Supplementary Tables

Supplementary Table 1: Tumor tissue-microarray metadata. Abbreviations: bladder cancer (BlC), colorectal cancer (CRC), head and neck squamous cell carcinomas (HNSCC), melanoma (Mel), breast cancer (BrC), non-small cell lung cancer (NSCLC), and ovarian cancer (OvC).

Core index	Tissue type	Tumor	Patient number	PD-L1 status
1	BlC	1	1	high
2	BlC	1	1	high
3	BlC	1	1	high
4	BlC	0	1	low
5	BlC	0	1	NaN
6	BlC	1	2	high
7	BlC	1	2	high
8	BlC	1	2	high
9	BlC	1	3	NaN
10	BlC	1	3	low
11	BlC	1	5	low
12	BlC	1	5	low
13	BlC	0	4	low
14	BlC	0	4	low
15	BlC	1	4	low
16	BlC	1	4	low
17	BlC	1	4	low
18	BlC	0	3	low
19	BlC	0	3	low
20	BlC	1	3	low
21	BlC	1	5	low
22	CRC	1	1	low
23	CRC	1	1	low
24	CRC	1	1	low
25	CRC	0	1	low
26	CRC	0	1	low
27	CRC	1	2	low
28	CRC	1	2	low

29	CRC	1	2	low
30	CRC	0	2	low
31	CRC	0	4	low
32	CRC	1	4	low
33	CRC	1	4	low
34	CRC	1	4	low
35	CRC	0	3	NaN
36	CRC	0	3	low
37	CRC	1	3	high
38	CRC	1	3	low
39	CRC	1	3	high
40	CRC	0	2	low
41	CRC	0	4	high
42	CRC	1	5	high
43	CRC	1	5	high
44	CRC	1	5	high
45	CRC	0	5	high
46	CRC	0	5	high
47	CRC	1	6	high
48	CRC	1	6	high
49	CRC	1	6	high
50	HNSCC	1	1	high
51	HNSCC	1	3	high
52	HNSCC	0	2	high
53	HNSCC	0	2	low
54	HNSCC	1	2	low
55	HNSCC	1	2	high
56	HNSCC	1	2	high
57	HNSCC	0	1	high
58	HNSCC	0	1	high
59	HNSCC	1	1	low
60	HNSCC	1	1	high
61	HNSCC	1	3	low
62	HNSCC	1	3	high

63	HNSCC	0	3	low
64	HNSCC	0	3	high
65	HNSCC	1	4	low
66	HNSCC	1	4	high
67	HNSCC	1	4	low
68	HNSCC	0	4	low
69	HNSCC	0	4	high
70	HNSCC	1	5	high
71	Mel	1	2	high
72	Mel	0	1	low
73	Mel	0	1	low
74	Mel	1	1	low
75	Mel	1	1	low
76	Mel	1	1	low
77	HNSCC	0	5	NaN
78	HNSCC	0	5	low
79	HNSCC	1	5	high
80	HNSCC	1	5	low
81	Mel	1	2	low
82	Mel	1	2	high
83	Mel	0	2	high
84	Mel	0	2	high
85	Mel	1	3	high
86	Mel	1	3	low
87	Mel	1	3	NaN
88	Mel	1	4	low
89	Mel	1	4	low
90	Mel	1	4	low
91	BrC	1	3	high
92	BrC	1	3	high
93	BrC	0	2	high
94	BrC	0	2	high
95	BrC	1	2	high
96	BrC	1	2	high

97	BrC	1	2	low
98	BrC	1	1	low
99	BrC	1	1	low
100	BrC	1	1	low
101	BrC	1	3	high
102	BrC	0	3	high
103	BrC	0	3	low
104	BrC	1	4	low
105	BrC	1	4	low
106	BrC	1	4	low
107	BrC	0	4	low
108	BrC	0	4	NaN
109	NSCLC	1	1	NaN
110	NSCLC	1	1	low
111	NSCLC	1	3	high
112	NSCLC	1	3	high
113	NSCLC	0	2	high
114	NSCLC	0	2	high
115	NSCLC	1	2	high
116	NSCLC	1	2	high
117	NSCLC	1	2	high
118	NSCLC	0	1	high
119	NSCLC	0	1	high
120	NSCLC	1	1	high
121	NSCLC	1	3	high
122	NSCLC	0	3	high
123	NSCLC	0	3	low
124	NSCLC	1	4	low
125	NSCLC	1	4	low
126	NSCLC	1	4	low
127	NSCLC	0	4	high
128	NSCLC	0	4	high
129	NSCLC	1	5	high
130	NSCLC	1	5	low

131	OvC	1	1	low
132	OvC	1	1	low
133	NSCLC	0	4	high
134	NSCLC	0	4	high
135	NSCLC	1	4	low
136	NSCLC	1	3	low
137	NSCLC	1	3	low
138	NSCLC	0	3	high
139	NSCLC	0	4	high
140	NSCLC	1	4	high
141	OvC	1	4	low
142	OvC	1	1	low
143	OvC	1	5	low
144	OvC	1	5	high
145	OvC	1	5	low
146	OvC	1	5	low
147	OvC	1	5	low
148	OvC	1	6	high
149	OvC	1	6	high
150	OvC	1	6	high
151	Tonsil	0	1	high
152	Tonsil	0	1	high
153	OvC	1	6	high
154	OvC	1	6	low
155	OvC	1	6	high
156	OvC	0	5	high
157	OvC	0	5	low
158	OvC	1	5	low
159	OvC	1	5	high
160	OvC	1	5	high
161	Tonsil	0	1	high
162	Tonsil	0	2	low
163	Tonsil	0	2	low
164	Tonsil	0	2	high

165	Tonsil	0	3	high
166	Tonsil	0	3	low
167	Tonsil	0	3	low
168	Lymph node	0	1	high
169	Lymph node	0	1	high
170	Lymph node	0	1	high

Supplementary Table 2: Normal tissue-microarray metadata.

Core index	Tissue type
1,2,3	Pancreas
4,5,6	Prostate
7,8	Renal
9,10	Bladder
11,12	Ovary
13,14,15	Lung
16,17,18	Colon
19,20,21	Kidney
22,23,24	Heart
25,26,27	Tonsil
28,29,30	Liver
31,32,33	Spleen
34,35,36	Lymph node
37,38,39	Thyroid
40,41,42	Breast
43,44,45	Skin

Supplementary Table 3: Gene panel of test iST platforms.

Xenium breast	Xenium lung	Xenium multi-tissue	MERSCOPE breast	MERSCOPE lung	CosMx 1k
ABCC11	ACE	ABCC11	ABCC11	ABCC2	AATK
ACTA2	ACE2	ACE2	ADAM9	ACKR1	ABL1
ACTG2	ACKR1	ACKR1	ADGRE5	AGER	ABL2
ADAM9	ADAM17	ACTA2	ADH1B	AGR3	ACACB

ADGRE5	ADAM28	ACTG2	ADIPOQ	AIF1	ACE
ADH1B	ADAMTS1	ADAM28	AGR3	AKR1B10	ACKR1
ADIPOQ	ADGRL4	ADAMTS1	AIF1	AKR1C1	ACKR3
AGR3	AGER	ADGRE1	AKR1C1	AKR1C2	ACKR4
AIF1	AGR3	ADGRL4	AKR1C3	ANKRD28	ACP5
AKR1C1	AIF1	ADH1C	ALDH1A3	ASCL1	ACTA2
AKR1C3	ANPEP	ADH4	ANGPT2	ATF3	ACTG2
ALDH1A3	APOD	ADIPOQ	ANKRD28	ATF4	ACVR1
ANGPT2	APOLD1	AGER	ANKRD29	ATF6	ACVR1B
ANKRD28	AQP9	AGR3	ANKRD30A	ATG7	ACVR2A
ANKRD29	AREG	AHSP	APOBEC3A	ATP2A3	ACVRL1
ANKRD30A	ARL14	AIF1	APOBEC3B	AXL	ADGRA2
APOBEC3A	ASCL1	ALAS2	APOC1	BANK1	ADGRA3
APOBEC3B	ASCL2	ALDH1A3	AQP1	BAX	ADGRE2
APOC1	ASCL3	AMY2A	AR	BCL2	ADGRE5
AQP1	ATP1B1	ANGPT2	AVPR1A	BCL2L1	ADGRF1
AQP3	BAIAP2L1	ANPEP	BACE2	BCL2L11	ADGRF3
AR	BANK1	APCDD1	BANK1	BPIFA1	ADGRF5
AVPR1A	BCAS1	APOA5	BASP1	C1QC	ADGRG1
BACE2	BMX	APOBEC3A	C15orf48	C20orf85	ADGRG3
BANK1	CA4	APOLD1	C1QA	CCL5	ADGRG5
BASP1	CCDC78	AQP2	C1QC	CCNA1	ADGRG6
C15orf48	CCNA1	AQP3	C2orf42	CCNB2	ADGRL1
C1QA	CCNB2	AQP8	C5orf46	CCR7	ADGRL2
C1QC	CCR7	AQP9	C6orf132	CD14	ADGRL4
C2orf42	CD14	AR	CAV1	CD19	ADGRV1
C5orf46	CD163	ARFGEF3	CAVIN2	CD1A	ADIPOQ
C6orf132	CD19	ASCL1	CCDC6	CD1C	ADIRF
CAV1	CD1A	ASCL3	CCDC80	CD2	ADM2
CAVIN2	CD1C	ASPN	CCL5	CD247	AGR2
CCDC6	CD2	BAMBI	CCL8	CD27	AHI1
CCDC80	CD24	BANK1	CCND1	CD274	AHR
CCL5	CD247	BASP1	CCPG1	CD28	AIF1
CCL8	CD27	BBOX1	CCR7	CD3D	AKT1

CCND1	CD274	BCL2L11	CD14	CD3G	ALCAM
CCPG1	CD28	BMX	CD163	CD4	ALOX5AP
CCR7	CD300E	BTNL9	CD19	CD44	ANGPT1
CD14	CD34	C15orf48	CD247	CD52	ANGPT2
CD163	CD38	C1orf162	CD27	CD68	ANGPTL1
CD19	CD3D	C1orf194	CD274	CD69	ANKRD1
CD247	CD3E	C20orf85	CD3E	CD79A	ANXA1
CD27	CD4	C5orf46	CD3G	CD79B	ANXA2
CD274	CD40	C6orf118	CD4	CD86	ANXA4
CD3E	CD40LG	C7	CD68	CD8A	APOA1
CD3G	CD68	CA4	CD69	CD8B	APOC1
CD4	CD70	CAPN8	CD79A	CDH26	APOD
CD68	CD79A	CAV1	CD79B	CDK1	APOE
CD69	CD80	CAVIN1	CD80	CENPF	APP
CD79A	CD86	CAVIN2	CD83	CFTR	AQP3
CD79B	CD8A	CCDC39	CD86	CGA	AR
CD80	CD8B	CCDC78	CD8A	CHAC1	AREG
CD83	CDH1	CCL19	CD9	CHGB	ARF1
CD86	CDK1	CCL27	CD93	CLDN5	ARG1
CD8A	CENPF	CCL5	CDC42EP1	CPA3	ARHGDIB
CD9	CFB	CCNB2	CDH1	CREB3L4	ARID5B
CD93	CFTR	CCR2	CEACAM6	CRELD2	ATF3
CDC42EP1	CHIT1	CCR7	CEACAM8	CTLA4	ATG10
CDH1	CLDN5	CD14	CENPF	CTNNB1	ATG12
CEACAM6	CLEC10A	CD163	CLEC14A	CXCL13	ATG5
CEACAM8	CLEC12A	CD19	CLEC9A	CXCL14	ATM
CENPF	CLEC4E	CD1A	CLECL1	CXCL9	ATP5F1B
CLEC14A	CNN1	CD1C	CLIC6	CXCR4	ATP5F1E
CLEC9A	COL5A2	CD1E	CPA3	CXCR5	ATR
CLECL1	COL8A1	CD2	CRISPLD2	DCN	AXL
CLIC6	CP	CD247	CTH	DCTPP1	AZGP1
CPA3	CSPG4	CD27	CTLA4	DDIT3	AZU1
CRISPLD2	CSTA	CD274	CTSG	DERL3	B2M
CTH	CTLA4	CD28	CTTN	DIRAS3	B3GNT7

CTLA4	CTSL	CD300E	CX3CR1	DMBT1	BAG3
CTSG	CTTN	CD34	CXCL12	DNAJB9	BASP1
CTTN	CXCL10	CD3D	CXCL16	DUOX1	BAX
CX3CR1	CXCL13	CD3E	CXCL5	EGFR	BBLN
CXCL12	CXCL5	CD4	CXCR4	EHMT1	BCL2
CXCL16	CXCL6	CD5L	CYTIP	EMG1	BCL2L1
CXCL5	CXCL9	CD68	DAPK3	EPCAM	BECN1
CXCR4	CXCR5	CD69	DNAAF1	EREG	BEST1
CYTIP	CXCR6	CD70	DNTTIP1	ERLEC1	BGN
DAPK3	CYP2F1	CD79A	DPT	ERN2	BID
DMKN	DAPK2	CD83	DSC2	FAS	BIRC3
DNAAF1	DCLK1	CD86	DSP	FASLG	BIRC5
DNTTIP1	DES	CD8A	DST	FCER1A	BMP1
DPT	DGKG	CD93	DUSP2	FCER1G	BMP2
DSC2	DIRAS3	CDH16	DUSP5	FCGBP	BMP3
DSP	DMBT1	CDK1	EGFL7	FCGR3A	BMP4
DST	DNAJB9	CENPF	EGFR	FCN1	BMP5
DUSP2	DPP6	CFAP53	EIF4EBP1	FCN3	BMP7
DUSP5	DUOX1	CFB	ENAH	FGFBP2	BMPR1A
EGFL7	ECSCR	CFHR1	EPCAM	FKBP11	BMPR2
EGFR	EGFR	CFHR3	ERBB2	FOXP3	BRAF
EIF4EBP1	EHF	CFTR	ERN1	GCLM	BRCA1
ENAH	ELF3	CHGA	ESM1	GKN2	BST1
EPCAM	ENAH	CLCA1	ESR1	GNG11	BST2
ERBB2	EPCAM	CLCA2	FAM107B	GNLY	BTF3
ERN1	ETV5	CLEC10A	FASN	GPR183	BTG1
ESM1	F3	CLEC14A	FBLN1	GSR	BTK
ESR1	FABP3	CLEC4E	FCER1A	GZMA	C11orf96
FAM107B	FAM184A	CLECL1	FCER1G	GZMB	C1QA
FAM49A	FAS	CLIC6	FCGR3A	GZMK	C1QB
FASN	FASLG	CNN1	FGL2	HAVCR2	C1QC
FBLN1	FASN	COCH	FLNB	HERPUD1	C5AR2
FCER1A	FBN1	COL17A1	FOXA1	HLA-DQA1	CACNA1C
FCER1G	FCER1A	COL5A2	FOXC2	HLA-DQB1	CALB1

FCGR3A	FCGR1A	CPA3	FOXP3	HMGA1	CALD1
FGL2	FCGR3A	CRHBP	FSTL3	HMOX1	CALM1
FLNB	FCMR	CRISPLD2	GATA3	HSPA5	CALM2
FOXA1	FCN1	CSF2RA	GJB2	HYOU1	CALM3
FOXC2	FCN3	CSF3	GLIPR1	ICAM1	CAMP
FOXP3	FGFBP2	CTLA4	GNLY	IDH1	CARMN
FSTL3	FGFR4	CTSG	GPR183	IFIT1	CASP3
GATA3	FKBP11	CTSK	GZMA	IFIT2	CASP8
GJB2	FOXI1	CXCL10	GZMK	IFIT3	CASR
GLIPR1	FOXJ1	CXCL2	HAVCR2	IL1A	CAV1
GNLY	FOXP3	CXCL6	HMGA1	IL2RA	CCDC80
GPR183	FSCN1	CXCL9	HOXD8	IL37	CCL11
GZMA	GJA5	CXCR4	HOXD9	IL4R	CCL13
GZMK	GKN2	CYP1A1	HPX	IL7R	CCL15
HAVCR2	GLCCI1	CYP2A7	IGF1	IRF1	CCL17
HMGA1	GLIPR2	CYP2B6	IGSF6	ISG20	CCL18
HOOK2	GNG11	CYP2F1	IL2RA	ITM2C	CCL19
HOXD8	GPI	CYP3A4	IL2RG	KDR	CCL2
HOXD9	GPR171	CYP4B1	IL3RA	KIT	CCL20
HPX	GPR183	CYTIP	IL7R	KLRB1	CCL21
IGF1	GPR34	DERL3	ITGAM	KLRC1	CCL22
IGSF6	GPX2	DES	ITGAX	KRT15	CCL26
IL2RA	GZMA	DIRAS3	ITM2C	KRT18	CCL28
IL2RG	GZMB	DMBT1	JUP	LAG3	CCL3/L1/L3
IL3RA	GZMK	DNAAF1	KDR	LEF1	CCL4/L1/L2
IL7R	HAVCR2	DNASE1L3	KIT	LGR5	CCL5
ITGAM	HIF1A	DPEP1	KLF5	LILRA4	CCL8
ITGAX	HIGD1B	DPT	KLRB1	LMAN1	CCND1
ITM2C	HMGCS1	DST	KLRC1	LTB	CCR1
JUP	HP	DUSP2	KLRD1	LTF	CCR10
KARS	HPGDS	ECSCR	KLRF1	LUM	CCR2
KDR	ICA1	EDN1	KRT23	MANF	CCR5
KIT	IGF1	EDNRB	KRT7	MARCO	CCR7
KLF5	IGFBP3	EGFL7	LAG3	MCEMP1	CCRL2

KLRB1	IL1RL1	EGFR	LDHB	MFAP5	CD14
KLRC1	IL7R	EHF	LGALSL	MGST1	CD163
KLRD1	IQGAP2	ELF5	LILRA4	MKI67	CD164
KLRF1	IRF8	EPCAM	LPL	MMP10	CD19
KRT14	ITGAM	ERBB2	LPXN	MMP12	CD1C
KRT23	ITGB4	ERG	LRRC15	MS4A1	CD2
KRT5	KCNK3	ESR1	LTB	MS4A7	CD209
KRT6B	KDR	FAS	LUM	MUC5B	CD22
KRT7	KIT	FBLN1	LY86	MYC	CD24
KRT8	KLF5	FBN1	LYPD3	MYDGF	CD27
LAG3	KLK11	FCER1A	LYZ	NAPSA	CD274
LARS	KLRB1	FCGR1A	MAP3K8	NFKB1	CD276
LDHB	KLRC1	FCGR3A	MDM2	NHSL2	CD28
LGALSL	KLRD1	FCN1	MKI67	NKG7	CD300A
LILRA4	KRT15	FCN2	MLPH	NKX2-1	CD33
LPL	KRT7	FGFBP1	MMP1	NUCB2	CD34
LPXN	LAG3	FGFBP2	MMP12	NUTF2	CD36
LRRC15	LAMC3	FGL2	MMP2	OAS2	CD37
LTB	LCK	FHL2	MMRN2	OAS3	CD38
LUM	LGALS3BP	FKBP11	MNDA	PAEP	CD3D
LY86	LGR5	FOXA1	MRC1	PCNA	CD3E
LYPD3	LGR6	FOXI1	MS4A1	PDCD1	CD3G
LYZ	LILRA4	FOXJ1	MUC6	PDIA3	CD4
MAP3K8	LILRA5	FOXP3	MYBPC1	PDIA4	CD40
MDM2	LILRB2	FSTL3	MYLK	PDIA6	CD40LG
MKI67	LILRB4	FXYD2	MYO5B	PECAM1	CD44
MLPH	LMOD1	GATA2	MZB1	PGC	CD47
MMP1	LTBP2	GATM	NCAM1	PIM2	CD48
MMP12	LTF	GCG	NDUFA4L2	PLPP5	CD52
MMP2	LYVE1	GDF15	NKG7	POSTN	CD53
MMRN2	MALL	GEM	NOSTRIN	PRDX4	CD55
MNDA	MAP7	GHRL	OCIAD2	PTPRC	CD58
MRC1	MARCO	GKN2	OPRPN	RACGAP1	CD59
MS4A1	MCEMP1	GLIPR1	OXTR	RAMP2	CD5L

MUC6	MEDAG	GLYATL1	PCLAF	RHOA	CD63
MYBPC1	MET	GNG11	PDCD1	RNASE1	CD68
MYH11	MFAP5	GNLY	PDCD1LG2	S100A12	CD69
MYLK	MIS18BP1	GPC1	PDE4A	SAA2	CD70
MYO5B	MKI67	GPC3	PDGFRA	SCG2	CD74
MZB1	MMP12	GPR183	PDGFRB	SEC11C	CD79A
NARS	MMP9	GPRC5A	PDK4	SELENOS	CD80
NCAM1	MMRN1	GPX2	PECAM1	SFRP2	CD81
NDUFA4L2	MPEG1	GYPA	PELI1	SFTA2	CD83
NKG7	MS4A1	GYPB	PGR	SFTPD	CD84
NOSTRIN	MS4A2	GZMA	PIM1	SLC1A3	CD86
OCIAD2	MS4A4A	GZMB	PLD4	SLC25A37	CD8A
OPRPN	MTUS1	GZMK	POSTN	SLC25A4	CD8B
OXTR	MUC1	HAMP	PPARG	SLC2A1	CD9
PCLAF	MUC5B	HAVCR2	PRDM1	SLC7A11	CD93
PDCD1	MYC	HEMGN	PRF1	SMAD4	CDH1
PDCD1LG2	MYH11	HEPACAM2	PTN	SNAI1	CDH11
PDE4A	MYO6	HES4	PTPRC	SNAI2	CDH19
PDGFRA	MZB1	HIGD1B	PTRHD1	SNCA	CDH5
PDGFRB	NCEH1	HLA-DQB2	RAB30	SOD2	CDKN1A
PDK4	NFKB1	HMGCS2	RAMP2	SOX9	CDKN3
PECAM1	NID1	HPGDS	RAPGEF3	SPARCL1	CEACAM1
PELI1	NKG7	HPX	RHOH	SPCS2	CEACAM6
PGR	NTN4	IGF1	RORC	SPCS3	CELSR1
PIGR	NTRK2	IGSF6	RTKN2	SSR3	CELSR2
PIM1	OTUD7B	IL1R2	RUNX1	STAT1	CENPF
PLD4	P2RX1	IL1RL1	SCD	STAT6	CFD
POSTN	PAMR1	IL2RA	SCGB2A1	TCL1A	CFLAR
PPARG	PCNA	IL3RA	SDC4	TGFB1	CHEK1
PRDM1	PCOLCE2	IL7R	SEC11C	TNFRSF13C	CHEK2
PRF1	PDCD1	INMT	SEC24A	TNFRSF17	CHI3L1
PTGDS	PDCD1LG2	INS	SELL	TNFRSF9	CIDEA
PTN	PDGFRA	IRF8	SERPINB9	TOP1	CIITA
PTPRC	PDGFRB	KCNK3	SFRP1	TOP2A	CLCF1

PTRHD1	PDPN	KCNMA1	SFRP4	TP63	CLDN4
QARS	PEBP4	KIT	SH3YL1	TRAC	CLEC10A
RAB30	PI3	KLK11	SLAMF1	TTC19	CLEC12A
RAMP2	PIM1	KLRB1	SLAMF7	UBE2J1	CLEC14A
RAPGEF3	PIM2	KLRC1	SLC25A37	UBE2S	CLEC1A
RHOH	PLA2G2A	KLRD1	SLC5A6	UCHL3	CLEC2B
RORC	PLA2G4F	KNG1	SMAP2	UGDH	CLEC2D
RTKN2	PLA2G7	KRT20	SMS	UQCRHL	CLEC4A
RUNX1	PLN	KRT7	SNAI1	VEGFA	CLEC4D
S100A14	PLVAP	LAG3	SOX17	VPREB3	CLEC4E
S100A4	POU2AF1	LAMP3	SOX18	WFDC2	CLEC5A
S100A8	PROX1	LGI4	SPIB	ZEB1	CLEC7A
SCD	PTGS1	LGR5	SQLE		CLOCK
SCGB2A1	RAMP2	LIF	SRPK1		CLU
SDC4	RARRES1	LILRA4	SSTR2		CMKLR1
SEC11C	RBP4	LILRA5	STC1		CNTFR
SEC24A	RERGL	LILRB2	SVIL		COL11A1
SELL	RETN	LILRB4	TAC1		COL12A1
SERHL2	RGS5	LPL	TACSTD2		COL14A1
SERPINA3	RND1	LTBP2	TCEAL7		COL15A1
SERPINB9	RUNX3	LY6D	TCF4		COL16A1
SFRP1	S100A12	LY86	TCF7		COL17A1
SFRP4	S100A7	LYVE1	TCIM		COL18A1
SH3YL1	S100B	MALL	TCL1A		COL1A1
SLAMF1	SAMD3	MAMDC2	TENT5C		COL1A2
SLAMF7	SCEL	MARCO	TFAP2A		COL21A1
SLC25A37	SEC11C	MCEMP1	THAP2		COL27A1
SLC5A6	SELE	MCF2L	TIFA		COL3A1
SMAP2	SELL	MDM2	TIGIT		COL4A1
SMS	SELP	MEDAG	TIMP4		COL4A2
SNAI1	SEMA3B	MEF2C	TMEM147		COL4A5
SOX17	SEMA3C	MEST	TNFRSF17		COL5A1
SOX18	SERPINA3	MET	TOMM7		COL5A2
SPIB	SFRP2	MFAP5	TOP2A		COL5A3

SQLE	SFTA2	MKI67	TPD52	COL6A1
SRPK1	SFTPD	MLANA	TRAC	COL6A2
SSTR2	SHANK3	MLPH	TRAPPC3	COL6A3
STC1	SLC15A2	MMRN1	TRIB1	COL8A1
SVIL	SLC18A2	MMRN2	TUBA4A	COL9A2
TAC1	SLC1A3	MNDA	TUBB2B	COL9A3
TACSTD2	SLC2A1	MPEG1	UCP1	COTL1
TCEAL7	SLC7A11	MRC1	USP53	COX4I2
TCF4	SLIT3	MS4A1	VOPP1	CPA3
TCF7	SMIM24	MS4A2	VWF	CPB1
TCIM	SOX2	MS4A4A	ZEB1	CRIP1
TCL1A	SOX9	MS4A6A	ZEB2	CRP
TENT5C	SPDEF	MTRNR2L11	ZNF562	CRYAB
TFAP2A	SPIB	MYBPC1		CSF1
THAP2	STAT4	MYC		CSF1R
TIFA	STC1	MYH11		CSF2
TIGIT	STEAP4	MYLK		CSF2RA
TIMP4	SVEP1	MZB1		CSF2RB
TMEM147	SYK	NAT8		CSF3
TNFRSF17	TACSTD2	NKG7		CSF3R
TOMM7	TC2N	NPDC1		CSHL1
TOP2A	TCL1A	NTN4		CSK
TPD52	THBS2	OGN		CSPG4
TPSAB1	THY1	OPRPN		CST7
TRAC	TM4SF18	PCNA		CSTB
TRAF4	TM4SF4	PCOLCE		CTLA4
TRAPPC3	TMC5	PCP4		CTNNB1
TRIB1	TMEM100	PCSK2		CTSD
TUBA4A	TMPRSS2	PDCD1		CTSG
TUBB2B	TNFRSF13B	PDGFRA		CTSW
UCP1	TNFRSF13C	PDGFRB		CUZD1
USP53	TNFRSF17	PDPN		CX3CL1
VOPP1	TNFRSF18	PEBP4		CX3CR1
VWF	TOP2A	PECAM1		CXCL1/2/3

WARS	TP63	PGR	CXCL10
ZEB1	TP73	PLA2G7	CXCL12
ZEB2	TREM2	PLAC9	CXCL13
ZNF562	TRPC6	PLCG2	CXCL14
	TSPAN8	PLD4	CXCL16
	UBE2C	PLIN4	CXCL17
	UPK1B	PMP22	CXCL5
	UPK3B	PPARG	CXCL8
	VSIG4	PPP1R1A	CXCL9
	VWF	PPP1R1B	CXCR1
	WFS1	PPY	CXCR2
	WNT2	PRDM1	CXCR3
	WT1	PRF1	CXCR4
		PRG4	CXCR5
		PROX1	CXCR6
		PTGDS	CYP1B1
		PTN	CYP2U1
		PTPRC	CYSTM1
		PVALB	CYTOR
		RAMP2	DCN
		RAPGEF3	DDC
		RBP5	DDIT3
		RERGL	DDR1
		RETN	DDR2
		RGS16	DDX58
		RIDA	DHRS2
		RND1	DLL1
		RTKN2	DLL4
		S100A1	DMBT1
		S100A12	DNMT1
		SCGB2A1	DNMT3A
		SCGN	DPP4
		SELE	DPT
		SELL	DST

SEMA3C	DUSP1
SERPINB2	DUSP2
SERPINB3	DUSP4
SERPINB9	DUSP5
SFRP2	DUSP6
SFRP4	EFNA1
SFTA2	EFNA4
SH2D3C	EFNA5
SLAMF1	EFNB1
SLAMF7	EFNB2
SLC18A2	EGF
SLC22A8	EGFR
SLC26A2	EIF5A/L1
SLC26A3	ELANE
SLC4A1	EMP3
SMIM24	ENG
SMYD2	ENO1
SNAI1	ENTPD1
SNCA	EOMES
SNCG	EPCAM
SNTN	EPHA2
SOX17	EPHA3
SOX18	EPHA4
SOX2	EPHA7
SPDEF	EPHB2
SPI1	EPHB3
SPIB	EPHB4
SRPX	EPHB6
SST	EPOR
STC1	ERBB2
STC2	ERBB3
STEAP4	ESAM
TAC1	ESR1
TAT	ETS1

TBX3	ETV4
TCF15	ETV5
TCF4	EZH2
TCIM	EZR
TCL1A	FABP4
TENT5C	FABP5
TFF2	FAM30A
TFPI	FAP
THAP2	FAS
THBS2	FASLG
THY1	FASN
TIMP4	FAU
TM4SF18	FCER1G
TM4SF4	FCGBP
TMC5	FCGR3A/B
TMEM100	FCRLA
TMEM174	FES
TMEM52B	FFAR2
TNC	FFAR3
TNFRSF13B	FFAR4
TNFRSF17	FGF1
TNFRSF9	FGF12
TOP2A	FGF13
TRAC	FGF18
TREM2	FGF2
TSPAN19	FGF7
UBE2C	FGF9
UMOD	FGFR1
UPK3B	FGFR2
VCAN	FGFR3
VSIG4	FGG
VWA5A	FGR
VWF	FHIT
	FKBP11

FKBP5
FLT1
FLT3LG
FN1
FOS
FOXF1
FOXP3
FPR1
FYB1
FYN
FZD1
FZD3
FZD4
FZD5
FZD6
FZD7
FZD8
G0S2
G6PD
GADD45B
GAS6
GATA3
GC
GCG
GDF15
GLUD1
GLUL
GNLY
GPBAR1
GPER1
GPNMB
GPR183
GPX1
GPX3

GSK3B
GSN
GSTP1
GZMA
GZMB
GZMH
GZMK
H2AZ1
H4C3
HAVCR2
HBA1/2
HBB
HCAR2/3
HCK
HCST
HDAC1
HDAC11
HDAC3
HDAC4
HDAC5
HEXB
HEY1
HGF
HIF1A
HILPDA
HLA-DPA1
HLA-DPB1
HLA-DQA1
HLA-DQB1/2
HLA-DRA
HLA-DRB
HMGB2
HMGCS1
HMGN2

HPGDS
HSD17B2
HSP90AA1
HSP90AB1
HSP90B1
HSPA1A/B
HSPB1
HSPG2
HTT
IAPP
ICA1
ICAM1
ICAM2
ICAM3
ICOS
ICOSLG
IDO1
IER3
IFI27
IFI44L
IFI6
IFIH1
IFIT1
IFIT3
IFITM1
IFITM3
IFNA1/13
IFNAR1
IFNAR2
IFNG
IFNGR1
IFNGR2
IFNL2/3
IGF1

IGF1R
IGF2
IGF2R
IGFBP3
IGFBP5
IGFBP6
IGFBP7
IGHA1
IGHD
IGHG1
IGHG2
IGHM
IGKC
IKZF3
IL10
IL10RA
IL10RB
IL11
IL11RA
IL12A
IL12B
IL12RB1
IL12RB2
IL13RA1
IL15
IL15RA
IL16
IL17A
IL17B
IL17D
IL17RA
IL17RB
IL17RE
IL18

IL18R1
IL1A
IL1B
IL1R1
IL1R2
IL1RAP
IL1RL1
IL1RN
IL2
IL20
IL20RA
IL22RA1
IL23A
IL24
IL27RA
IL2RA
IL2RB
IL2RG
IL32
IL33
IL34
IL36G
IL3RA
IL4R
IL6
IL6R
IL6ST
IL7
IL7R
INHA
INHBA
INHBB
INS
INSIG1

INSR
IRF3
IRF4
ISG15
ITGA1
ITGA2
ITGA3
ITGA5
ITGA6
ITGA8
ITGA9
ITGAE
ITGAL
ITGAM
ITGAV
ITGAX
ITGB1
ITGB2
ITGB4
ITGB5
ITGB6
ITGB8
ITK
ITM2A
ITM2B
JAG1
JAK1
JAK2
JCHAIN
JUN
JUNB
KDR
KIT
KITLG

KLF2
KLK3
KLRB1
KLRF1
KLRK1
KRAS
KRT1
KRT10
KRT13
KRT14
KRT15
KRT16
KRT17
KRT18
KRT19
KRT20
KRT23
KRT4
KRT5
KRT6A/B/C
KRT7
KRT8
KRT80
KRT86
LAG3
LAIR1
LAMA4
LAMP2
LAMP3
LCN2
LDB2
LDHA
LDLR
LEFTY1

LEP
LGALS1
LGALS3
LGALS3BP
LGALS9
LGR5
LIF
LIFR
LINC01781
LINC01857
LINC02446
LMNA
LPAR5
LTB
LTBR
LTF
LUM
LY6D
LY75
LYN
LYVE1
LYZ
MAF
MALAT1
MAML2
MAP1LC3B/2
MAP2K1
MAPK13
MAPK14
MARCKSL1
MARCO
MB
MECOM
MEG3

MERTK
MET
MFAP5
MGP
MHC I
MIF
MIR4435-2HG
MKI67
MMP1
MMP12
MMP14
MMP19
MMP2
MMP7
MMP9
MPO
MRC1
MRC2
MS4A1
MS4A4A
MS4A6A
MSMB
MSR1
MST1R
MT1X
MT2A
MTOR
MX1
MXRA8
MYC
MYH11
MYH6
MYL12A
MYL4

MYL7
MYL9
MZB1
MZT2A/B
NACA
NANOG
NCAM1
NCR1
NDRG1
NDUFA4L2
NEAT1
NELL2
NFKB1
NFKBIA
NGFR
NKG7
NLRC4
NLRC5
NLRP1
NLRP2
NLRP3
NOD2
NOSIP
NOTCH1
NOTCH2
NOTCH3
NPPC
NPR1
NPR2
NPR3
NR1H2
NR1H3
NR2F2
NR3C1

NRG1
NRXN1
NRXN3
NTRK2
NUPR1
NUSAP1
OAS1
OAS2
OAS3
OASL
OLFM4
OLR1
OSM
OSMR
P2RX5
PARP1
PCNA
PDCD1
PDCD1LG2
PDGFA
PDGFB
PDGFC
PDGFD
PDGFRA
PDGFRB
PDS5A
PECAM1
PF4/V1
PFN1
PGF
PGK1
PGR
PHLDA2
PIGR

PLAC8
PLAC9
PLCG1
PLD3
PNOC
POU5F1
PPARA
PPARD
PPARG
PPIA
PRF1
PROX1
PRSS2
PRTN3
PSAP
PSCA
PSD3
PTEN
PTGDR2
PTGDS
PTGES
PTGES2
PTGES3
PTGIS
PTGS1
PTGS2
PTK2
PTK6
PTPRC
PTPRCAP
PTTG1
PXDN
QRFPR
RAC1

RAC2
RACK1
RAG1
RAMP1
RAMP2
RAMP3
RARA
RARB
RARG
RARRES1
RARRES2
RB1
RBM47
RBPJ
REG1A
RELA
RELT
RGCC
RGS1
RGS13
RGS2
RGS5
RNF43
ROR1
RORA
RPL21
RPL22
RPL32
RPL34
RPL37
RPS4Y1
RSPO3
RUNX3
RXRA

RXRB
RYK
RYR2
S100A10
S100A2
S100A4
S100A6
S100A8
S100A9
S100B
S100P
SAA1/2
SAT1
SCG5
SCGB3A1
SEC23A
SEC61G
SELENOP
SELL
SELPLG
SERPINA1
SERPINA3
SERPINB5
SERPINH1
SFN
SH3BGRL3
SIGIRR
SLA
SLC2A1
SLC40A1
SLCO2B1
SLPI
SMAD2
SMAD3

SMAD4
SMARCB1
SMO
SNAI1
SNAI2
SOD1
SOD2
SORBS1
SOSTDC1
SOX2
SOX4
SOX9
SPARCL1
SPINK1
SPOCK2
SPP1
SPRY2
SPRY4
SQLE
SQSTM1
SRC
SREBF1
SRGN
SRSF2
SST
ST6GAL1
ST6GALNAC3
STAT1
STAT3
STAT4
STAT5A
STAT5B
STAT6
STMN1

SYK
TACSTD2
TAGLN
TAP1
TAP2
TBX21
TCAP
TCF7
TCL1A
TEK
TFEB
TGFB1
TGFB2
TGFB3
TGFBI
TGFBR1
TGFBR2
THBS1
THBS2
THSD4
TIE1
TIGIT
TIMP1
TLR1
TLR2
TLR3
TLR4
TLR5
TLR7
TLR8
TM4SF1
TNF
TNFAIP6
TNFRSF10A

TNFRSF10B
TNFRSF10D
TNFRSF11A
TNFRSF11B
TNFRSF12A
TNFRSF13B
TNFRSF14
TNFRSF17
TNFRSF18
TNFRSF19
TNFRSF1A
TNFRSF1B
TNFRSF21
TNFRSF4
TNFRSF9
TNFSF10
TNFSF12
TNFSF13B
TNFSF14
TNFSF15
TNFSF4
TNFSF8
TNFSF9
TNNC1
TNNT2
TNXA/B
TOP2A
TOX
TP53
TPI1
TPM1
TPM2
TPSAB1/B2
TPT1

TSC22D1
TSHZ2
TTN
TTR
TUBB
TUBB4B
TWIST1
TWIST2
TXK
TYK2
TYMS
TYROBP
UBA52
UBE2C
UPK3A
VCAM1
VCAN
VEGFA
VEGFB
VEGFC
VEGFD
VHL
VIM
VPREB3
VSIR
VTN
VWA1
VWF
WIF1
WNT10B
WNT11
WNT3
WNT5A
WNT5B

WNT7A
WNT7B
WNT9A
XBP1
XCL1/2
XKR4
YBX3
YES1
ZBTB16
ZFP36

Supplementary Table 4: Metrics by each run, combination of platform, panel, and TMA.

TMA	Platform	Panel	Data collection date (Year: 2023)	Days after slicing	Cores with data	Cores with data (%)	Cell count (k)	Total transcripts (million)	Transcript per cell	Cells per 1000µm^2	Good cells (%, transcripts>10 per cell)	Good cells (%, transcripts>20 per cell)
Tumor	Xenium	Breast	May-10	6	169	97.7	399.3	46.6	116.6	7.4	97.4	92.8
	Xenium	Multi-tissue	May-25	21	159	91.9	379.5	33.8	89.2	7.2	97.1	91.7
	Xenium	Lung	Jun-16	43	149	86.1	360.8	28.2	78.2	7.1	95.1	86.7
	CosMx	1K	Jun-17	44	163	94.2	240.2	22.3	92.8	5.0	93.2	83.4
	MERSCOPE	Breast	Jul-17	74	107	61.8	232.4	13.2	56.8	6.1	68.5	57.9
	MERSCOPE	Lung	May-25	21	96	55.5	274.0	2.4	8.8	4.8	25.8	12.3
Normal	Xenium	Breast	May-10	6	48	100.0	300.9	14.7	49.0	2.2	84.0	71.5
	Xenium	Multi-tissue	May-25	21	48	100.0	292.7	11.7	39.9	2.3	84.3	68.5
	Xenium	Lung	Jun-16	43	48	100.0	252.6	8.5	33.5	2.0	77.4	58.8
	CosMx	1K	Jun-17	44	47	97.9	178.4	8.4	47.0	2.2	86.8	67.1
	MERSCOPE	Breast	Jul-17	74	38	79.2	164.0	0.2	1.5	0.2	2.4	0.6
	MERSCOPE	Lung	May-23	19	45	93.8	255.3	0.1	0.4	0.3	0.1	0.0

Supplementary Table 5: Number of genes detected two standard deviations above the average expression of the negative control probes. The max value of each tissue type was bolded.

Platform (panel) Tissue Type\	CosMx 1k	MERSCOPE breast	MERSCOPE lung	Xenium breast	Xenium lung	Xenium multi-tissue
Bladder	**246**	101	123	154	243	208
BrC	**526**	138	90	265	271	346
Breast	**431**	98	91	230	270	347
CRC	**503**	154	122	252	274	343
Colon	241	101	74	210	267	**311**
HNSCC	**394**	130	107	257	235	332
Heart	218	29	46	162	185	**243**
Kidney	165	155	118	272	276	**359**
Liver	192	112	91	246	272	**346**
Lung	170	27	41	228	276	**325**
Lymph node	197	85	53	190	274	**336**
Mel	**412**	106	77	265	265	343
NSCLC	**406**	145	95	267	281	345
OvC	**503**	180	109	262	279	357
Ovary	**566**	203	144	270	286	347
Prostate	**505**	185	150	247	287	356
Skin	**417**	66	95	270	281	367
Spleen	157	21	48	279	283	**369**
Thyroid	**675**	136	129	275	287	369
Tonsil	**569**	144	126	246	261	361

Supplementary Table 6: Number of segmented cells per 1000 μm^2 by tissue type and by platform x panel combination.

Platform (panel) Tissue Type\	CosMx 1k	MERSCOPE breast	MERSCOPE lung	Xenium breast	Xenium lung	Xenium multi-tissue
Bladder	1.83	0.70	0.36	1.53	1.17	1.65
BrC	4.65	6.87	4.81	7.48	7.33	7.73
Breast	1.91	0.06	0.18	0.46	1.00	0.65
CRC	5.26	6.49	5.34	8.62	7.69	8.41
Colon	2.40	0.43	0.27	3.29	2.64	3.21
HNSCC	4.44	4.61	2.70	6.43	5.53	4.76
Heart	0.71	0.20	0.20	1.04	0.94	0.95
Kidney	2.95	1.27	0.40	4.00	3.42	3.83
Liver	2.23	0.57	0.85	2.14	1.96	2.06
Lung	0.29	0.07	0.03	0.70	0.54	0.62
Lymph node	0.51	0.08	0.06	0.19	0.19	0.23
Mel	7.27	5.02	2.77	9.66	9.01	7.78
NSCLC	4.56	4.83	3.78	6.70	6.15	7.54
OvC	6.43	11.40	9.69	13.29	12.38	12.07
Ovary	2.49	1.20	0.80	2.74	2.19	2.52
Prostate	3.32	0.79	0.89	3.68	3.81	3.98
Skin	2.18	0.12	0.13	1.73	1.36	1.61
Spleen	9.57	1.69	1.63	15.39	10.98	15.66
Thyroid	0.71	0.13	0.53	2.68	2.91	2.34
Tonsil	10.89	0.45	2.79	17.39	13.87	15.27

Supplementary Table 7: Area of segmented cells (μm^2) by tissue type and by platform x panel combination.

Platform (panel) Tissue Type\	CosMx 1k	MERSCOPE breast	MERSCOPE lung	Xenium breast	Xenium lung	Xenium multi-tissue
Bladder	190.70	85.59	79.70	343.30	345.11	342.01
BrC	125.11	72.00	70.84	112.78	112.78	102.25
Breast	143.24	75.28	72.78	169.79	130.16	151.72
CRC	112.28	63.51	59.65	95.82	94.38	93.45
Colon	149.24	77.97	76.65	148.86	161.37	158.59
HNSCC	147.56	86.03	79.98	153.17	162.52	152.52
Heart	220.02	91.58	71.24	467.37	500.59	500.80
Kidney	120.74	93.91	82.64	153.01	159.63	158.23
Liver	191.43	90.36	84.06	271.66	285.82	292.68
Lung	188.86	97.83	79.77	199.12	226.95	207.36
Lymph node	257.20	68.82	78.16	486.36	397.09	495.19
Mel	102.05	67.47	61.26	89.21	88.84	85.16
NSCLC	107.51	78.64	73.08	95.62	92.70	97.06
OvC	98.24	53.13	54.49	68.23	68.35	67.31
Ovary	178.76	93.12	81.93	191.55	224.82	210.95
Prostate	110.00	59.28	61.05	108.29	100.63	100.68
Skin	140.62	89.73	70.81	173.97	166.38	166.79
Spleen	57.24	57.76	57.32	47.16	48.00	46.04
Thyroid	57.24	44.74	43.52	41.50	39.69	43.64
Tonsil	53.22	47.01	45.48	33.57	34.30	33.55

Supplementary Table 8: Pearson correlation results of tumor TMA and TCGA database across all panels.

Platform (panel) Cancer Type\	Xenium multi-tissue	Xenium breast	Xenium lung	MERSCOPE breast	MERSCOPE lung	CosMx 1k
Bladder cancer	0.64	0.72	0.69	0.66	NaN	0.64
Breast cancer	0.65	0.66	0.70	0.71	0.76	0.66
CRC	0.75	0.77	0.76	0.74	0.73	0.66
HNSCC	0.76	0.78	0.77	0.73	0.68	0.69
Melanoma	0.65	0.58	0.63	0.61	0.59	0.60
NSCLC	0.69	0.75	0.59	0.73	0.52	0.63
Ovarian cancer	0.69	0.71	0.73	0.74	0.75	0.71

Supplementary Table 9: Pearson correlation results of normal TMA and GTEx database across all panels.

Platform (panel) Tissue Type\	Xenium multi-tissue	Xenium breast	Xenium lung	MERSCOPE breast	MERSCOPE lung	CosMx 1k
Bladder	0.64	0.64	0.59	0.44	0.49	0.58
Breast	0.68	0.71	0.58	0.36	0.50	0.69
Colon	0.57	0.61	0.55	0.40	0.40	0.61
Heart	0.75	0.77	0.76	0.12	-0.05	0.55
Kidney	0.72	0.76	0.74	0.63	0.69	0.50
Liver	0.82	0.85	0.81	0.56	0.60	0.69
Lung	0.74	0.79	0.69	0.06	0.18	0.53
Lymph node	0.41	0.41	0.32	0.18	0.38	0.38
Ovary	0.54	0.56	0.48	0.49	0.60	0.69
Prostate	0.80	0.81	0.80	NaN	0.72	0.77
Skin	0.72	0.82	0.79	0.37	0.54	0.68
Spleen	0.76	0.81	0.74	0.04	0.13	0.35
Thyroid	0.17	0.23	0.19	0.31	0.34	0.44
Tonsil	0.77	0.79	0.79	0.61	0.58	0.72
Pancreas	0.23	0.34	0.16	NaN	0.27	0.41

Supplementary Table 10: Example of gene level data.

Core	Gene	Tissue type	Count	Code type
1	AATK	Bladder	17	gene
1	ABL1	Bladder	30	gene
1	ABL2	Bladder	22	gene
1	ACACB	Bladder	27	gene
1	ACE	Bladder	21	gene
1	ACKR1	Bladder	12	gene
1	ACKR3	Bladder	35	gene
1	ACKR4	Bladder	30	gene
1	ACP5	Bladder	76	gene
1	ACTA2	Bladder	31	gene
1	ACTG2	Bladder	11	gene

Supplementary Table 11: Example of cell level data.

cell_id	transcript_ counts	control_ probe_ counts	control_ codeword_ counts	unassigned_ codeword_ counts	total_counts	cell_area	nucleus_ area	x	y	core	tissue_type	geometry
aaaabane-1	213	0	0	0	213	116.01	39.78	7,428.87	21.81	61	HNSCC	POINT (7428.874658203124 21.810035228729248)
aaaagnbb-1	139	0	0	0	139	118.67	10.25	7,428.12	4.89	61	HNSCC	POINT (7428.116796875 4.891704702377319)
aaabnncg-1	251	0	0	1	252	136.64	71.03	7,437.15	19.53	61	HNSCC	POINT (7437.15302734375 19.53349733352661)
aaabnnhb-1	107	0	0	0	107	60.64	12.51	7,436.43	10.70	61	HNSCC	POINT (7436.42919921875 10.702136468887328)
aaabojgn-1	163	0	0	0	163	156.11	33.82	7,443.17	4.72	61	HNSCC	POINT (7443.172753906249 4.719903254508972)
aaacafik-1	633	0	0	0	633	342.15	153.03	7,452.35	17.53	61	HNSCC	POINT (7452.350927734375 17.53206386566162)
aaaccjoo-1	184	0	0	0	184	86.20	24.66	7,454.67	26.94	61	HNSCC	POINT (7454.669335937499 26.943363189697266)
aaacdggg-1	89	0	0	0	89	60.87	12.24	7,460.32	29.56	61	HNSCC	POINT (7460.318017578124 29.56240882873535)
aaacdmce-1	290	0	0	0	290	245.24	56.54	7,464.75	4.88	61	HNSCC	POINT (7464.747314453125 4.880907201766967)
aaaceomi-1	140	0	0	0	140	99.52	28.18	7,466.66	23.29	61	HNSCC	POINT (7466.6623046875 23.29304599761963)

Supplementary Table 12: Example of cell by gene data.

cell_id	core	tissue_type	ABCC11	ADAM9	ADGRE5	ADH1B	…	ZEB1	ZEB2	ZNF562
3003241900002100003_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100004_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100006_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100007_region_0	61	HNSCC	0	0	1	0	…	0	0	0
3003241900002100007_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100008_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100009_region_0	61	HNSCC	0	0	0	0	…	0	0	0
3003241900002100010_region_0	61	HNSCC	0	0	0	0	…	1	2	0
3003241900002100010_region_1	124	NSCLC	0	0	0	0	…	0	0	0
3003241900002100011_region_0	61	HNSCC	0	0	0	0	…	0	0	0