

**Supplemental Table S1.** Antibodies used in flow cytometry

<b>Antibody</b>	<b>Format</b>	<b>Research Resource Identifiers (RRIDs)</b>	<b>Source</b>
<b>Anti-human antibodies</b>			
CD24	FITC	RRID:AB_10562033	BD Biosciences, Franklin Lakes, NJ, USA
CD29	PE	RRID:AB_395836	“
CD44	APC	RRID:AB_398683	“
CD117	APC	RRID:AB_398461	“
CD126	PE	RRID:AB_394271	“
CD130	FITC	RRID:AB_868803	Abcam, Cambridge, UK
CD133	PE	RRID:AB_2726287	Miltenyi Biotec, Bergisch Gladbach, Germany
CXCR3	APC	RRID:AB_398481	BD Biosciences, Franklin Lakes, NJ, USA
IL23R	PE	RRID:AB_2124780	R&D Systems, Minneapolis, MN, USA
IL30	eFluor660	RRID:AB_11149127	Thermo Fisher Scientific, Waltham, MA, USA
<b>Anti-mouse antibodies</b>			
CD24	PE	RRID:AB_2656574	Miltenyi Biotec, Bergisch Gladbach, Germany
CD29	FITC	RRID:AB_2660691	“
CD44	FITC	RRID:AB_2658178	“
CD49f	BV650	RRID:AB_2744415	BD Biosciences, Franklin Lakes, NJ, USA
CD126	PE	RRID:AB_996658	Thermo Fisher Scientific, Waltham, MA, USA
CD130	APC	RRID:AB_10670874	“
CD133	APC	RRID:AB_2660069	Miltenyi Biotec, Bergisch Gladbach, Germany
CXCR3	PE	RRID:AB_10897140	BD Biosciences, Franklin Lakes, NJ, USA
IL-12R $\beta$ 1	PE	RRID:AB_394310	“
IL23R	PerCP-Cy	RRID:AB_2738972	“

**Supplemental Table S2.** Gene list of the RT<sup>2</sup> Profiler Human Cancer Inflammation & Immunity Crosstalk PCR Array (#PAHS-181Z)

Gene categories	Gene symbols
<b>Immune &amp; Inflammatory Responses</b>	<p><i>Immunostimulatory Factors:</i> IFNG, IL12A, IL12B, IL15, IL2, TNF</p> <p><i>Immunosuppressive Factors:</i> CD274 (PD-L1), CSF2 (GM-CSF), CTLA4, CXCL12 (SDF1), CXCL5 (ENA-78, LIX), CXCL8 (IL8), IDO1 (IDO), IL10, IL13, IL4, MIF, NOS2 (iNOS), PDCD1 (PD1), PTGS2 (COX2), TGFB1, VEGFA</p> <p><i>Pro-Inflammatory Genes:</i> CCL2 (MCP-1), CCL20 (MIP-3A), IFNG, IL12A, IL12B, IL17A, IL1A, IL1B, IL2, IL23A, IL6, PTGS2 (COX2), TLR4, TNF, VEGFA</p> <p><i>Anti-Inflammatory Genes:</i> IL10, IL13, IL4, TGFB1</p> <p><i>Enzymatic Modulators of Inflammation &amp; Immunity:</i> AICDA (AID), GZMA, GZMB, IDO1 (IDO), NOS2 (iNOS), PTGS2 (COX2)</p>
<b>Antigen Presentation</b>	HLA-A, HLA-B, HLA-C, MICA, MICB
<b>Chemokines</b>	CCL18 (PARC), CCL2 (MCP-1), CCL20 (MIP-3A), CCL21 (MIP-2), CCL22 (MDC), CCL28, CCL4 (MIP-1B), CCL5 (RANTES), CXCL1 (GRO1, GROa, SCYB1), CXCL10 (INP10), CXCL11 (I-TAC, IP-9), CXCL12 (SDF1), CXCL2 (GRO2, GROb, SCYB2), CXCL5 (ENA-78, LIX), CXCL9 (MIG)
<b>Chemokine Receptors</b>	ACKR3, CCR1, CCR10, CCR2, CCR4, CCR7, CCR9, CXCR1, CXCR2, CXCR3, CXCR4, CXCR5
<b>Interleukins</b>	CXCL8 (IL8), IL10, IL12A, IL12B, IL13, IL15, IL17A, IL1A, IL1B, IL2, IL23A, IL4, IL6
<b>Other Cytokines</b>	KITLG (SCF), MIF, SPP1, TNF, TNFSF10 (TRAIL)
<b>Growth Factors &amp; Receptors</b>	CSF1 (MCSF), CSF2 (GM-CSF), CSF3 (GCSF), EGF, EGFR (ERBB1), IGF1, TGFB1, VEGFA
<b>Signal Transduction</b>	<p><i>Interferon Signaling:</i> GBP1, IFNG, IL6, IRF1</p> <p><i>Interferon-Responsive Genes:</i> CCL2 (MCP-1), CCL5 (RANTES), CXCL10 (INP10), CXCL9 (MIG), GBP1, IRF1, MYD88, STAT1, TLR3, TNFSF10 (TRAIL)</p> <p><i>NFκB Targets:</i> BCL2L1 (BCLXL), CCL2 (MCP-1), CCL5 (RANTES), CSF1 (MCSF), CSF2 (GM-CSF), CSF3 (GCSF), CXCL8 (IL8), IFNG, TNF</p> <p><i>STAT Targets:</i> CCL2 (MCP-1), CCL4 (MIP-1B), CCL5 (RANTES), CSF1 (MCSF), CSF2 (GM-CSF), CSF3 (GCSF), CXCL10 (INP10), CXCL11 (I-TAC, IP-9), CXCL12 (SDF1), CXCL8 (IL8), CXCL9 (MIG), IL10, IL17A, IL1B, IL23A, IL6, MYC</p> <p><i>Toll-Like Receptor Signaling:</i> MYD88, TLR2, TLR3, TLR4</p> <p><i>Transcription Factors:</i> FOXP3, HIF1A, IRF1, MYC, NFKB1, STAT1, STAT3, TP53 (p53)</p>
<b>Apoptosis</b>	<p><i>Pro-Apoptotic:</i> FASLG (TNFSF6), TNF, TNFSF10 (TRAIL), TP53 (p53)</p> <p><i>Anti-Apoptotic:</i> BCL2, BCL2L1 (BCLXL), MYC, STAT3</p>

**Supplemental Table S3.** Gene list of the RT<sup>2</sup> Profiler Mouse Cancer Inflammation & Immunity Crosstalk PCR Array (#PAMM-181Z)

Gene categories	Gene symbols
<b>Immune &amp; Inflammatory Responses</b>	<p><i>Immunostimulatory Factors:</i> Ifng, Il12a, Il12b, Il15, Il2, Tnf.</p> <p><i>Immunosuppressive Factors:</i> Cd274 (Pdl1), Csf2 (GMCSF), Ctla4, Cxcl12, Cxcl5 (ENA-78, LIX), Ido1 (Ido), Il10, Il13, Il4, Il5, Mif, Nos2 (iNos), Pdc1 (PD-1), Ptgs2 (Cox2), Tgfb1, Vegfa</p> <p><i>Pro-Inflammatory Genes:</i> Ccl2 (MCP-1), Ccl20 (Mip-3a), Ifng, Il12a, Il12b, Il17a, Il1a, Il1b, Il2, Il22, Il23a, Il6, Ptgs2 (Cox2), Tlr4, Tnf, Vegfa</p> <p><i>Anti-Inflammatory Genes:</i> Il10, Il13, Il4, Tgfb1</p> <p><i>Enzymatic Modulators of Inflammation &amp; Immunity:</i> Aicda (Aid), Gzma, Gzmb, Ido1 (Ido), Nos2 (iNos), Ptgs2 (Cox2)</p>
<b>Antigen Presentation</b>	H2-D1, H2-K1
<b>Chemokines</b>	Ccl2 (MCP-1), Ccl20 (Mip-3a), Ccl22 (Mdc), Ccl28, Ccl4 (Mip-1b), Ccl5 (Rantes), Cxcl1 (Gro1), Cxcl10 (Inp10), Cxcl11 (Itac, Ip9), Cxcl12, Cxcl2 (Gro2), Cxcl5 (ENA-78, LIX), Cxcl9 (Mig)
<b>Interleukins</b>	Il10, Il12a, Il12b, Il13, Il15, Il17a, Il1a, Il1b, Il2, Il22, Il23a, Il4, Il5, Il6
<b>Chemokine &amp; Interleukin Receptors</b>	Ackr3, Ccr1, Ccr10, Ccr2, Ccr4, Ccr5, Ccr7, Ccr9, Cxcr1, Cxcr2, Cxcr3, Cxcr4, Cxcr5, Il1r1
<b>Other Cytokines</b>	Kitl (Scf), Mif, Spp1, Tnf, Tnfsf10 (Trail)
<b>Growth Factors &amp; Receptors</b>	Csf1 (Mcsf), Csf2 (GMCSF), Csf3 (Gcsf), Egf, Egfr, Igf1, Tgfb1, Vegfa
<b>Signal Transduction</b>	<p><i>Interferon Signaling:</i> Gbp2b, Ifng, Il6, Irf1</p> <p><i>Interferon-Responsive Genes:</i> Ccl2 (MCP-1), Ccl5 (Rantes), Cxcl10 (Inp10), Cxcl9 (Mig), Gbp2b, Irf1, Myd88, Stat1, Tlr3, Tnfsf10 (Trail)</p> <p><i>NFκB Targets:</i> Bcl2l1 (Bcl-XL), Ccl2 (MCP-1), Ccl5 (Rantes), Csf1 (Mcsf), Csf2 (GMCSF), Csf3 (Gcsf), Ifng, Tnf</p> <p><i>STAT Targets:</i> Ccl2 (MCP-1), Ccl4 (Mip-1b), Ccl5 (Rantes), Csf1 (Mcsf), Csf2 (GMCSF), Csf3 (Gcsf), Cxcl10 (Inp10), Cxcl11 (Itac, Ip9), Cxcl12, Cxcl9 (Mig), Il10, Il17a, Il1b, Il23a, Il6, Myc</p> <p><i>Toll-Like Receptor Signaling:</i> Myd88, Tlr2, Tlr3, Tlr4, Tlr7, Tlr9</p> <p><i>Transcription Factors:</i> Foxp3, Hif1a, Irf1, Myc, Nfkb1, Stat1, Stat3, Trp53 (p53)</p>
<b>Apoptosis</b>	<p><i>Pro-Apoptotic:</i> Fasl, Tnf, Tnfsf10 (Trail), Trp53 (p53)</p> <p><i>Anti-Apoptotic:</i> Bcl2, Bcl2l1 (Bcl-XL), Myc, Stat3</p>

**Supplemental Table S4.** Clinical and pathological characteristics of TNBC patients

<b>Baseline characteristics</b>	<b>Overall sample (n=32)</b>
<b>Mean age (in years) <math>\pm</math> SD</b>	57.0 $\pm$ 9.3
<b>Histotypes (%)</b>	
- <i>Ductal carcinoma</i>	75.3
- <i>Lobular carcinoma</i>	7.5
- <i>Others</i>	17.2
<b>Stage (%)</b>	
- <i>IA</i>	42.8
- <i>IIA or IIB</i>	30.4
- <i>IIIA, IIIB or IIIC</i>	26.8
<b>Lymph node metastases (%)</b>	57.2

**Supplemental Table S5.** Antibodies used in immunostaining

Antibody	Clone	Origin	Research Resource Identifiers (RRIDs)	Source
ATP1A1 <sup>c</sup>	ST0533	Rabbit	RRID:AB_2809472	Thermo Fisher, Waltham, MA, USA
CD3		Rabbit	RRID:AB_2335677	Agilent, Santa Clara, CA, USA
CD4	YTS191.1.2	Rat	RRID:AB_323559	Bio-Rad, Hercules, CA, USA
CD8	YTS169.4	Rat	RRID:AB_322770	"
CD11b	EPR1344	Rabbit	RRID:AB_2650514	Abcam, Cambridge, UK
CD31	SZ31	Rat	RRID:AB_2631039	Dianova, Hamburg, Germany
CD133	CMab-43	Mouse	RRID:AB_2869872	BD Biosciences, Franklin Lakes, NJ, USA
CXCL10 <sup>a,c</sup>		Rabbit	RRID:AB_308792	Abcam, Cambridge, UK
F4/80	Cl:A3-1	Rat	RRID:AB_323279	Bio-Rad, Hercules, CA, USA
Foxp3	FJK-16s	Rat	RRID:AB_467575	Thermo Fisher, Waltham, MA, USA
Gr-1	RB6-8C5	Rat	RRID:AB_394638	BD Biosciences, Franklin Lakes, NJ, USA
IL23 <sup>a,c</sup>		Rabbit	RRID:AB_1015843	LifeSpan BioScience, Seattle, WA, USA
IL30 <sup>b</sup>		Rabbit	RRID:AB_10898806	Abcam, Cambridge, UK
IL30 <sup>c</sup>		Rabbit	RRID:AB_838475	Novus Biologicals, Centennial, CO, USA
IL30		Goat	RRID:AB_355012	R&D Systems, Minneapolis, MN, USA
KLF4	EPR3550	Rabbit	RRID:AB_2721027	Abcam, Cambridge, UK
LAG3	EPR20261	Rabbit	RRID:AB_2883982	Abcam, Cambridge, UK
Ly-6G	1A8	Rat	RRID:AB_1089179	BioLegend, San Diego, CA, USA
Myc	9E10	mouse	RRID:AB_627268	Santa Cruz Biotechnology, Dallas, TX, USA
NKp46		Rabbit	RRID:AB_10767953	Biorbyt, Cambridge, UK
PCNA	PC10	Mouse	RRID:AB_2160651	Agilent, Santa Clara, CA, USA
ROR $\gamma$ t	AFKJS-9	Rat	RRID:AB_1834475	Thermo Fisher, Waltham, MA, USA
TCR $\delta$	H41	Mouse	RRID:AB_1130061	Santa Cruz Biotechnology, Dallas, TX, USA

<sup>a</sup> Antibodies used for immunohistochemistry on both human and murine tissues.

<sup>b</sup> Antibody used only for immunohistochemistry on human tissue.

<sup>c</sup> Antibody used for immunofluorescence on human cells.

**Supplemental Table S6.** Profiling of tumor infiltrating immune cells with CIBERSORTx

	IL30 <sup>high</sup> BCs <sup>a</sup>	IL30 <sup>low</sup> BCs <sup>a</sup>
<b><i>B cells naïve</i></b>	6.29%	6.44%
<b><i>B cells memory</i></b>	0.44%	0.56%
<b><i>Plasma cells</i></b>	3.59%	3.24%
<b><i>T cells CD8<sup>+</sup></i></b>	4.75%	4.72%
<b><i>T cells CD4<sup>+</sup> naïve</i></b>	0.01% <sup>b</sup>	0.07%
<b><i>T cells CD4<sup>+</sup> memory resting</i></b>	10.00% <sup>b</sup>	12.93%
<b><i>T cells CD4<sup>+</sup> memory activated</i></b>	0.77%	0.58%
<b><i>T cells follicular helper</i></b>	8.83%	7.76%
<b><i>T cells regulatory (Tregs)</i></b>	3.98%	3.29%
<b><i>T cells gamma delta</i></b>	0.00% <sup>b</sup>	0.27%
<b><i>NK cells resting</i></b>	2.65%	2.31%
<b><i>NK cells activated</i></b>	1.41%	0.66%
<b><i>Monocytes</i></b>	0.90%	1.25%
<b><i>Macrophages M0</i></b>	20.79%	17.28%
<b><i>Macrophages M1</i></b>	7.11%	6.26%
<b><i>Macrophages M2</i></b>	21.55%	23.41%
<b><i>Dendritic cells resting</i></b>	0.08% <sup>b</sup>	0.49%
<b><i>Dendritic cells activated</i></b>	1.19%	1.01%
<b><i>Eosinophils</i></b>	0.02%	0.01%
<b><i>Neutrophils</i></b>	0.28%	0.17%

<sup>a</sup> Values are expressed as mean percentages of total tumor infiltrating cells.

<sup>b</sup>  $p < 0.05$ , Student's *t*-test versus IL30<sup>low</sup> BCs.

**Supplemental Table S7.** List of immune exhaustion genes analyzed with CIBERSORTx

<b>Gene symbol</b>	<b>Protein name</b>
<i>BATF</i>	Basic Leucine Zipper ATF-Like Transcription Factor
<i>CR2 (CD21)</i>	Complement C3d Receptor 2
<i>CTLA4</i>	Cytotoxic T-Lymphocyte Associated Protein 4
<i>EOMES</i>	Eomesodermin
<i>FCRL4</i>	Fc Receptor Like 4
<i>FOXO1</i>	Forkhead Box O1
<i>FOXP1</i>	Forkhead Box P1
<i>HAVCR2 (TIM3)</i>	Hepatitis A Virus Cellular Receptor 2 (T Cell Immunoglobulin Mucin 3)
<i>IDO1</i>	Indoleamine 2,3-Dioxygenase 1
<i>IFNA1</i>	Interferon Alpha 1
<i>IFNB1</i>	Interferon Beta 1
<i>IL10</i>	Interleukin 10
<i>IL22</i>	Interleukin 22
<i>LAG3</i>	Lymphocyte Activation Gene 3
<i>LAIR1</i>	Leukocyte Associated Immunoglobulin Like Receptor 1
<i>NFATC1</i>	Nuclear Factor of Activated T Cells 1
<i>NR4A1</i>	Nuclear Receptor Subfamily 4 Group A Member 1
<i>PDCD1 (PD-1)</i>	Programmed Cell Death 1
<i>PDCD1LG2 (PD-L2)</i>	Programmed Cell Death 1 Ligand 2
<i>PD-L1 (CD274)</i>	Programmed Cell Death 1 Ligand 1
<i>PRDM1 (BLIMP-1)</i>	PR domain zinc finger protein 1 (B lymphocyte induced maturation protein-1)
<i>SIGLEC6</i>	Sialic Acid Binding Ig Like Lectin 6
<i>SIRT1</i>	Sirtuin 1
<i>TBX21 (T-bet)</i>	T-Box Transcription Factor 21 (T-box expressed in T cells)
<i>TGFB1</i>	Transforming Growth Factor Beta 1
<i>TIGIT</i>	T Cell Immunoreceptor with Ig and ITIM Domains
<i>TOX</i>	Thymocyte Selection Associated High Mobility Group Box
<i>TOX2</i>	TOX High Mobility Group Box Family Member 2
<i>TRAF1</i>	TNF Receptor Associated Factor 1
<i>VHL</i>	Von Hippel-Lindau Tumor Suppressor
<i>VSIR (VISTA)</i>	V-Set Immunoregulatory Receptor (V-domain Ig suppressor of T cell activation)
<i>VTCN1 (B7-H4)</i>	V-Set Domain Containing T Cell Activation Inhibitor 1 (B7 Family Member H4)

**Supplemental Table S8.** Expression of CXCL10 and IL23 by CD133<sup>+</sup>IL30<sup>+</sup>BCSCs in TNBC samples

Patient's number	CD133 <sup>+</sup> IL30 <sup>+</sup> CXCL10 <sup>+</sup> cells (%) <sup>a</sup>	CD133 <sup>+</sup> IL30 <sup>+</sup> IL23 <sup>+</sup> cells (%) <sup>b</sup>
1	57.43	49.69
2	51.30	45.45
3	56.80	49.76
4	63.97	55.84
5	59.57	55.61
6	61.44	46.68
7	61.79	47.07
8	67.39	48.48
9	58.74	61.76
10	59.40	56.71
11	54.88	61.21
12	59.74	49.59
13	57.16	47.84
14	58.12	56.98
15	53.43	39.33
16	63.36	59.21
17	51.89	62.61
18	66.36	50.90
19	59.09	61.09
20	57.43	42.39
21	55.27	50.63
22	62.34	46.64
23	64.99	34.23
24	50.36	38.96
25	62.81	34.05
26	57.41	55.55
27	55.24	40.90
28	51.93	61.02
29	64.72	56.46
30	54.67	56.68
31	54.50	62.06
32	53.42	55.74

<sup>a</sup> Mean  $\pm$  SD of CXCL10 positive cells/total number of CD133<sup>+</sup>IL30<sup>+</sup>cells per field.

<sup>b</sup> Mean  $\pm$  SD of IL23 positive cells/total number of CD133<sup>+</sup>IL30<sup>+</sup>cells per field.