

Supplementary table S1. Samples list in the ESCC cohort (100 cases)

Number	Sample ID	Cancer Type	Sex	Tumor Size (cm)	Overall Survival (Months)	Overall Survival Status	CCL2-IHC Score	CD68 positive cell
1	D08A0181	ESCC	Male	5*2.5*1.5	58	DECEASED	8	150
2	D08A0184	ESCC	Male	4.1*3*1.4	26	DECEASED	2	400
3	D08A0185	ESCC	Male	4.5*3.5*1	13	DECEASED	8	50
4	D08A0187	ESCC	Male	6.5*2.3*2.5	107	LIVING	3	30
5	D08A0188	ESCC	Male	3*2*1.5	15	DECEASED	2	50
6	D08A0189	ESCC	Male	NA	106	LIVING	6	100
7	D08A0194	ESCC	Female	3.5*3.5*1	6	DECEASED	12	40
8	D08A0196	ESCC	Female	7.5*6*1	60	DECEASED	2	60
9	D08A0260	ESCC	Male	3*1.5*1.2	31	DECEASED	2	100
10	D08A0284	ESCC	Male	4.5*3*2	51	DECEASED	8	300
11	D08A0285	ESCC	Female	3.5*2*2	47	DECEASED	6	80
12	D08A0286	ESCC	Male	3*1.5*0.5	29	DECEASED	3	50
13	D08A0290	ESCC	Male	0.5*1.2	22	DECEASED	3	20
14	D08A0293	ESCC	Female	2.5*1.5*1	35	DECEASED	4	90
15	D08A0294	ESCC	Male	4*2*1.5	10	DECEASED	6	30
16	D08A0333	ESCC	Female	5*5*1	100	LIVING	4	400
17	D08A0334	ESCC	Male	4*2*2	2	DECEASED	8	80
18	D08A0337	ESCC	Male	1*1*0.5,1.2*1*1	23	DECEASED	12	150
19	D08A0340	ESCC	Male	7.5*5*1.5	9	DECEASED	2	100
20	D08A0342	ESCC	Male	6*3*1.5	27	DECEASED	12	300
21	D08A0373	ESCC	Male	10*8*2	6	DECEASED	9	60
22	D08A0376	ESCC	Male	5.5*4.5*1.5	43	DECEASED	6	100
23	D08A0379	ESCC	Male	2*2*1	44	DECEASED	6	60
24	D08A0380	ESCC	Male	3*3*1	8	DECEASED	6	50
25	D08A0381	ESCC	Female	5*3*1	9	DECEASED	4	70
26	D08A0383	ESCC	Male	2.5*1.5*0.5	16	DECEASED	4	60
27	D08A0384	ESCC	Male	5*3.5*1.5	97	LIVING	8	200
28	D08A0385	ESCC	Male	6*6*1.5	26	DECEASED	12	50
29	D08A0388	ESCC	Female	4*3*1	97	LIVING	6	150
30	D08A0391	ESCC	Male	6*4*1.5	33	DECEASED	6	300
31	D08A0393	ESCC	Female	5*4*1	10	DECEASED	9	150
32	D08A0394	ESCC	Male	4*2.5*1.5	6	DECEASED	12	200
33	D08A0395	ESCC	Male	3*1.5*1	8	DECEASED	8	80
34	D08A0397	ESCC	Male	NA	2	DECEASED	12	200
35	D08A0400	ESCC	Male	5*3.5*1	43	DECEASED	8	200
36	D08A0401	ESCC	Male	4*3*1	44	DECEASED	6	300
37	D08A0402	ESCC	Male	3*2.5*1	95	LIVING	4	40
38	D08A0403	ESCC	Male	4.5*3*0.6	23	DECEASED	6	80
39	D08A0404	ESCC	Male	3*3*3	73	LIVING	6	80
40	D08A0405	ESCC	Male	8*4*2	4	DECEASED	8	200
41	D08A0477	ESCC	Male	4*2*1, 6*5*4	9	DECEASED	12	300
42	D08A0569	ESCC	Male	7*3.5*2	13	DECEASED	0	10
43	D08A0571	ESCC	Male	5*2*1	15	DECEASED	0	70
44	D08A0572	ESCC	Male	6*4*1	13	DECEASED	9	100
45	D08A0573	ESCC	Female	4.5*3*1.5	2	DECEASED	6	60
46	D08A0577	ESCC	Female	4*3*1.5	88	LIVING	2	100
47	D08A0579	ESCC	Male	5*3.5*1.5	33	DECEASED	9	150
48	D08A0580	ESCC	Male	2.5*2*0.5	12	DECEASED	9	400

49	D08A0581	ESCC	Female	5*4*2	12	DECEASED	4	200
50	D08A0582	ESCC	Male	6*5*1.5 ;	88	LIVING	4	100
51	D08A0583	ESCC	Male	3.8*2*1	4	DECEASED	12	150
52	D08A0584	ESCC	Male	3*2.5*1	5	DECEASED	12	200
53	D08A0588	ESCC	Male	4*2.5*1	30	DECEASED	6	20
54	D08A0589	ESCC	Male	NA	15	DECEASED	4	20
55	D08A0593	ESCC	Male	4*4*1	87	LIVING	4	10
56	D08A0595	ESCC	Female	NA	5	DECEASED	8	100
57	D08A0596	ESCC	Female	6*5*1	22	DECEASED	9	100
58	D08A0648	ESCC	Female	4*2*1	5	DECEASED	8	300
59	D08A0649	ESCC	Male	5*3*1	0	DECEASED	9	200
60	D08A0650	ESCC	Male	7*3*1	5	DECEASED	12	100
61	D08A0652	ESCC	Male	NA	86	LIVING	9	300
62	D08A0659	ESCC	Male	NA	7	DECEASED	8	40
63	D08A0660	ESCC	Female	NA	14	DECEASED	12	100
64	D08A0692	ESCC	Male	4*2*1	15	DECEASED	12	20
65	D08A0694	ESCC	Male	7.5*4*1.5	5	DECEASED	12	100
66	D08A0696	ESCC	Female	3*2*1	16	DECEASED	6	30
67	D08A0697	ESCC	Male	4.5*3*1	84	LIVING	4	150
68	D08A0699	ESCC	Male	6*6*1.5	26	DECEASED	12	200
69	D08A0700	ESCC	Male	7*4*1.5	84	LIVING	3	50
70	D08A0701	ESCC	Female	5.5*3*1.5	84	LIVING	8	300
71	D08A0702	ESCC	Male	4*3*1	1	DECEASED	8	200
72	D08A0705	ESCC	Male	NA	83	LIVING	9	300
73	D08A0718	ESCC	Female	5.5*4*1.5	5	DECEASED	9	20
74	D08A0719	ESCC	Female	2*1*0.8	83	LIVING	9	200
75	D08A0720	ESCC	Male	NA	4	DECEASED	12	100
76	D08A0721	ESCC	Male	7*4*1	15	DECEASED	12	400
77	D08A0722	ESCC	Male	10*3*1	55	DECEASED	6	150
78	D08A0723	ESCC	Male	1.5*1*1	25	DECEASED	4	300
79	D08A0724	ESCC	Female	NA	10	DECEASED	6	90
80	D08A0745	ESCC	Male	NA	27	DECEASED	12	60
81	D08A0746	ESCC	Male	5*3*2	82	LIVING	6	400
82	D08A0748	ESCC	Male	6*4.5*1.5	81	LIVING	9	50
83	D08A0752	ESCC	Female	NA	28	DECEASED	6	100
84	D08A0753	ESCC	Male	5*4*2	10	DECEASED	3	20
85	D08A0803	ESCC	Male	4.5*3.7*0.5	83	LIVING	4	200
86	D08A0804	ESCC	Male	NA	10	DECEASED	6	80
87	D08A1719	ESCC	Female	6*3.5*0.7	10	DECEASED	9	150
88	D08A1720	ESCC	Female	4*2*2	31	DECEASED	9	50
89	D08A1729	ESCC	Male	NA	15	DECEASED	12	100
90	D08A1731	ESCC	Male	5.5*3*1.5	19	DECEASED	4	60
91	D08A1732	ESCC	Male	2*2*1	10	DECEASED	9	200
92	D08A1735	ESCC	Male	NA	24	DECEASED	6	60
93	D08A1740	ESCC	Female	6*3*1.5	9	DECEASED	6	50
94	D08A1742	ESCC	Male	7*4*0.8	8	DECEASED	6	20
95	D08A1743	ESCC	Male	5*4*1.5	27	DECEASED	9	150
96	D08A1746	ESCC	Male	3*3*1	23	DECEASED	6	50
97	D08A1747	ESCC	Female	1.5*1*0.5	4	DECEASED	6	100
98	D08A1750	ESCC	Female	6*3.3*1	10	DECEASED	12	200
99	D08A1751	ESCC	Male	3*2*1	19	DECEASED	12	100
100	D08A1755	ESCC	Male	5.5*3*1.5	8	DECEASED	6	100

Supplementary table S2. ESCC samples list from TCGA database

Number	Sample ID	Cancer Type	Sex	AJCC Stage	Histologic Grade	Overall Survival (Months)	Overall Survival Status	Informed consent verified
1	TCGA-IG-A3I8-01	ESCC	Female	T3	G2	33.25	LIVING	YES
2	TCGA-IG-A3QL-01	ESCC	Male	T2	G2	35.18	LIVING	YES
3	TCGA-IG-A3Y9-01	ESCC	Male	T4	G2	0.85	DECEASED	YES
4	TCGA-IG-A3YA-01	ESCC	Male	T4	G2	20.76	LIVING	YES
5	TCGA-IG-A3YB-01	ESCC	Male	T3	G2	2.63	LIVING	YES
6	TCGA-IG-A3YC-01	ESCC	Male	T3	G2	20.11	LIVING	YES
7	TCGA-IG-A4P3-01	ESCC	Male	T2	G2	18.63	DECEASED	YES
8	TCGA-IG-A50L-01	ESCC	Male	T3	G2	0.53	LIVING	YES
9	TCGA-IG-A51D-01	ESCC	Male	T1	G2	17.02	LIVING	YES
10	TCGA-IG-A5B8-01	ESCC	Male	T3	G1	0.79	DECEASED	YES
11	TCGA-IG-A5S3-01	ESCC	Female	T3	G2	23.39	LIVING	YES
12	TCGA-IG-A625-01	ESCC	Male	T3	G2	12.81	DECEASED	YES
13	TCGA-IG-A6QS-01	ESCC	Male	T2	G1	9.95	DECEASED	YES
14	TCGA-IG-A8O2-01	ESCC	Male	T3	G3	4.66	DECEASED	YES
15	TCGA-IG-A97H-01	ESCC	Male	T3	G3	14.49	LIVING	YES
16	TCGA-IG-A97I-01	ESCC	Male	T2	G2	12.16	LIVING	YES
17	TCGA-JY-A6FD-01	ESCC	Female	T3	G1	67.97	LIVING	YES
18	TCGA-JY-A6FE-01	ESCC	Male	T3	G3	3.68	DECEASED	YES
19	TCGA-JY-A6FG-01	ESCC	Male	T3	G2	41.49	DECEASED	YES
20	TCGA-JY-A93F-01	ESCC	Female	T2	G1	24.01	LIVING	YES
21	TCGA-KH-A6WC-01	ESCC	Male	T1	GX	6.27	LIVING	YES
22	TCGA-L5-A43H-01	ESCC	Male	T3	GX	0.3	DECEASED	YES
23	TCGA-L5-A43J-01	ESCC	Male	T3	G3	4.3	DECEASED	YES
24	TCGA-L5-A4OM-01	ESCC	Female	T1	GX	47.9	DECEASED	YES
25	TCGA-L5-A88S-01	ESCC	Male	T3	GX	15.47	LIVING	YES
26	TCGA-L5-A88W-01	ESCC	Male	T3	GX	25.1	DECEASED	YES
27	TCGA-L5-A88Z-01	ESCC	Female	T1	GX	7.39	LIVING	YES
28	TCGA-L5-A8NK-01	ESCC	Female	T3	G1	13.53	LIVING	YES
29	TCGA-L5-A8NQ-01	ESCC	Male	T2	G3	21.35	DECEASED	YES
30	TCGA-L7-A56G-01	ESCC	Male	NA	G3	10.84	DECEASED	YES
31	TCGA-LN-A49K-01	ESCC	Male	T3	G2	5.91	DECEASED	YES
32	TCGA-LN-A49L-01	ESCC	Male	T2	G2	10.45	DECEASED	YES
33	TCGA-LN-A49M-01	ESCC	Male	T2	G1	12.65	LIVING	YES
34	TCGA-LN-A49N-01	ESCC	Male	T2	G2	12.42	LIVING	YES
35	TCGA-LN-A49O-01	ESCC	Male	T3	G3	13.4	LIVING	YES
36	TCGA-LN-A49P-01	ESCC	Male	T3	G2	12.32	LIVING	YES
37	TCGA-LN-A49R-01	ESCC	Male	T3	G3	13.37	LIVING	YES
38	TCGA-LN-A49S-01	ESCC	Male	T3	G2	13.14	LIVING	YES
39	TCGA-LN-A49U-01	ESCC	Male	T3	G1	15.34	LIVING	YES
40	TCGA-LN-A49W-01	ESCC	Male	T3	G3	13.24	LIVING	YES
41	TCGA-LN-A49X-01	ESCC	Male	T3	G2	12.61	LIVING	YES
42	TCGA-LN-A49Y-01	ESCC	Male	T3	G2	12.45	LIVING	YES
43	TCGA-LN-A4A1-01	ESCC	Male	T3	G3	12.58	LIVING	YES

44	TCGA-LN-A4A2-01	ESCC	Male	T3	G1	12.48	LIVING	YES
45	TCGA-LN-A4A3-01	ESCC	Male	T3	G2	12.75	LIVING	YES
46	TCGA-LN-A4A4-01	ESCC	Male	T3	GX	12.58	LIVING	YES
47	TCGA-LN-A4A5-01	ESCC	Male	T2	G2	22.37	DECEASED	YES
48	TCGA-LN-A4A6-01	ESCC	Male	T2	G2	12.84	LIVING	YES
49	TCGA-LN-A4A8-01	ESCC	Male	T2	G2	15.51	LIVING	YES
50	TCGA-LN-A4A9-01	ESCC	Male	T2	G1	11.53	DECEASED	YES
51	TCGA-LN-A4MQ-01	ESCC	Male	T3	G3	12.32	LIVING	YES
52	TCGA-LN-A4MR-01	ESCC	Male	T2	G2	13.21	LIVING	YES
53	TCGA-LN-A5U5-01	ESCC	Male	T3	G2	4.47	DECEASED	YES
54	TCGA-LN-A5U6-01	ESCC	Male	T2	G2	12.32	LIVING	YES
55	TCGA-LN-A5U7-01	ESCC	Male	T2	G1	25.23	LIVING	YES
56	TCGA-LN-A7HV-01	ESCC	Male	T2	G1	10.51	LIVING	YES
57	TCGA-LN-A7HW-01	ESCC	Male	T2	G2	11.99	LIVING	YES
58	TCGA-LN-A7HX-01	ESCC	Male	T2	G2	12.22	LIVING	YES
59	TCGA-LN-A7HY-01	ESCC	Male	T3	G2	12.02	LIVING	YES
60	TCGA-LN-A7HZ-01	ESCC	Male	T2	G2	13.17	LIVING	YES
61	TCGA-LN-A8HZ-01	ESCC	Male	T2	G3	12.32	LIVING	YES
62	TCGA-LN-A8I0-01	ESCC	Male	T2	G2	13.37	LIVING	YES
63	TCGA-LN-A8I1-01	ESCC	Female	T2	G3	13.17	LIVING	YES
64	TCGA-LN-A9FO-01	ESCC	Male	T2	G2	0.13	LIVING	YES
65	TCGA-LN-A9FP-01	ESCC	Female	T2	G3	12.02	LIVING	YES
66	TCGA-LN-A9FQ-01	ESCC	Male	T3	G3	12.84	LIVING	YES
67	TCGA-LN-A9FR-01	ESCC	Male	T2	G2	12.25	LIVING	YES
68	TCGA-Q9-A6FU-01	ESCC	Female	T3	G2	5.16	DECEASED	YES
69	TCGA-S8-A6BW-01	ESCC	Male	T2	G1	20.37	LIVING	YES
70	TCGA-V5-A7RC-01	ESCC	Male	NA	GX	3.42	DECEASED	YES
71	TCGA-V5-AASV-01	ESCC	Male	T3	G3	15.34	LIVING	YES
72	TCGA-VR-A8EO-01	ESCC	Male	T3	G3	25.79	LIVING	YES
73	TCGA-VR-A8EP-01	ESCC	Male	T3	G3	27.07	LIVING	YES
74	TCGA-VR-A8ER-01	ESCC	Male	T4	GX	12.42	DECEASED	YES
75	TCGA-VR-A8ET-01	ESCC	Male	T2	G2	1.54	DECEASED	YES
76	TCGA-VR-A8EU-01	ESCC	Male	T1	G2	18.3	DECEASED	YES
77	TCGA-VR-A8EW-01	ESCC	Male	T3	G2	8.11	DECEASED	YES
78	TCGA-VR-A8EX-01	ESCC	Male	T1	G2	28.09	DECEASED	YES
79	TCGA-VR-A8EY-01	ESCC	Female	T3	G1	33.67	LIVING	YES
80	TCGA-VR-A8EZ-01	ESCC	Male	T3	G2	18.17	DECEASED	YES
81	TCGA-VR-AA4G-01	ESCC	Female	T2	G2	18.04	LIVING	YES
82	TCGA-VR-AA7B-01	ESCC	Female	T3	G2	11.24	LIVING	YES
83	TCGA-VR-AA7D-01	ESCC	Male	T3	G2	9.17	DECEASED	YES
84	TCGA-VR-AA7I-01	ESCC	Male	T4	G1	15.9	DECEASED	YES
85	TCGA-XP-A8T6-01	ESCC	Male	T2	G2	25.07	DECEASED	YES
86	TCGA-XP-A8T8-01	ESCC	Male	T1	G1	14.36	LIVING	YES
87	TCGA-Z6-A8JD-01	ESCC	Male	T3	G2	3.42	LIVING	YES
88	TCGA-Z6-A8JE-01	ESCC	Male	T3	G3	2.1	LIVING	YES
89	TCGA-Z6-A9VB-01	ESCC	Male	T3	G2	1.31	LIVING	YES
90	TCGA-Z6-AAPN-01	ESCC	Male	T3	G1	2.66	LIVING	YES

Supplementary table S3. Mouse (m) and Human (h) Primers for PCR

Primers	Sequence (5' to 3')
mCCL2-F	GCATCCACGTGTTGGCTCAG
mCCL2-R	TTCTTGGGGTCAGCACAGAC
mCCR2-F	TCTTCCTGCTCACATTACCA
mCCR2-R	GCCAAGTACCTATCAATTGT
mIL-12b-F	TTGAACTGGCGTTGGAAGCACG
mIL-12b-R	CCACCTGTGAGTTCTTCAAAGGC
mIL-13-F	AACGGCAGCATGGTATGGAGTG
mIL-13-R	TGGGTCCTGTAGATGGCATTGC
mIL-10-F	CGGGAAGACAATAACTGCACCC
mIL-10-R	CGGTTAGCAGTATGTTGTCCAGC
mPD1-F	CCCAAGGCAAAAATCGAGGAGAG
mPD1-R	CGAGGGGCTGGGATATCTTG
mPD-L1-F	AGATCACAGCCAGGGCAAAA
mPD-L1-R	AGAAGAGGAGGACCGTGGAC
mPD-L2-F	CTCGTTCCACATACCTCAAGTCC
mPD-L2-R	CTGGAACCTTTAGGATGTGAGTG
mMet-F	GTTCTGCTTGGCAACGAGAGCT
mMet-R	GGAGAATGCACTGTATTGCGTCG
hMET-F	TGCACAGTTGGTCTGCCATGA
hMET-R	CAGCCATAGGACCGTATTTCCGG
hEGFR-F	AACACCCTGGTCTGGAAGTACG
hEGFR-R	TCGTTGGACAGCCTTCAAGACC
mEgfr-F	GGACTGTGTCTCCTGCCAGAAT
mEgfr-R	GGCAGACATTCTGGATGGCACT
mBrca1-F	CGAGGAAATGGCAACTTGCCTAG
mBrca1-R	TCACTCTGCGAGCAGTCTTCAG
hBRCA1-F	CTGAAGACTGCTCAGGGCTATC
hBRCA1-R	AGGGTAGCTGTTAGAAGGCTGG
mTrp63-F	GTATCGGACAGCGCAAAGAACG
mTrp63-R	CTGGTAGGTACAGCAGCTCATC
hTP63-F	CAGGAAGACAGAGTGTGCTGGT
hTP63-R	AATTGGACGGCGGTTTCATCCCT
mSox2-F	AACGGCAGCTACAGCATGATGC
mSox2-R	CGAGCTGGTCATGGAGTTGTAC
hSOX2-F	GCTACAGCATGATGCAGGACCA
hSOX2-R	TCTGCGAGCTGGTCATGGAGTT
mMyc-F	TCGCTGCTGTCTCCGAGTCC
mMyc-R	GGTTTGCCTTCTCCACAGAC
hMYC-F	CCTGGTGCTCCATGAGGAGAC
hMYC-R	CAGACTCTGACCTTTTGCCAGG
mCd44-F	CGGAACCACAGCCTCCTTTCAA
mCd44-R	TGCCATCCGTTCTGAAACCACG
hCD44-F	CCAGAAGGAACAGTGGTTTGGC
hCD44-R	ACTGTCCTCTGGGCTTGGTGT

Supplementary materials S4. Reagents and antibodies

Catlog #	Reagent Name	Clone	Vendor	Application
CC-3170	BEGM Bullet Kit	Not applied	Lonza	Cell culture
CC-5002	Trypsin Neutralizing Solution	Not applied	Lonza	Cell culture
279-MC-010	Recombinant Human CCL2/MCP-1 Protein	Not applied	R&D	Chemotaxis
CBA-102	CytoSelect 24-Well Cell Migration Assay kit (5µm, Fluorometric Format)	Not applied	Cell biolabs	Chemotaxis
P8139	Phorbol 12-myristate 13-acetate	Not applied	Sigma-Aldrich	Macrophage polarization
L6529	Lipopolysaccharides from Escherichia coli O55:B5	Not applied	Sigma-Aldrich	Macrophage polarization
300-02	Recombinant Human IFN-gamma	Not applied	Peprotech	Macrophage polarization
200-04	Recombinant Human IL-4	Not applied	Peprotech	Macrophage polarization
200-13	Recombinant human IL-13	Not applied	Peprotech	Macrophage polarization
LS004176	Collagenase, Type 2	Not applied	Worthington	Cell isolation
553080	FITC Rat Anti-Mouse CD45 Antibody	30-F11	BD Pharmingen	Flow cytometry
560527	PerCP-Cy TM 5.5 Rat Anti-Mouse CD3 Molecular Complex Antibody	17A2	BD Pharmingen	Flow cytometry
558694	APC Mouse anti-Human CD279 Antibody	MIH4	BD Pharmingen	Flow cytometry
553049	PE Rat Anti-Mouse CD4 Antibody	RM4-5	BD Pharmingen	Flow cytometry
565410	PE Rat Anti-Mouse F4/80 Antibody	T45-2342	BD Pharmingen	Flow cytometry
550416	Purified Mouse Anti-Human MCP-1 Antibody	5D3-F7	BD Pharmingen	Flow cytometry
100708	PE anti-mouse CD8a Antibody	53-6.7	Biolegend	Flow cytometry
101228	PerCP/Cy5.5 anti-mouse/human CD11b Antibody	M1/70	Biolegend	Flow cytometry
103132	PerCP/Cy5.5 anti-mouse CD45 Antibody	30-F11	Biolegend	Flow cytometry
107210	APC anti-mouse CD273 (B7-DC, PD-L2) Antibody	TY25	Biolegend	Flow cytometry
108909	APC anti-mouse CD49b (pan-NK cells) Antibody	DX5	Biolegend	Flow cytometry
115507	PE anti-mouse CD19 Antibody	6D5	Biolegend	Flow cytometry
123110	PE anti-mouse F4/80 Antibody	BM8	Biolegend	Flow cytometry
124312	APC anti-mouse CD274 (B7-H1, PD-L1) Antibody	10F.9G2	Biolegend	Flow cytometry
127614	APC anti-mouse Ly-6G Antibody	1A8	Biolegend	Flow cytometry
128008	PE anti-mouse Ly-6C Antibody	HK1.4	Biolegend	Flow cytometry

135210	APC anti-mouse CD279 (PD-1) Antibody	29F.1A12	Biolegend	Flow cytometry
141708	APC anti-mouse CD206 (MMR) Antibody	C068C2	Biolegend	Flow cytometry
150604	Alexa Fluor 647 anti-mouse CD192 (CCR2) Antibody	SA203G11	Biolegend	Flow cytometry
307627	PerCP anti-human HLA-DR Antibody	L243	Biolegend	Flow cytometry
329708	APC anti-human CD274 (B7-H1, PD-L1) Antibody	29E.2A3	Biolegend	Flow cytometry
330106	PE anti-human CD209 (DC-SIGN) Antibody	9E9A8	Biolegend	Flow cytometry
422302	Human TruStain FcX™ (Fc Receptor Blocking Solution)	Not applied	Biolegend	Flow cytometry
84651S	PD-1 Rabbit monoclonal antibody (Mouse Specific)	D7D5W	CST	IHC
98941S	CD8 α Rabbit monoclonal antibody (Mouse Specific)	D4W2Z	CST	IHC
83882S	TIM-3 Rabbit monoclonal antibody (Mouse Specific)	D3M9R	CST	IHC
30325S	F4/80 Rabbit monoclonal antibody	D4C8V	CST	IHC
93668S	Arginase-1 Rabbit monoclonal antibody	D4E3M	CST	IHC
8125S	SignalStain Boost IHC Detection Reagent (HRP, Mouse)	Not applied	CST	IHC
MAB2791-100	Human CCL2/MCP-1 Antibody	23002	R&D	IHC
MAB2040	Human CD68/SR-D1 Antibody	298813	R&D	IHC
MAB55381	Mouse CCR2 Antibody	475301	R&D	IHC
MCA341GA	Mouse anti-rat CD68 Antibody	ED1	Bio-Rad	IHC
ab7202	Anti-MCP1/CCL2 antibody	Polyclonal	Abcam	IHC
RECYTMAG-65K	MILLIplex MAP Rat Cytokine/Chemokine Magnetic Bead Panel	Not applied	Millipore	Immunology Multiplex Assay
MCYTOMAG-70K	MILLIplex MAP Mouse Cytokine/Chemokine Magnetic Bead Panel	Not applied	Millipore	Immunology Multiplex Assay
740007	LEGENDplex™ Mouse Proinflammatory Chemokine Panel	Not applied	Biolegend	Immunology Multiplex Assay
740502	LEGENDplex™ Human Macrophage/Microglia Panel	Not applied	Biolegend	Immunology Multiplex Assay
740845	LEGENDplex™ Mouse Macrophage/Microglia Panel	Not applied	Biolegend	Immunology Multiplex Assay
AM9932	Nuclease-Free Water	Not applied	Life Technologies	PCR
A25742	PowerUp™ SYBR™ Green Master Mix	Not applied	Life Technologies	PCR
74004	RNeasy Micro Kit	Not applied	Qiagen	PCR

Supplementary table S5. Uni- and multi-variate COX proportional hazard model analysis for overall survival of ESCC patients in cohort II

Variable	Univariate		multivariate	
	HR(95%CI)	P value	HR(95%CI)	P value
Gender		0.865		0.637
	Male	0.958(0.582-1.576)	1.155(0.635-2.099)	0.637
Age		0.055		0.104
	>65	1.539(0.990-2.392)	1.549(0.914-2.626)	0.104
Clinical grade ¹		0.954		0.906
	II	0.922(0.547-1.554)	0.864(0.449-1.663)	0.662
	III	0.966(0.554-1.683)	0.892(0.431-1.847)	0.758
T stage ²		0.241		0.936
	T3 or T4	0.706(0.395-1.262)	0.963(0.389-2.385)	
N stage ³		0.956		0.395
	N1	0.935(0.559-1.563)	2.805(0.761-10.346)	0.121
	N2	1.113(0.607-2.041)	3.795(0.830-17.350)	0.086
	N3	0.905(0.321-2.552)	3.654(0.602-22.173)	0.159
AJCC stage ⁴		0.001*		0.008*
	2	0.131(0.043-0.402)	0.115(0.028-0.470)	0.003*
	3	0.129(0.043-0.392)	0.035(0.003-0.355)	0.005*
Tumor size		0.753		0.523
	>5 cm	1.083(0.659-1.778)	1.209(0.675-2.166)	0.523
CCL2 expression		0.014		0.013
	high	1.729(1.115-2.681)	1.884(1.141-3.112)	0.013*

1 Clinical stage was divided into I, II, and III; stage II and III were compared to stage I, respectively.

2 T stage was divided into T1 or T2, T3 or T4; T1 or T2 were set as reference.

3 N stage was divided into N0\N1\N2\N3; N1\N2\N3 were compared to N0 respectively.

4 AJCC stage was divided into 1\2\3. Stage 2 and 3 were compared to stage 1, respectively.

Supplementary table S6. KEGG pathway enrichment by GSEA analysis

PATHWAY NAME	SIZE	ES	NES	NOM p-val	FDR q-val	FWER p-val
KEGG_TGF_BETA_SIGNALING_PATHWAY	85	0.610	1.976	0.000	0.086	0.062
KEGG_T_CELL_RECEPTOR_SIGNALING_PATHWAY	108	0.613	1.922	0.000	0.048	0.091
KEGG_CHEMOKINE_SIGNALING_PATHWAY	188	0.622	1.921	0.000	0.042	0.095
KEGG_TOLL_LIKE_RECEPTOR_SIGNALING_PATHWAY	102	0.573	1.887	0.000	0.042	0.124
KEGG_PATHWAYS_IN_CANCER	325	0.459	1.877	0.000	0.044	0.144
KEGG_CYTOKINE_CYTOKINE_RECEPTOR_INTERACTION	264	0.652	1.843	0.000	0.043	0.186
KEGG_FOCAL_ADHESION	198	0.579	1.818	0.000	0.038	0.228
KEGG_HEMATOPOIETIC_CELL_LINEAGE	84	0.725	1.784	0.000	0.045	0.282
KEGG_PRION_DISEASES	35	0.603	1.753	0.000	0.051	0.354
KEGG_COMPLEMENT_AND_COAGULATION_CASCADES	68	0.635	1.709	0.000	0.061	0.468
KEGG_HYPERTROPHIC_CARDIOMYOPATHY_HCM	83	0.612	1.670	0.000	0.064	0.556
KEGG_MAPK_SIGNALING_PATHWAY	265	0.432	1.666	0.002	0.064	0.568
KEGG_ADHERENS_JUNCTION	73	0.471	1.943	0.002	0.073	0.079
KEGG_REGULATION_OF_ACTIN_CYTOSKELETON	210	0.486	1.839	0.002	0.038	0.192
KEGG_CELL_ADHESION_MOLECULES_CAMS	131	0.666	1.731	0.002	0.052	0.411
KEGG_ACUTE_MYELOID_LEUKEMIA	57	0.469	1.925	0.002	0.060	0.090
KEGG_DILATED_CARDIOMYOPATHY	90	0.605	1.610	0.002	0.070	0.705
KEGG_INTESTINAL_IMMUNE_NETWORK_FOR_IGA_PRODUCTION	46	0.747	1.706	0.002	0.060	0.472
KEGG_CHRONIC_MYELOID_LEUKEMIA	73	0.441	2.014	0.002	0.104	0.041
KEGG_B_CELL_RECEPTOR_SIGNALING_PATHWAY	75	0.578	1.841	0.002	0.041	0.189
KEGG_NATURAL_KILLER_CELL_MEDIATED_CYTOTOXICITY	132	0.598	1.747	0.002	0.049	0.369
KEGG_NOD_LIKE_RECEPTOR_SIGNALING_PATHWAY	62	0.647	1.853	0.004	0.044	0.174
KEGG_FC_GAMMA_R_MEDIATED_PHAGOCYTOSIS	95	0.512	1.892	0.004	0.045	0.115
KEGG_JAK_STAT_SIGNALING_PATHWAY	155	0.506	1.654	0.004	0.065	0.604
KEGG_ECM_RECEPTOR_INTERACTION	83	0.642	1.673	0.004	0.066	0.552
KEGG_TYPE_I_DIABETES_MELLITUS	41	0.767	1.706	0.004	0.058	0.472
KEGG_ALLOGRAFT_REJECTION	35	0.777	1.619	0.004	0.070	0.687
KEGG_GRAFT_VERSUS_HOST_DISEASE	37	0.801	1.657	0.004	0.067	0.600
KEGG_VIRAL_MYOCARDITIS	68	0.635	1.767	0.004	0.049	0.324
KEGG_MELANOMA	71	0.512	1.606	0.006	0.070	0.713
KEGG_PANCREATIC_CANCER	70	0.399	1.790	0.006	0.045	0.272
KEGG_LEISHMANIA_INFECTION	70	0.692	1.819	0.006	0.041	0.228
KEGG_AUTOIMMUNE_THYROID_DISEASE	50	0.697	1.674	0.006	0.068	0.550
KEGG_MTOR_SIGNALING_PATHWAY	52	0.417	1.744	0.008	0.048	0.382
KEGG_RENAL_CELL_CARCINOMA	70	0.418	1.830	0.008	0.039	0.207
KEGG_ASTHMA	28	0.764	1.672	0.008	0.065	0.554
KEGG_ENDOCYTOSIS	180	0.363	1.748	0.008	0.051	0.367
KEGG_ANTIGEN_PROCESSING_AND_PRESENTATION	81	0.640	1.684	0.009	0.065	0.523