0	0
G1	Male	2010/12/1	2012/11/1	701	0	urothelial carcinoma	1	T3	0	0	High	3	2	4	8	0	2
G2	Female	2010/12/1	2011/9/27	300	1	urothelial carcinoma	1	T3	0	0	High	3	2	2	4	0	2
G3	Male	2011/2/1	2011/11/2 1	293	1	urothelial carcinoma	1	T3	0	0	High	3	3	4	12	0	0
G4	Male	2011/12/1	2014/3/1	821	0	urothelial carcinoma	1	T2	0	0	High	2	1	3	3	0	10
G5	Male	2012/2/27	2014/3/1	733	0	urothelial carcinoma	1	T3	N A	0	NA	3-4	2	4	8	0	5

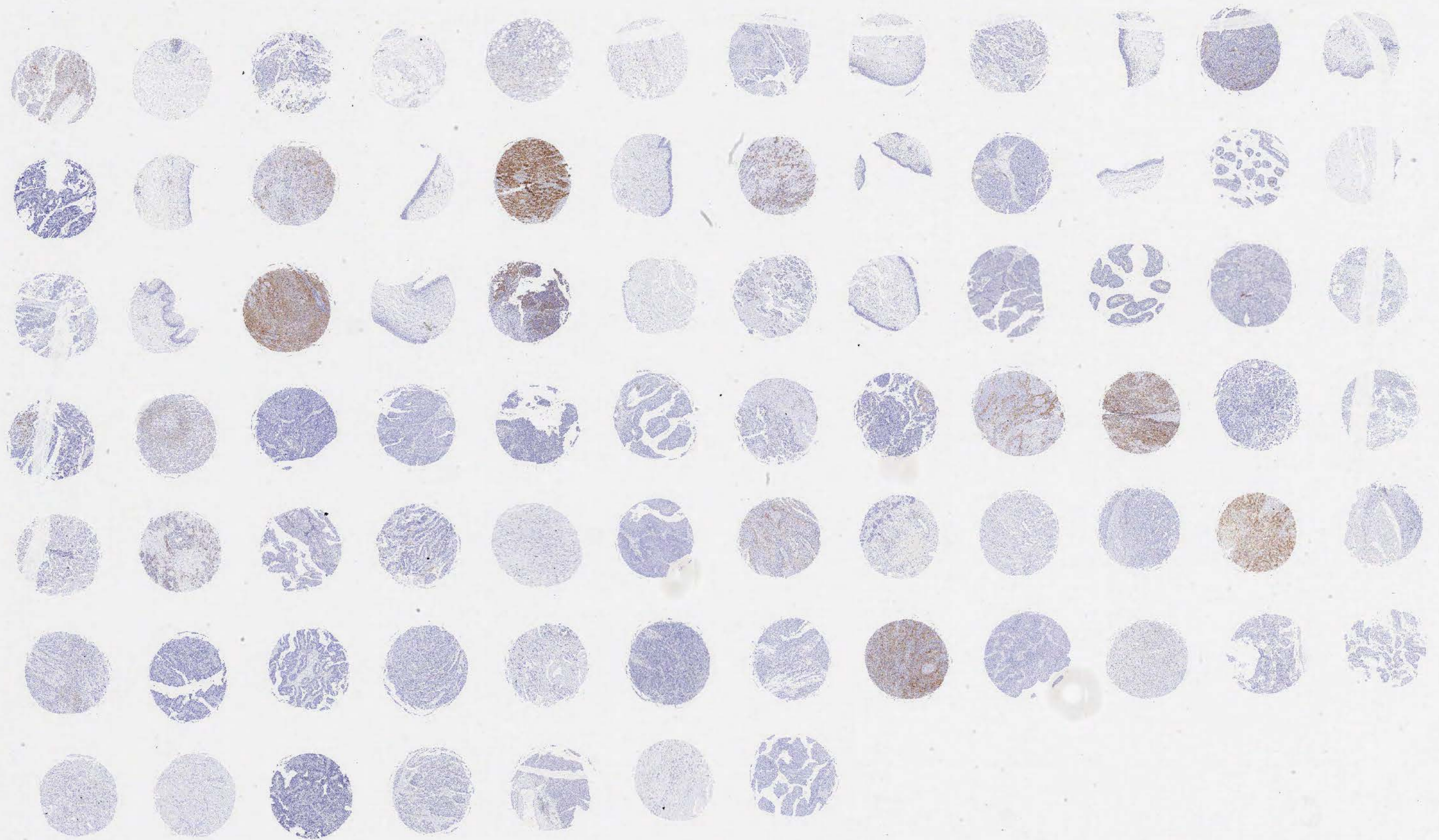
G6	Male	2012/3/15	2014/3/1	716	0	urothelial carcinoma	NA	N A	1	0	Low	4	0.5	2	1	0	0
G7	Male	2012/3/21	2014/3/1	710	0	urothelial carcinoma	NA	N A	0	0	High	NA	2	3	6	0	0

Supplementary 2. Immunohistochemistry results of STC1 in tissue microarray.



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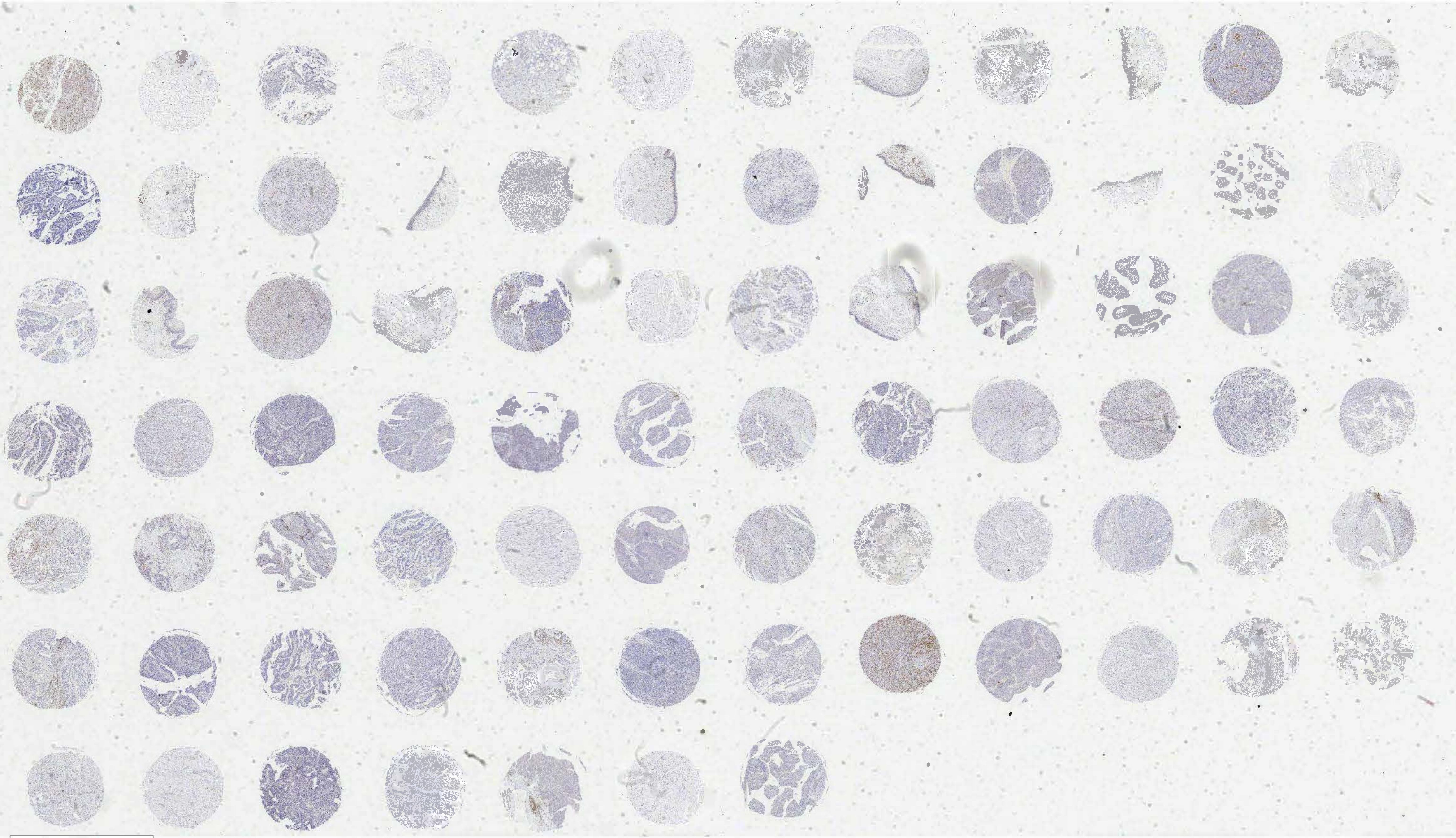
Supplementary 3. Immunohistochemistry results of PDL1 in tissue microarray.



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Supplementary 4. Immunohistochemistry results of CD3 in tissue microarray.



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Supplementary 5. List of correlated immune genes that associated with STC1 in TCGA.

Gene	Correlation
CANX	Positively related
CD1D	Positively related
CD4	Positively related
CD74	Positively related
CTSB	Positively related
CTSL	Positively related
FCER1G	Positively related
HLA-DMB	Positively related
HLA-DPA1	Positively related
HLA-DPB1	Positively related
HLA-DQA1	Positively related
HLA-DQB1	Positively related
HLA-DRA	Positively related
HLA-DRB1	Positively related
ICAM1	Positively related
THBS1	Positively related
CD209	Positively related
CXCL8	Positively related
CXCL10	Positively related
CXCL9	Positively related
CXCL5	Positively related
CXCL6	Positively related
CXCL1	Positively related
CXCL12	Positively related
CXCL2	Positively related
CXCL3	Positively related
CCL13	Positively related
CCL8	Positively related
DEFA3	Positively related
PTGDS	Positively related
S100B	Positively related
S100A10	Positively related
COLEC12	Positively related
IL6	Positively related
TGFB1	Positively related
MMP9	Positively related
TLR4	Positively related
A2M	Positively related
PLAU	Positively related
IL1B	Positively related
PAEP	Positively related
NOX4	Positively related
RBP7	Positively related

CETP Positively related  
PI15 Positively related  
CTSG Positively related  
AEN Positively related  
CYBB Positively related  
LRP1 Positively related  
STAT3 Positively related  
SOCS3 Positively related  
CCL20 Positively related  
ZYG1 Positively related  
TNFAIP3 Positively related  
F2R Positively related  
ELN Positively related  
LYZ Positively related  
CSRP1 Positively related  
JUN Positively related  
ITGAV Positively related  
CCR6 Positively related  
TLR8 Positively related  
PDGFRA Positively related  
FURIN Positively related  
TPM2 Positively related  
TLR1 Positively related  
FGF2 Positively related  
MSR1 Positively related  
DLL4 Positively related  
SLC11A1 Positively related  
STING1 Positively related  
CCL4 Positively related  
MARCO Positively related  
JAK1 Positively related  
ILK Positively related  
IL7R Positively related  
PTX3 Positively related  
PTGS2 Positively related  
SEPTIN7 Positively related  
CD14 Positively related  
MASP1 Positively related  
MAP2K1 Positively related  
HMOX1 Positively related  
HGF Positively related  
BACH2 Positively related  
PIK3CG Positively related  
STAB2 Positively related

PDGFRB Positively related  
PCSK1 Positively related  
AQP9 Positively related  
ANXA6 Positively related  
VIM Positively related  
VCAM1 Positively related  
TNFSF4 Positively related  
ACO1 Positively related  
CXCR1 Positively related  
CCL14 Positively related  
CCL18 Positively related  
CCL26 Positively related  
CCR8 Positively related  
CCL2 Positively related  
CCL21 Positively related  
CCL7 Positively related  
CCL3 Positively related  
CCR5 Positively related  
CCL23 Positively related  
CCL4L2 Positively related  
CCR1 Positively related  
CCL24 Positively related  
CXCR4 Positively related  
CCR4 Positively related  
LTBP1 Positively related  
IL13 Positively related  
IL10 Positively related  
JAK2 Positively related  
PTGDR Positively related  
CD86 Positively related  
HCK Positively related  
OLR1 Positively related  
RNASE2 Positively related  
LYN Positively related  
BTK Positively related  
PPP3CB Positively related  
PPP3CC Positively related  
NFATC1 Positively related  
NFATC2 Positively related  
FOS Positively related  
NFKBIA Positively related  
PIK3R5 Positively related  
PIK3CD Positively related  
AKT3 Positively related

LILRB3 Positively related  
RASGRP3 Positively related  
IFITM1 Positively related  
C3 Positively related  
CMA1 Positively related  
CCN1 Positively related  
EDN1 Positively related  
FGF10 Positively related  
PROK2 Positively related  
SAA1 Positively related  
SBDS Positively related  
SEMA3A Positively related  
SEMA3G Positively related  
SEMA5B Positively related  
SEMA6B Positively related  
SEMA6D Positively related  
SLIT2 Positively related  
TNC Positively related  
TYMP Positively related  
C5AR1 Positively related  
CMKLR1 Positively related  
CYSLTR1 Positively related  
ACKR1 Positively related  
EDNRA Positively related  
EDNRB Positively related  
FPR1 Positively related  
FPR2 Positively related  
GPR17 Positively related  
C5AR2 Positively related  
PLAUR Positively related  
PLXNC1 Positively related  
PLXND1 Positively related  
AGT Positively related  
APLN Positively related  
AREG Positively related  
BDNF Positively related  
BMP1 Positively related  
BMP6 Positively related  
CLCF1 Positively related  
CSF1 Positively related  
CSF2 Positively related  
CSF3 Positively related  
CCN2 Positively related  
EBI3 Positively related

EREG Positively related  
ESM1 Positively related  
FGF1 Positively related  
FGF7 Positively related  
GREM1 Positively related  
HBEGF Positively related  
IGF1 Positively related  
IL11 Positively related  
IL24 Positively related  
IL32 Positively related  
IL33 Positively related  
IL6ST Positively related  
INHBA Positively related  
INHBB Positively related  
KITLG Positively related  
KL Positively related  
LIF Positively related  
LTBP2 Positively related  
NAMPT Positively related  
NGF Positively related  
CCN3 Positively related  
NRG1 Positively related  
OGN Positively related  
OSM Positively related  
OSTN Positively related  
PDGFB Positively related  
PDGFC Positively related  
PDGFD Positively related  
PGF Positively related  
PMCH Positively related  
PTHLH Positively related  
RABEP1 Positively related  
SCG2 Positively related  
SPP1 Positively related  
STC2 Positively related  
TGFB2 Positively related  
TGFB3 Positively related  
TNFRSF11B Positively related  
TNFSF12 Positively related  
TNFSF13B Positively related  
TNFSF14 Positively related  
TNFSF18 Positively related  
TNFSF8 Positively related  
UTS2B Positively related

VEGFC Positively related  
ACVRL1 Positively related  
ADCYAP1R1 Positively related  
ANGPTL1 Positively related  
ANGPTL2 Positively related  
APLNR Positively related  
AVPR1A Positively related  
BMPR2 Positively related  
C3AR1 Positively related  
CALCRL Positively related  
CRLF2 Positively related  
CSF1R Positively related  
CSF2RA Positively related  
CSF2RB Positively related  
CSF3R Positively related  
ENG Positively related  
FGFR1 Positively related  
FLT1 Positively related  
FLT4 Positively related  
GHR Positively related  
GLP2R Positively related  
IGF2R Positively related  
IL10RA Positively related  
IL13RA2 Positively related  
IL15RA Positively related  
IL2RB Positively related  
IL18R1 Positively related  
IL18RAP Positively related  
IL1R1 Positively related  
IL1R2 Positively related  
IL1RL1 Positively related  
IL2RA Positively related  
IL3RA Positively related  
KDR Positively related  
LIFR Positively related  
MCHR1 Positively related  
NPR1 Positively related  
NPR3 Positively related  
NR2F1 Positively related  
NR3C1 Positively related  
NR4A1 Positively related  
NR4A2 Positively related  
NR4A3 Positively related  
NR5A2 Positively related

NRP1 Positively related  
NRP2 Positively related  
OSMR Positively related  
PGR Positively related  
PTGER2 Positively related  
PTGER3 Positively related  
PTGFR Positively related  
PTH1R Positively related  
RORA Positively related  
RXRG Positively related  
S1PR1 Positively related  
S1PR2 Positively related  
SDC2 Positively related  
SSTR1 Positively related  
SSTR2 Positively related  
TACR1 Positively related  
TEK Positively related  
TGFB1 Positively related  
TGFB2 Positively related  
TIE1 Positively related  
TNFRSF10C Positively related  
TNFRSF10D Positively related  
TNFRSF12A Positively related  
TNFRSF19 Positively related  
TNFRSF1B Positively related  
TNFRSF4 Positively related  
TNFRSF9 Positively related  
ICAM2 Positively related  
ITGAL Positively related  
ITGB2 Positively related  
TYROBP Positively related  
FCGR3A Positively related  
FCGR3B Positively related  
LCP2 Positively related  
FYN Positively related  
SHC1 Positively related  
CD48 Positively related  
SH2D1A Positively related  
FAS Positively related  
GZMB Positively related  
PRF1 Positively related  
PTPRC Positively related  
ITK Positively related  
GRAP2 Positively related



CD28 Positively related  
ICOS Positively related  
RASGRP1 Positively related  
TRAC Positively related  
TRAJ53 Positively related  
TRAV12-3 Positively related  
TRBV7-3 Positively related  
TRBV7-9 Positively related  
TRBV12-3 Positively related  
TRBV12-4 Positively related  
TRBV20-1 Positively related  
SEM1 Negatively related  
RFXANK Negatively related  
TRPC4AP Negatively related  
S100P Negatively related  
DEFB126 Negatively related  
S100A5 Negatively related  
LMBR1L Negatively related  
WFIKKN1 Negatively related  
WFDC2 Negatively related  
FABP6 Negatively related  
IRF3 Negatively related  
DUOX1 Negatively related  
APOBEC3F Negatively related  
TFR2 Negatively related  
PRDX2 Negatively related  
TKFC Negatively related  
SRC Negatively related  
SYTL1 Negatively related  
PPP4C Negatively related  
HDAC1 Negatively related  
SLC29A3 Negatively related  
OAS1 Negatively related  
AGER Negatively related  
UNC93B1 Negatively related  
CDH1 Negatively related  
GRK2 Negatively related  
BLNK Negatively related  
VAV3 Negatively related  
CHP2 Negatively related  
CARD11 Negatively related  
NFKBIB Negatively related  
PIK3R2 Negatively related  
PTPN6 Negatively related

SEMA3F Negatively related  
SEMA4A Negatively related  
PLXNB1 Negatively related  
CGB7 Negatively related  
CORT Negatively related  
CTF1 Negatively related  
FAM3B Negatively related  
NTF4 Negatively related  
RABEP2 Negatively related  
AIMP1 Negatively related  
ACVR2A Negatively related  
ESRRA Negatively related  
FGFR2 Negatively related  
FGFR3 Negatively related  
GIPR Negatively related  
IL20RA Negatively related  
NR2F6 Negatively related  
RARG Negatively related  
RXRA Negatively related  
SDC1 Negatively related  
THRB Negatively related  
TNFRSF14 Negatively related  
TNFRSF25 Negatively related  
VIPR1 Negatively related  
PAK4 Negatively related  
CBLC Negatively related

**Table S1** Correlation analysis between STC1 expression and gene markers of immune cells in bladder cancer.

Description	Gene markers	TCGA	
		Correlation Coefficient	P value
T cell -general	CD3D	0.2	<0.001
	CD3E	0.25	<0.001
	CD2	0.23	<0.001
	CD7	0.23	<0.001
CD8+ T cell	CD8A	0.28	<0.001
	CD8B	0.23	<0.001
	CCR7	-0.052	0.3
	CD45R	0.37	<0.001
CD4+ T cell	CD4	0.3	<0.001
	IL7RA	0.45	<0.001
	BTLA	0.23	<0.001
	PDCD1	0.25	<0.001
Th1 cell	STAT1	0.26	<0.001
	STAT4	0.31	<0.001
	CXCR3	0.22	<0.001
	CCR5	0.28	<0.001
Th2 cell	STAT6	-0.13	0.007
	GATA3	-0.28	<0.001
	CXCR6	0.23	<0.001
	CCR3	0.13	0.012
Th17 cell	STAT3	0.32	<0.001
	IL17A	0.081	0.1

	IL17RA	0.11	<b>0.022</b>
	IL23A	-0.022	0.66
Treg cell	FOXP3	0.28	<b>&lt;0.001</b>
	TGFB	0.26	<b>&lt;0.001</b>
	ITGA4	0.46	<b>&lt;0.001</b>
	CCR8	0.35	<b>&lt;0.001</b>
Tfh cell	BCL6	-0.074	0.14
	CXCR5	0.021	0.67
	CD84	0.33	<b>&lt;0.001</b>
	CD83	0.26	<b>&lt;0.001</b>
B cell	CD19	0.071	0.16
	CD20	0.18	<b>&lt;0.001</b>
	CD79A	0.18	<b>&lt;0.001</b>
	CD79B	0.25	<b>&lt;0.001</b>
M1 macrophage	FCGR3A	0.37	<b>&lt;0.001</b>
	CD86	0.34	<b>&lt;0.001</b>
	NOS2	0.2	<b>&lt;0.001</b>
M2 macrophage	CD163	0.39	<b>&lt;0.001</b>
	VSIG4	0.4	<b>&lt;0.001</b>
	ARG1	-0.059	0.24
Tumor associated macrophage	IL10	0.43	<b>&lt;0.001</b>
	CD206	0.41	<b>&lt;0.001</b>
	CCL2	0.44	<b>&lt;0.001</b>
	CCL5	0.26	<b>&lt;0.001</b>
Neutrophil	CD11b	0.36	<b>&lt;0.001</b>

	CD66b	0.032	0.52
	CXCR1	0.38	<b>&lt;0.001</b>
	CXCR2	-0.082	0.1
Dendritic cell	TLR7	0.22	<b>&lt;0.001</b>
	HLA-DPB1	0.29	<b>&lt;0.001</b>
	CD1c	0.17	<b>&lt;0.001</b>
	CD1e	0.1	<b>0.035</b>

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Supplementary 1. Detailed clinical information of patients with BLCA.

Supplementary 2. Immunohistochemistry results of STC1 in tissue microarray.

Supplementary 3. Immunohistochemistry results of PDL1 in tissue microarray.

Supplementary 4. Immunohistochemistry results of CD3 in tissue microarray.

Supplementary 5. List of correlated immune genes that associated with STC1 in TCGA.

Table S1. Correlation analysis between STC1 expression and gene markers of immune cells in bladder cancer.