

Online Supplement

KCNK3 Mutation Causes Altered Immune Function in Pulmonary Arterial Hypertension Patients and Mouse Models

James D. West¹, Eric D. Austin², Elise M. Rizzi³, Ling Yan², Harikrishna Tanjore¹, Amber L. Crabtree¹, Christy S. Moore¹, Gladson Muthian⁴, Erica J. Carrier¹, David A. Jacobson⁵, Rizwan Hamid², Peggy L. Kendall³, Susan Majka⁶, Anandharajan Rathinasabapathy¹

¹ Division of Allergy, Pulmonary and Critical Care Medicine, Department of Medicine, Vanderbilt University Medical Center, Nashville, USA

² Department of Pediatrics, Vanderbilt University Medical Center, Nashville, USA

³ Division of Allergy and Immunology, Department of Medicine, Washington University in St. Louis, St. Louis, USA

⁴ Department of Cancer Biology, Biochemistry and Neuropharmacology, School of Medicine, Meharry Medical College, Nashville, USA

⁵ Department of Molecular Physiology and Biophysics, Vanderbilt University, Nashville, USA

⁶ Division of Pulmonary, Critical Care and Sleep Medicine, Department of Medicine, National Jewish Health, Denver, USA

Corresponding author:

Anandharajan Rathinasabapathy PhD
Vanderbilt University Medical Center

1161 21st Ave S

T-1218 MCN

Nashville, TN 37232-2650

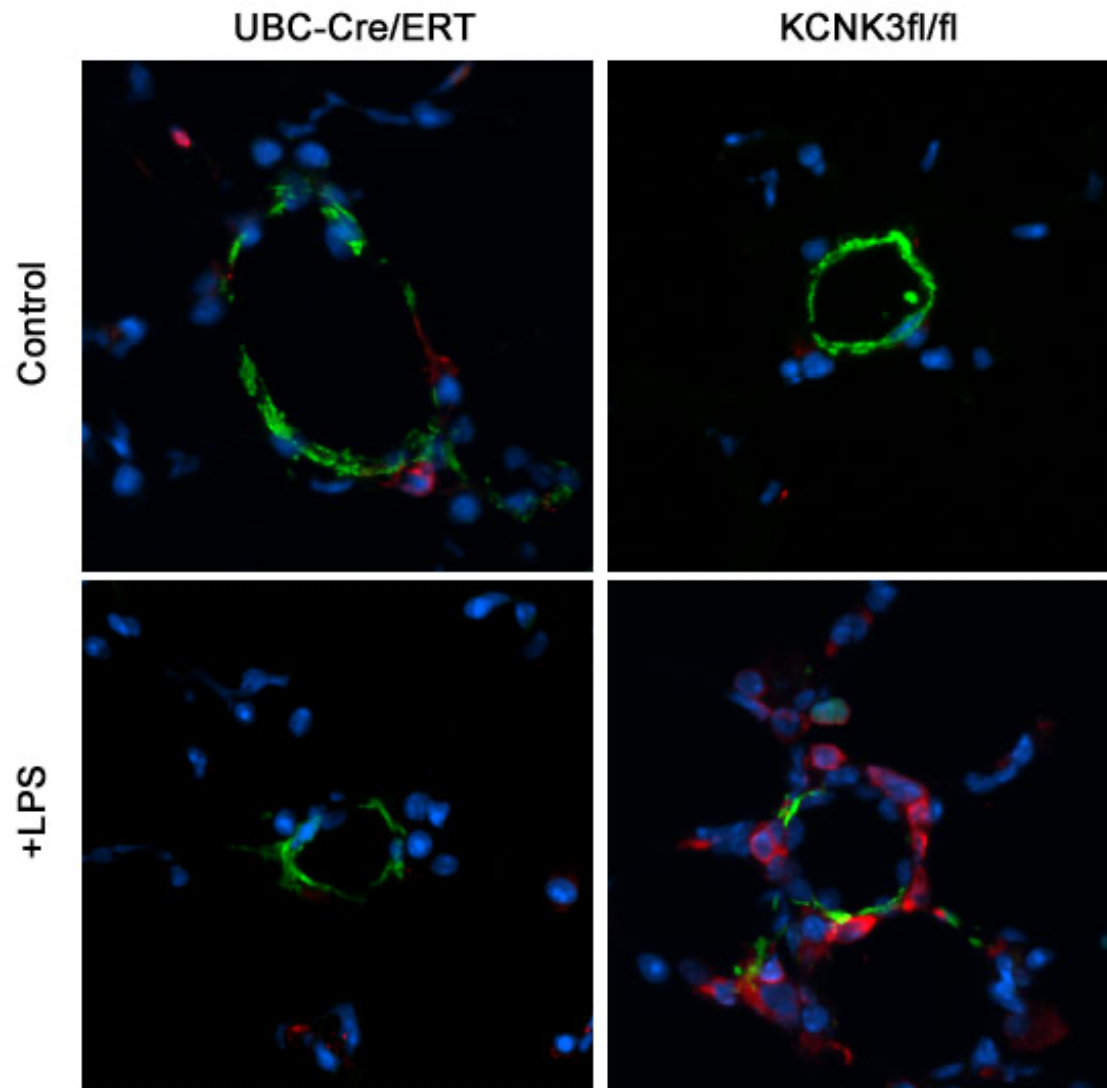
phone: 615 343-3311

fax: 615 343-3480

anandharajan.rathinasabapathy@vumc.org

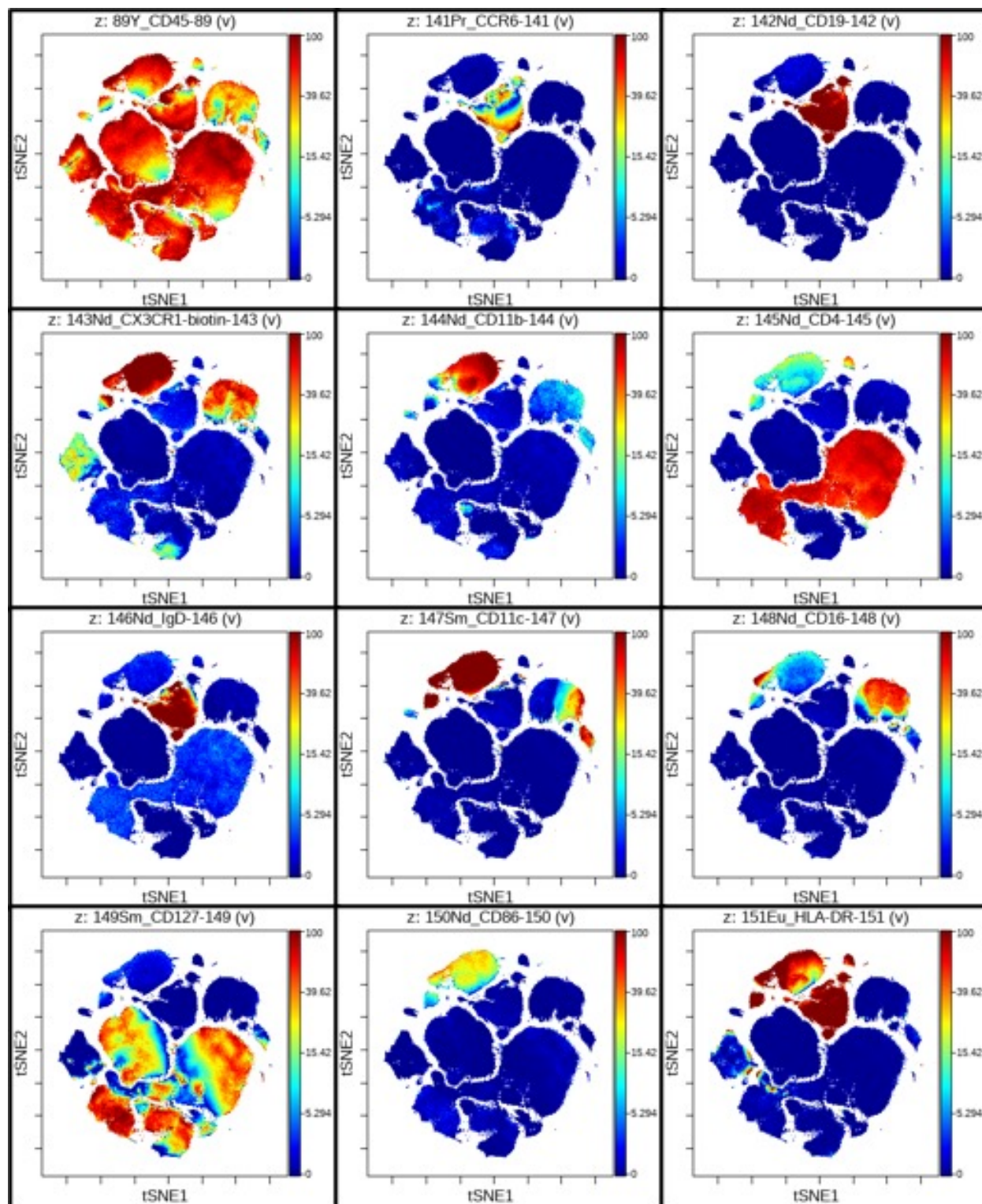
Supplemental Figures

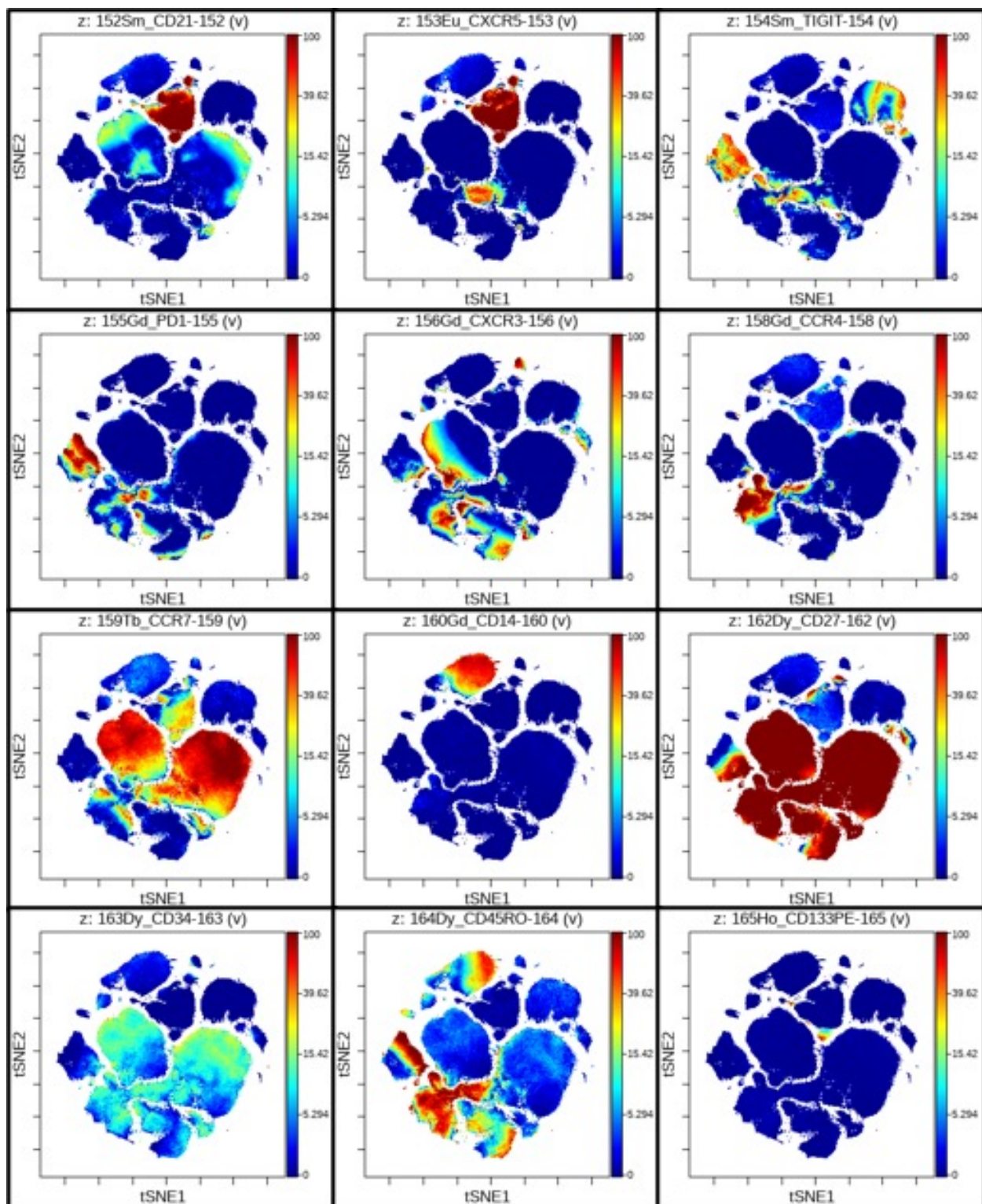
Figure S1. IHC assessment of CD3 ϵ in mouse lung tissue samples



IHC assessment on mouse tissue samples validate the role of inflammation in driving KCNK3-PAH. Immunofluorescence depicting increased numbers of CD3 ϵ ⁺ cells (red) around the muscularized vessels (green) in UBC-Cre/ERT2 *kcnk3^{fl/fl}* mice treated with low dose LPS – these are less common in other conditions. Nucleus is stained in blue. Images are magnified at 400X.

Figure S2. Live White Blood Cell viSNE expression heatmaps (concatenated files)





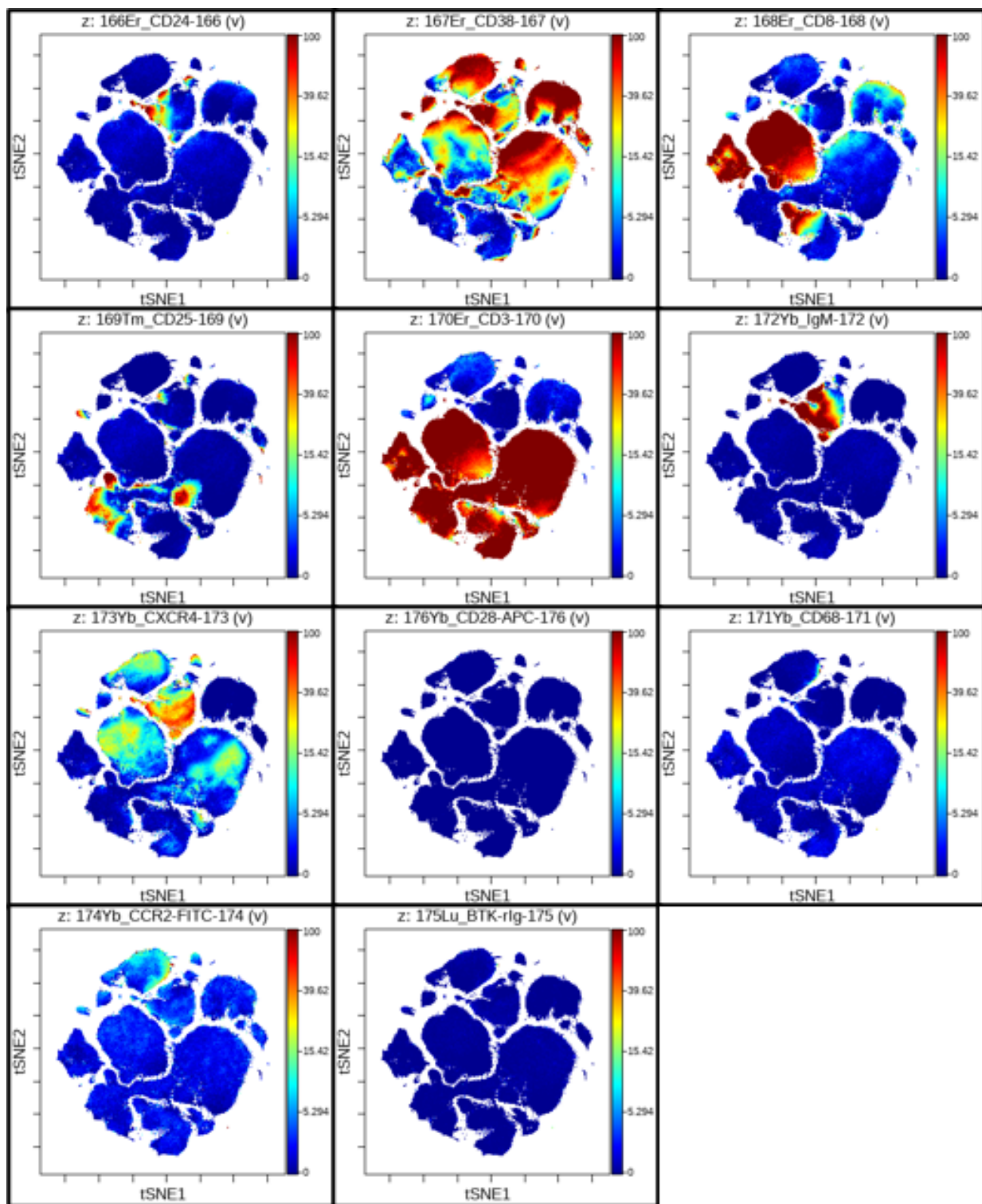
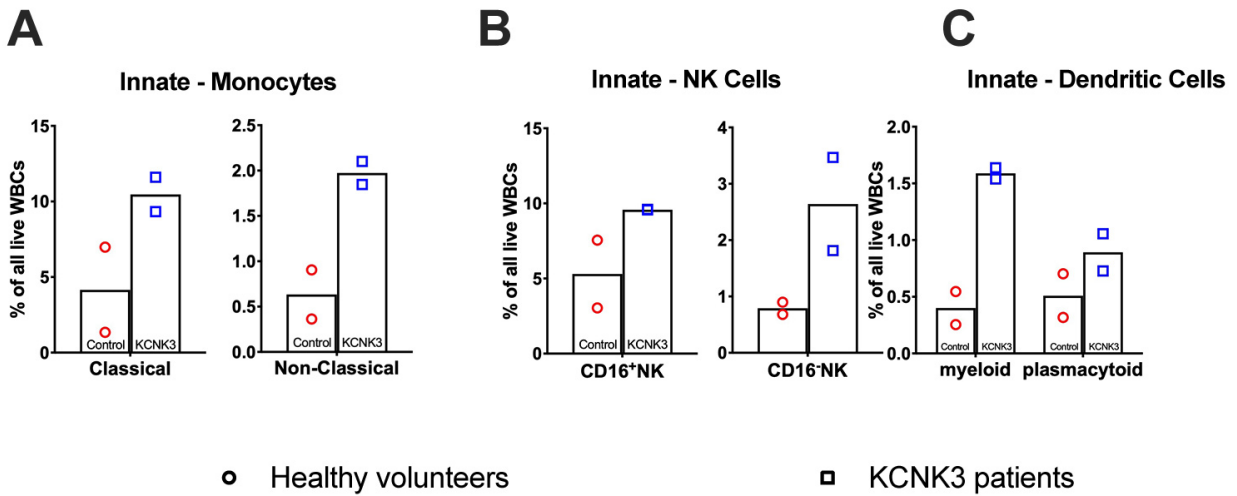


Figure S3. CyTOF assessment of human PBMCs suggest the activation of Innate immune responses in KCNK3-HPAH patients



CytoTOF assessment on human PBMCs demonstrated a 2-3x increase of innate immune components – classical and non-classical monocytes, CD16⁺ and CD16⁻ NK cells, and also dendritic cells (both myeloid and plasmacytoid) in KCNK3-HPAH patients.

Supplemental Table

Table S1. Gene Ontology of iPS Microarray

Probe Set ID	Gene Symbol	Control 1	Control 2	KCNK3 mutant	mRNA Accession
8147837	ZFPM2	3.753788	3.678257	6.14383	NM_012082
8116818	BMP6	3.767481	3.767481	6.720144	NM_001718
8102532	PDE5A	3.836234	3.836234	5.256213	NM_001083
8105267	ITGA2	3.869874	4.772655	6.09214	NM_002203
8151931	TSPYL5	3.871941	4.350015	6.135015	NM_033512
8132250	BMPER	3.906456	4.665087	6.831632	NM_133468
8154692	TEK	3.938014	4.757459	6.053513	NM_000459
8138689	SKAP2	3.95428	4.662279	6.095451	NM_001303468
8104758	NPR3	4.054159	4.269153	5.217735	NM_000908
7979241	BMP4	4.100423	4.100423	5.939707	NM_001202
8121850	HEY2	4.145161	3.968143	5.13365	NM_012259
7962212	PKP2	4.601914	5.21813	7.149449	NM_001005242
8091698	SHOX2	4.647913	4.647913	5.937673	NM_001163678
7970949	MAB21L1	4.853406	5.387149	3.272384	NM_005584
7923086	ASPM	4.943844	5.437356	3.84633	NM_001206846
7922976	PTGS2	5.08736	5.981365	3.949162	NM_000963
8155214	MELK	5.108953	5.253481	3.980186	NM_001256685
8097628	HHIP	5.276442	6.571479	8.17002	NM_022475
7929078	KIF20B	5.283451	5.621128	4.069167	NM_001284259
8151890	TP53INP1	5.398271	5.684606	6.72948	NM_001135733
8160441	CDKN2A	5.405371	6.286618	7.110746	NM_000077
8014591	HNF1B	5.409317	5.157039	4.133977	NM_000458
7979307	DLGAP5	5.446868	6.333407	4.598376	NM_001146015
8103728	HMGB2	5.505724	6.224369	4.825548	NM_001130688
8003322	CYBA	5.524947	5.353505	6.568742	NM_000101
8059376	SERPINE2	5.621711	6.705077	7.794783	NM_001136528
7901010	KIF2C	5.636137	5.622636	4.457448	NM_001297655

7926259	MCM10	5.736029	6.203403	4.849039	NM_018518
7909708	CENPF	5.79323	5.969531	4.298212	NM_016343
8144153	NCAPG2	5.795675	6.171447	4.87952	NM_001281932
8175217	GPC4	5.863088	5.970106	4.770126	NM_001448
7929032	FAS	5.89383	6.509405	7.874172	NM_000043
8001133	SHCBP1	5.92767	6.45394	5.09224	NM_024745
8110084	MSX2	6.030248	5.542302	4.6626	NM_002449
8123864	TFAP2A	6.066299	7.289571	4.622367	NM_001032280
7950555	LRRC32	6.104	7.3752	8.674616	NM_001128922
8147777	CTHRC1	6.108233	6.072557	7.119371	NM_001256099
8054580	BUB1	6.180406	6.921506	5.317943	NM_001278616
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7999387	EMP2	6.341525	6.493083	4.880129	NM_001424
8021418	MALT1	6.405386	6.026776	5.133571	NM_006785
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7960340	FOXM1	6.610526	6.677169	5.407912	NM_001243088
8012403	AURKB	6.772769	7.014205	5.745514	NM_001256834
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7900699	CDC20	6.876464	7.557014	6.038435	NM_001255
7937020	MKI67	6.987939	7.336534	5.973728	NM_001145966
8141395	MCM7	7.124069	7.22803	6.039013	NM_001278595
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8039484	IL11	7.597742	6.657686	5.072037	NM_000641
8137526	INSIG1	7.694956	7.303686	5.959184	NM_005542
7977397	CRIP2	7.732655	7.478788	8.912133	NM_001270837
8160452	CDKN2B	7.976059	8.152885	9.333387	NM_004936
8131803	IL6	8.02247	8.191318	4.911787	NM_000600
8139488	IGFBP3	8.174747	8.573958	9.554642	NM_000598
7994109	PLK1	8.364383	8.736185	7.011639	NM_005030

8075310	LIF	8.520697	7.815692	6.476033	NM_001257135
7931097	HTRA1	8.542815	8.583393	9.595797	NM_002775
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8163637	TNC	9.691027	8.838282	7.285433	NM_002160
7961514	MGP	2.687491	4.406413	7.548132	NM_000900
8120932	PRSS35	2.75527	3.319588	5.172153	NM_001170423
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7927631	DKK1	5.540877	6.521642	8.028819	NM_012242
7899615	SERINC2	5.564854	6.225732	7.040218	NM_001199037
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8124166	MBOAT1	5.609929	5.224465	4.342823	NM_001080480
8073662	PARVB	5.632806	6.054708	6.962265	NM_001003828
7985873	TICRR	5.660335	5.780117	4.13255	NM_001308025
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7987192	SLC12A6	5.712003	6.071669	6.960524	NM_001042494
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7976795	MEG3	5.797094	4.62799	8.763985	NR_002766
7991034	HOMER2	5.849521	5.078139	3.967296	NM_004839
8066136	RBL1	5.862245	6.185608	5.012794	NM_002895
8122426	PHACTR2	5.881479	6.045347	7.011969	NM_001100164
8035465	ISYNA1	5.902519	6.326935	7.378338	NM_001170938
8174201	BEX1	5.928147	6.508002	4.58607	NM_018476
8127932	TBX18	5.929869	6.054721	7.253736	NM_001080508
8124413	HIST1H4D	5.933147	5.453468	4.469857	NM_003539
8046895	FAM171B	5.955008	5.998316	7.253956	NM_177454

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8122099	ENPP1	6.090173	5.905112	4.109865	NM_006208
8094301	SLIT2	6.135262	5.948711	5.038857	NM_001289135
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7971461	LCP1	6.146396	6.6564	4.214	NM_002298
8046695	ITGA4	6.150455	6.75944	7.62582	NM_000885
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7982358	ARHGAP11A	6.714486	6.679373	5.076457	NM_001286479
8104022	PDLIM3	6.723104	7.247554	8.323392	NM_001114107
8166049	PRPS2	6.723617	7.484012	5.661592	NM_001039091
8075637	LARGE	6.735202	6.120577	4.951985	NM_004737
7899627	TINAGL1	6.764538	7.867495	9.416409	NM_001204414
8068671	BACE2	6.770382	6.915091	5.451259	NM_012105
7980908	FBLN5	6.811926	6.405494	7.963328	NM_006329
7909568	DTL	6.814297	7.144142	5.125301	NM_001286229
8124437	HIST1H3F	6.837243	6.804944	5.524141	NM_021018
8005097	HS3ST3B1	6.848228	6.542455	4.308916	NM_006041
8136248	MEST	6.851563	7.921887	9.269516	NM_001253900
8113726	PPIC	6.88954	6.961374	7.931062	NM_000943
8142981	PODXL	6.915294	8.047222	9.431723	NM_001018111
7938364	WEE1	7.017804	6.910364	5.440882	ENST00000524549
8071671	GNAZ	7.019323	6.80997	5.117898	NM_002073
8171297	MID1	7.03113	6.817859	5.862845	NM_000381
8172035	DYNLT3	7.072733	6.993057	8.060137	NM_006520
8086517	CDCP1	7.109221	6.308784	5.001067	NM_022842
7936494	GFRA1	7.119196	7.759834	5.153673	NM_001145453
7904158	OLFML3	7.150547	6.427267	5.400223	NM_001286352
8060813	MCM8	7.167406	7.469702	6.213185	NM_001281520
8098204	CPE	7.180418	7.107944	5.306978	NM_001873
8097098	USP53	7.198789	7.094873	8.274392	NM_019050
7990054	UACA	7.211989	7.884422	8.728663	NM_001008224
8131600	TSPAN13	7.272326	8.111202	8.880699	NM_014399
8153021	ST3GAL1	7.311047	7.733921	5.902519	NM_003033
8124388	HIST1H3B	7.325696	7.368342	6.000334	NM_003537
8046333	CYBRD1	7.331817	8.274347	9.861664	NM_001127383

8072687	MCM5	7.348068	7.269277	6.160971	NM_006739
8001784	CDH8	7.349384	7.907311	5.138951	NM_001796
7950307	UCP2	7.360543	6.714551	5.876097	NM_003355
8008784	PRR11	7.372391	7.340515	6.009403	NM_018304
8175871	L1CAM	7.405349	6.392854	4.482969	NM_000425
8030383	RCN3	7.444001	8.160577	9.005676	NM_020650
7951662	CRYAB	7.492001	7.712568	9.261177	NM_001289807
7901969	ROR1	7.508128	7.837547	8.7986	NM_001083592
8118890	SCUBE3	7.556987	7.424299	9.089632	NM_001303136
7932082	CCDC3	7.611732	5.931174	4.199731	NM_001282658
8138888	PDE1C	7.619255	7.007731	5.71167	NM_001191056
7956046	DGKA	7.682218	8.047695	8.974467	NM_001345
8001449	IRX3	7.686186	6.763125	5.903809	NM_024336
8116418	GFPT2	7.722575	7.365243	6.056204	NM_005110
7999468	LITAF	7.774823	8.401083	5.481526	NM_001136472
8108683	PCDHB2	7.826665	7.642568	5.407521	NM_018936
8015387	KRT17	7.879084	8.692177	4.921796	NM_000422
8115851	STC2	7.938939	8.277897	9.19849	NM_003714
8059854	ARL4C	8.012944	7.043461	6.047235	NM_001282431
8161701	TMEM2	8.033732	7.542506	6.329821	NM_001135820
7990345	SEMA7A	8.048428	7.646872	6.653291	NM_001146029
8054439	ST6GAL2	8.056755	7.422904	6.671877	NM_001142351
7930980	PLPP4	8.117237	6.940271	5.186088	NM_001030059
7948229	SLC43A3	8.155936	7.825219	5.539972	NM_001278201
8013042	KRT17P2	8.177467	9.178667	7.110447	AK296148
8117426	HIST1H2BH	8.182202	8.207098	6.600335	NM_003524
7960919	MFAP5	8.197567	8.670865	10.45437	NM_001297709
8001197	NETO2	8.232244	7.581448	6.031626	NM_001201477
8059905	COL6A3	8.280857	9.34433	7.145096	NM_004369
8170119	FHL1	8.357913	9.238449	10.05693	NM_001159699
8006433	CCL2	8.3782	9.556733	6.362932	NM_002982

7928589	PPIF	8.491174	8.482619	7.346016	NM_005729
7984540	KIF23	8.538855	8.299293	7.300292	NM_001281301
7997642	CRISPLD2	8.578808	7.69061	3.878607	NM_031476
8117368	HIST1H4C	8.675164	9.000552	7.755011	NM_003542
8109752	TENM2	8.681618	8.2613	5.533885	NM_001080428
7955637	KRT18	9.106567	9.797234	10.46973	NM_000224
7952268	THY1	9.24589	9.657022	7.613053	NM_001311160
8169240	PRPS1	9.43181	9.541888	7.767011	NM_001204402
8104461	---	4.412413	3.94606	5.30721	NONHSAT100420
7998927	---	4.714522	5.183132	3.620875	uc021tbe.1
7930380	ADD3	5.126945	6.023119	7.075558	NM_001121
8034783	ADGRL1	5.232126	5.685818	6.480236	NM_001008701
8158771	AIF1L	5.47957	5.280882	3.963605	NM_001185095
7902565	ADGRL2	5.62748	5.822192	7.070981	NM_001297704
8040362	---	5.632806	5.658631	6.66814	GENSCAN00000010282
8037387	---	5.638609	6.119893	4.730884	NONHSAT066617
7981317	---	5.715791	5.478179	8.456131	NONHSAT039752
8050766	ADCY3	5.776019	6.164147	4.92509	NM_004036
8154491	ADAMTSL1	5.802879	6.186495	4.232107	NM_001040272
7981514	AHNAK2	5.991465	5.931174	6.994463	NM_138420
8112327	---	6.559037	6.855026	5.681139	ENST00000497342
7985786	ACAN	6.699649	6.164265	4.538263	NM_001135
8171248	ANOS1	7.662767	8.269506	9.28553	NM_000216
7896752	---	8.069938	8.450727	4.518978	ENST00000387421
8165667	---	8.069938	8.450727	4.518978	ENST00000387421
8043375	---	8.316909	8.62455	4.255461	ENST00000387421
8132318	ANLN	8.681654	8.558188	7.171162	NM_001284301

Table S2. RNA-Seq gene expression in Whole Mouse Lung

ensembl_gene_id	mgi_symbol	Description	Control	Control	KCNK3 ^{n/n}	KCNK3 ^{n/n}	Fold Change
ENSMUSG0000018381	Abi3	ABI gene family, member 3 [Source:MGI Symbol;Acc:MGI:1913860]	11.2	11.2	11.5	11.6	1.3
ENSMUSG0000044337	Ackr3	atypical chemokine receptor 3 [Source:MGI Symbol;Acc:MGI:109562]	12.3	12.2	11.8	11.7	-1.4
ENSMUSG0000017307	Acot8	acyl-CoA thioesterase 8 [Source:MGI Symbol;Acc:MGI:2158201]	8.9	9.0	9.3	9.2	1.3
ENSMUSG0000058145	Adamts17	a disintegrin-like and metallopeptidase (reprolysin type) with thrombospondin type 1 motif, 17 [Source:MGI Symbol;Acc:MGI:3588195]	8.8	8.8	9.2	9.2	1.3
ENSMUSG0000031448	Adprhl1	ADP-ribosylhydrolase like 1 [Source:MGI Symbol;Acc:MGI:2442168]	5.2	5.4	6.3	6.2	2.0
ENSMUSG0000058620	Adra2b	adrenergic receptor, alpha 2b [Source:MGI Symbol;Acc:MGI:87935]	5.3	5.2	4.7	4.6	-1.5
ENSMUSG0000010601	Apol7a	apolipoprotein L 7a [Source:MGI Symbol;Acc:MGI:1923011]	5.3	5.4	6.0	5.9	1.5
ENSMUSG0000028919	Arhgef19	Rho guanine nucleotide exchange factor (GEF) 19 [Source:MGI Symbol;Acc:MGI:1925912]	9.6	9.6	9.9	10.0	1.3
ENSMUSG0000047446	Arl4a	ADP-ribosylation factor-like 4A [Source:MGI Symbol;Acc:MGI:99437]	11.4	11.3	11.0	10.9	-1.3
ENSMUSG0000037053	Azgp1	alpha-2-glycoprotein 1, zinc [Source:MGI Symbol;Acc:MGI:103163]	7.7	7.7	8.2	8.1	1.3
ENSMUSG0000021070	Bdkrb2	bradykinin receptor, beta 2 [Source:MGI Symbol;Acc:MGI:102845]	7.9	7.9	7.4	7.6	-1.4
ENSMUSG0000038871	Bpgm	2,3-bisphosphoglycerate mutase [Source:MGI Symbol;Acc:MGI:1098242]	11.1	11.3	10.7	10.7	-1.5
ENSMUSG0000063130	Calml3	calmodulin-like 3 [Source:MGI Symbol;Acc:MGI:1917655]	7.4	7.3	6.9	7.1	-1.3
ENSMUSG0000031883	Car7	carbonic anhydrase 7 [Source:MGI Symbol;Acc:MGI:103100]	6.4	6.5	6.0	6.0	-1.3
ENSMUSG0000031143	Ccdc22	coiled-coil domain containing 22 [Source:MGI Symbol;Acc:MGI:1859608]	4.2	3.9	5.0	5.3	2.1
ENSMUSG0000042262	Ccr8	chemokine (C-C motif) receptor 8 [Source:MGI Symbol;Acc:MGI:1201402]	5.9	6.0	5.4	5.5	-1.4

ENSMUSG0000069607	Cd300lh	CD300 antigen like family member H [Source:MGI Symbol;Acc:MGI:2687214]	3.6	3.6	4.3	4.3	1.6
ENSMUSG0000030798	Cd37	CD37 antigen [Source:MGI Symbol;Acc:MGI:88330]	7.0	6.9	6.5	6.6	-1.4
ENSMUSG0000027435	Cd93	CD93 antigen [Source:MGI Symbol;Acc:MGI:106664]	15.1	15.1	15.5	15.4	1.3
ENSMUSG0000021175	Cdca7l	cell division cycle associated 7 like [Source:MGI Symbol;Acc:MGI:2384982]	8.5	8.4	8.1	8.0	-1.3
ENSMUSG0000000305	Cdh4	cadherin 4 [Source:MGI Symbol;Acc:MGI:99218]	9.8	9.8	9.3	9.3	-1.4
ENSMUSG0000002835	Chaf1a	chromatin assembly factor 1, subunit A (p150) [Source:MGI Symbol;Acc:MGI:1351331]	9.3	9.2	8.7	8.8	-1.4
ENSMUSG0000022945	Chaf1b	chromatin assembly factor 1, subunit B (p60) [Source:MGI Symbol;Acc:MGI:1314881]	8.2	8.1	7.8	7.8	-1.3
ENSMUSG0000030365	Clec2i	C-type lectin domain family 2, member i [Source:MGI Symbol;Acc:MGI:2136650]	7.4	7.4	7.0	7.1	-1.3
ENSMUSG0000025064	Col17a1	collagen, type XVII, alpha 1 [Source:MGI Symbol;Acc:MGI:88450]	8.5	8.5	8.9	8.8	1.3
ENSMUSG0000018916	Csf2	colony stimulating factor 2 (granulocyte-macrophage) [Source:MGI Symbol;Acc:MGI:1339752]	6.5	6.6	7.2	7.2	1.6
ENSMUSG0000052336	Cx3cr1	chemokine (C-X3-C motif) receptor 1 [Source:MGI Symbol;Acc:MGI:1333815]	9.8	9.8	10.3	10.3	1.4
ENSMUSG0000027983	Cyp2u1	cytochrome P450, family 2, subfamily u, polypeptide 1 [Source:MGI Symbol;Acc:MGI:1918769]	7.3	7.3	7.7	7.6	1.3
ENSMUSG0000047642	D930020B18Rik	RIKEN cDNA D930020B18 gene [Source:MGI Symbol;Acc:MGI:2442001]	6.4	6.3	7.1	6.9	1.6
ENSMUSG0000036862	Dchs1	dachsous 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:2685011]	11.4	11.5	11.8	11.8	1.3
ENSMUSG0000043051	Disc1	disrupted in schizophrenia 1 [Source:MGI Symbol;Acc:MGI:2447658]	7.2	7.1	7.7	7.5	1.3
ENSMUSG0000047517	Dmbt1	deleted in malignant brain tumors 1 [Source:MGI Symbol;Acc:MGI:106210]	3.1	3.0	3.7	3.7	1.6
ENSMUSG0000036766	Dner	delta/notch-like EGF repeat containing [Source:MGI Symbol;Acc:MGI:2152889]	6.3	6.4	6.0	5.9	-1.3
ENSMUSG0000040631	Dok4	docking protein 4 [Source:MGI Symbol;Acc:MGI:2148865]	11.0	11.0	11.3	11.4	1.3

ENSMUSG0000078580	E430018J23Rik	RIKEN cDNA E430018J23 gene [Source:MGI Symbol;Acc:MGI:2141981]	8.7	8.7	9.2	9.0	1.3
ENSMUSG0000010476	Ebf3	early B cell factor 3 [Source:MGI Symbol;Acc:MGI:894289]	5.0	5.1	4.4	4.5	-1.5
ENSMUSG0000022122	Ednrb	endothelin receptor type B [Source:MGI Symbol;Acc:MGI:102720]	11.6	11.5	11.8	12.0	1.3
ENSMUSG0000022203	Efs	embryonal Fyn-associated substrate [Source:MGI Symbol;Acc:MGI:105311]	8.8	8.8	9.2	9.4	1.4
ENSMUSG0000019989	Enpp3	ectonucleotide pyrophosphatase/phosphodiesterase 3 [Source:MGI Symbol;Acc:MGI:2143702]	7.5	7.3	7.0	7.0	-1.3
ENSMUSG0000028644	Ermap	erythroblast membrane-associated protein [Source:MGI Symbol;Acc:MGI:1349816]	5.8	6.2	4.9	5.0	-2.1
ENSMUSG0000019768	Esr1	estrogen receptor 1 (alpha) [Source:MGI Symbol;Acc:MGI:1352467]	7.7	7.6	8.9	8.9	2.3
ENSMUSG0000019909	Fam162b	family with sequence similarity 162, member B [Source:MGI Symbol;Acc:MGI:1924546]	6.9	7.2	7.9	8.0	1.8
ENSMUSG0000042788	Fam166b	family with sequence similarity 166, member B [Source:MGI Symbol;Acc:MGI:2445194]	7.6	7.5	7.9	7.9	1.3
ENSMUSG0000050493	Fam167b	family with sequence similarity 167, member B [Source:MGI Symbol;Acc:MGI:2668032]	6.4	6.3	6.0	5.9	-1.3
ENSMUSG0000073805	Fam196a	family with sequence similarity 196, member A [Source:MGI Symbol;Acc:MGI:3605068]	7.0	7.0	6.3	6.2	-1.7
ENSMUSG0000034532	Fbxo16	F-box protein 16 [Source:MGI Symbol;Acc:MGI:1354706]	6.1	6.0	6.7	6.5	1.5
ENSMUSG0000089984	Fbxo24	F-box protein 24 [Source:MGI Symbol;Acc:MGI:1918426]	5.8	5.7	5.3	5.3	-1.4
ENSMUSG0000090173	Fbxw10	F-box and WD-40 domain protein 10 [Source:MGI Symbol;Acc:MGI:3052463]	6.4	6.3	5.6	5.6	-1.7
ENSMUSG0000037106	Fer1l6	fer-1-like 6 (C. elegans) [Source:MGI Symbol;Acc:MGI:3645398]	6.4	6.4	5.4	5.4	-1.9
ENSMUSG0000044453	Ffar1	free fatty acid receptor 1 [Source:MGI Symbol;Acc:MGI:2684079]	6.3	6.4	5.6	5.6	-1.7
ENSMUSG0000047787	Flrt1	fibronectin leucine rich transmembrane protein 1 [Source:MGI Symbol;Acc:MGI:3026647]	6.0	5.9	5.6	5.6	-1.3
ENSMUSG0000029212	Gabrb1	gamma-aminobutyric acid (GABA) A receptor, subunit beta 1 [Source:MGI Symbol;Acc:MGI:95619]	5.5	5.7	6.2	6.1	1.4

ENSMUSG0000028671	Gale	galactose-4-epimerase, UDP [Source:MGI Symbol;Acc:MGI:1921496]	8.8	8.8	9.2	9.1	1.3
ENSMUSG0000015944	Gatsl2	GATS protein-like 2 [Source:MGI Symbol;Acc:MGI:1933384]	11.4	11.5	11.8	11.8	1.3
ENSMUSG0000038508	Gdf15	growth differentiation factor 15 [Source:MGI Symbol;Acc:MGI:1346047]	6.9	6.9	7.4	7.3	1.4
ENSMUSG0000061104	Gm10094	predicted gene 10094 [Source:MGI Symbol;Acc:MGI:3704317]	6.2	6.1	5.8	5.7	-1.3
ENSMUSG0000091556	Gm14569	predicted gene 14569 [Source:MGI Symbol;Acc:MGI:3705243]	6.0	5.9	6.4	6.5	1.5
ENSMUSG0000031748	Gnao1	guanine nucleotide binding protein, alpha O [Source:MGI Symbol;Acc:MGI:95775]	10.3	10.2	10.7	10.9	1.4
ENSMUSG0000015812	Gnrh1	gonadotropin releasing hormone 1 [Source:MGI Symbol;Acc:MGI:95789]	6.1	5.7	5.1	5.2	-1.7
ENSMUSG0000039720	Got1l1	glutamic-oxaloacetic transaminase 1-like 1 [Source:MGI Symbol;Acc:MGI:1923865]	4.6	4.7	5.4	5.3	1.6
ENSMUSG0000031700	Gpt2	glutamic pyruvate transaminase (alanine aminotransferase) 2 [Source:MGI Symbol;Acc:MGI:1915391]	9.3	9.4	9.8	9.7	1.3
ENSMUSG0000046182	Gsg1l	GSG1-like [Source:MGI Symbol;Acc:MGI:2685483]	8.2	8.1	7.5	7.6	-1.5
ENSMUSG0000023982	Guca1a	guanylate cyclase activator 1a (retina) [Source:MGI Symbol;Acc:MGI:102770]	5.6	6.1	4.6	4.7	-2.4
ENSMUSG0000051839	Gypa	glycophorin A [Source:MGI Symbol;Acc:MGI:95880]	6.9	7.4	4.5	3.7	-8.3
ENSMUSG0000038422	Hdhd3	haloacid dehalogenase-like hydrolase domain containing 3 [Source:MGI Symbol;Acc:MGI:1919998]	7.4	7.5	7.8	7.9	1.3
ENSMUSG0000041180	Hectd2	HECT domain containing 2 [Source:MGI Symbol;Acc:MGI:2442663]	8.2	8.3	8.0	7.8	-1.3
ENSMUSG0000043342	Hoxd9	homeobox D9 [Source:MGI Symbol;Acc:MGI:96210]	6.5	6.2	5.3	5.5	-1.9
ENSMUSG0000029096	Htra3	HtrA serine peptidase 3 [Source:MGI Symbol;Acc:MGI:1925808]	10.2	10.2	10.6	10.8	1.4
ENSMUSG0000079017	Ifi2712a	interferon, alpha-inducible protein 27 like 2A [Source:MGI Symbol;Acc:MGI:1924183]	9.4	9.5	10.0	10.0	1.4
ENSMUSG0000031111	Igsf1	immunoglobulin superfamily, member 1 [Source:MGI Symbol;Acc:MGI:2147913]	4.7	4.7	5.4	5.3	1.6

ENSMUSG0000049093	Il23r	interleukin 23 receptor [Source:MGI Symbol;Acc:MGI:2181693]	5.6	5.6	4.8	5.0	-1.6
ENSMUSG0000068227	Il2rb	interleukin 2 receptor, beta chain [Source:MGI Symbol;Acc:MGI:96550]	9.9	9.8	9.4	9.3	-1.4
ENSMUSG0000037801	Iqch	IQ motif containing H [Source:MGI Symbol;Acc:MGI:1925500]	4.6	4.4	5.5	5.1	1.8
ENSMUSG0000018470	Kcnab3	potassium voltage-gated channel, shaker-related subfamily, beta member 3 [Source:MGI Symbol;Acc:MGI:1336208]	6.7	6.6	5.9	5.5	-1.9
ENSMUSG0000025597	Klh14	kelch-like 4 [Source:MGI Symbol;Acc:MGI:2442829]	8.2	8.2	7.8	7.6	-1.4
ENSMUSG0000030167	Klrc1	killer cell lectin-like receptor subfamily C, member 1 [Source:MGI Symbol;Acc:MGI:1336161]	6.1	6.1	5.6	5.6	-1.4
ENSMUSG0000100916	Lhb	luteinizing hormone beta [Source:MGI Symbol;Acc:MGI:96782]	7.1	6.9	7.6	7.5	1.5
ENSMUSG0000030427	Lilra6	leukocyte immunoglobulin-like receptor, subfamily A (with TM domain), member 6 [Source:MGI Symbol;Acc:MGI:1195969]	7.9	7.7	8.2	8.3	1.4
ENSMUSG0000022595	Lypd2	Ly6/Plaur domain containing 2 [Source:MGI Symbol;Acc:MGI:1915561]	8.9	8.7	9.2	9.2	1.3
ENSMUSG0000025963	Mdh1b	malate dehydrogenase 1B, NAD (soluble) [Source:MGI Symbol;Acc:MGI:1923918]	7.1	7.1	7.5	7.5	1.3
ENSMUSG0000051855	Mest	mesoderm specific transcript [Source:MGI Symbol;Acc:MGI:96968]	9.2	9.2	8.8	8.7	-1.3
ENSMUSG0000054641	Mmrn1	multimerin 1 [Source:MGI Symbol;Acc:MGI:1918195]	12.7	12.6	12.2	12.3	-1.3
ENSMUSG0000079429	Mroh2a	maestro heat-like repeat family member 2A [Source:MGI Symbol;Acc:MGI:3705228]	5.9	5.8	5.4	5.4	-1.3
ENSMUSG0000025141	Myadml2	myeloid-associated differentiation marker-like 2 [Source:MGI Symbol;Acc:MGI:1915765]	3.3	3.0	4.9	4.9	3.4
ENSMUSG0000022346	Myc	myelocytomatosis oncogene [Source:MGI Symbol;Acc:MGI:97250]	9.5	9.4	8.9	8.8	-1.5
ENSMUSG0000041361	Myzap	myocardial zonula adherens protein [Source:MGI Symbol;Acc:MGI:2142908]	10.7	10.7	11.2	11.2	1.4
ENSMUSG0000030380	Mzfl	myeloid zinc finger 1 [Source:MGI Symbol;Acc:MGI:107457]	6.3	6.3	6.8	6.7	1.4

ENSMUSG0000006471	Ndor1	NADPH dependent diflavin oxidoreductase 1 [Source:MGI Symbol;Acc:MGI:1926047]	11.1	11.0	10.5	10.5	-1.5
ENSMUSG0000031478	Nek3	NIMA (never in mitosis gene a)-related expressed kinase 3 [Source:MGI Symbol;Acc:MGI:1344371]	7.5	7.4	7.8	7.9	1.3
ENSMUSG0000029832	Nfe2l3	nuclear factor, erythroid derived 2, like 3 [Source:MGI Symbol;Acc:MGI:1339958]	7.6	7.6	7.3	7.2	-1.3
ENSMUSG0000015468	Notch4	notch 4 [Source:MGI Symbol;Acc:MGI:107471]	13.2	13.4	13.7	13.8	1.4
ENSMUSG0000059791	Nrm	nurim (nuclear envelope membrane protein) [Source:MGI Symbol;Acc:MGI:2146855]	9.0	8.9	8.6	8.6	-1.3
ENSMUSG0000020297	Nsg2	neuron specific gene family member 2 [Source:MGI Symbol;Acc:MGI:1202070]	7.3	7.2	7.0	6.9	-1.3
ENSMUSG0000045392	Olfir1033	olfactory receptor 1033 [Source:MGI Symbol;Acc:MGI:3030867]	6.2	6.4	6.8	6.8	1.4
ENSMUSG0000037366	Pafah2	platelet-activating factor acetylhydrolase 2 [Source:MGI Symbol;Acc:MGI:2140321]	10.4	10.3	10.7	10.7	1.3
ENSMUSG0000030513	Pcsk6	proprotein convertase subtilisin/kexin type 6 [Source:MGI Symbol;Acc:MGI:102897]	10.6	10.6	10.3	10.1	-1.3
ENSMUSG0000035246	Pcyt1b	phosphate cytidyltransferase 1, choline, beta isoform [Source:MGI Symbol;Acc:MGI:2147987]	7.7	7.7	7.3	7.4	-1.3
ENSMUSG0000050751	Pgbd5	piggyBac transposable element derived 5 [Source:MGI Symbol;Acc:MGI:2429955]	5.1	5.1	4.6	4.6	-1.4
ENSMUSG0000041202	Pla2g2d	phospholipase A2, group IID [Source:MGI Symbol;Acc:MGI:1341796]	6.6	6.7	6.2	6.3	-1.3
ENSMUSG0000026173	Plcd4	phospholipase C, delta 4 [Source:MGI Symbol;Acc:MGI:107469]	6.1	6.3	6.8	6.7	1.5
ENSMUSG0000044667	Plppr4	phospholipid phosphatase related 4 [Source:MGI Symbol;Acc:MGI:106530]	4.7	4.7	5.2	5.3	1.4
ENSMUSG0000070802	Pnmal2	PNMA-like 2 [Source:MGI Symbol;Acc:MGI:3645856]	8.9	9.0	9.2	9.3	1.3
ENSMUSG0000020974	Pole2	polymerase (DNA directed), epsilon 2 (p59 subunit) [Source:MGI Symbol;Acc:MGI:1197514]	7.5	7.4	7.0	7.1	-1.4
ENSMUSG0000061718	Ppp1r1b	protein phosphatase 1, regulatory (inhibitor) subunit 1B [Source:MGI Symbol;Acc:MGI:94860]	9.2	9.3	9.8	9.8	1.4
ENSMUSG0000038151	Prdm1	PR domain containing 1, with ZNF domain [Source:MGI Symbol;Acc:MGI:99655]	9.6	9.5	9.8	9.9	1.3

ENSMUSG0000010175	Prox1	prospero homeobox 1 [Source:MGI Symbol;Acc:MGI:97772]	10.3	10.3	9.9	10.0	-1.3
ENSMUSG0000053198	Prx	periaxin [Source:MGI Symbol;Acc:MGI:108176]	14.2	14.2	14.5	14.6	1.3
ENSMUSG0000097487	Ptges3l	prostaglandin E synthase 3 (cytosolic)-like [Source:MGI Symbol;Acc:MGI:1916146]	5.2	5.3	5.5	5.6	1.3
ENSMUSG0000038751	Ptk6	PTK6 protein tyrosine kinase 6 [Source:MGI Symbol;Acc:MGI:99683]	5.8	6.0	6.9	6.8	1.9
ENSMUSG0000026204	Ptpn	protein tyrosine phosphatase, receptor type, N [Source:MGI Symbol;Acc:MGI:102765]	8.1	8.1	7.7	7.8	-1.3
ENSMUSG0000066677	Pydc3	pyrin domain containing 3 [Source:MGI Symbol;Acc:MGI:2442822]	10.0	9.9	10.3	10.5	1.3
ENSMUSG0000030359	Pzp	pregnancy zone protein [Source:MGI Symbol;Acc:MGI:87854]	4.9	4.9	5.4	5.4	1.4
ENSMUSG0000003411	Rab3b	RAB3B, member RAS oncogene family [Source:MGI Symbol;Acc:MGI:1917158]	4.4	4.3	5.2	5.3	1.8
ENSMUSG0000029602	Rasal1	RAS protein activator like 1 (GAP1 like) [Source:MGI Symbol;Acc:MGI:1330842]	4.7	4.7	4.0	3.9	-1.7
ENSMUSG0000025576	Rbfox3	RNA binding protein, fox-1 homolog (C. elegans) 3 [Source:MGI Symbol;Acc:MGI:106368]	6.3	6.4	6.8	6.9	1.4
ENSMUSG0000029136	Rbks	ribokinase [Source:MGI Symbol;Acc:MGI:1918586]	7.0	6.8	7.4	7.6	1.5
ENSMUSG0000032454	Rbp2	retinol binding protein 2, cellular [Source:MGI Symbol;Acc:MGI:97877]	4.1	4.0	5.3	5.4	2.4
ENSMUSG0000048899	Rimkla	ribosomal modification protein rimK-like family member A [Source:MGI Symbol;Acc:MGI:3040686]	4.9	5.0	4.4	4.6	-1.4
ENSMUSG0000046215	Rprml	reprimin-like [Source:MGI Symbol;Acc:MGI:2144486]	6.2	6.2	7.0	7.3	1.9
ENSMUSG0000074115	Saa1	serum amyloid A 1 [Source:MGI Symbol;Acc:MGI:98221]	2.9	2.4	5.0	5.5	6.2
ENSMUSG0000031665	Sall1	sal-like 1 (Drosophila) [Source:MGI Symbol;Acc:MGI:1889585]	4.2	4.4	5.3	5.8	2.4
ENSMUSG0000070304	Scn2b	sodium channel, voltage-gated, type II, beta [Source:MGI Symbol;Acc:MGI:106921]	6.3	6.2	5.9	5.7	-1.4
ENSMUSG0000005696	Sh2d1a	SH2 domain containing 1A [Source:MGI Symbol;Acc:MGI:1328352]	3.6	3.8	5.4	4.9	2.8

ENSMUSG0000051504	Siglech	sialic acid binding Ig-like lectin H [Source:MGI Symbol;Acc:MGI:2443256]	6.9	6.8	7.3	7.5	1.4
ENSMUSG0000070280	Slc22a14	solute carrier family 22 (organic cation transporter), member 14 [Source:MGI Symbol;Acc:MGI:2685974]	4.7	4.6	5.1	5.2	1.4
ENSMUSG0000029175	Slc35f6	solute carrier family 35, member F6 [Source:MGI Symbol;Acc:MGI:1922169]	11.3	11.3	11.7	11.7	1.3
ENSMUSG0000006574	Slc4a1	solute carrier family 4 (anion exchanger), member 1 [Source:MGI Symbol;Acc:MGI:109393]	9.3	10.1	7.1	6.3	-7.8
ENSMUSG0000041644	Slc5a12	solute carrier family 5 (sodium/glucose cotransporter), member 12 [Source:MGI Symbol;Acc:MGI:2138890]	5.0	5.6	6.8	6.7	2.8
ENSMUSG0000025938	Slco5a1	solute carrier organic anion transporter family, member 5A1 [Source:MGI Symbol;Acc:MGI:2443431]	8.5	8.5	8.1	8.2	-1.3
ENSMUSG0000036867	Smad6	SMAD family member 6 [Source:MGI Symbol;Acc:MGI:1336883]	12.6	12.6	13.0	13.1	1.3
ENSMUSG0000025889	Snca	synuclein, alpha [Source:MGI Symbol;Acc:MGI:1277151]	8.7	9.3	7.6	7.4	-2.8
ENSMUSG0000026532	Spta1	spectrin alpha, erythrocytic 1 [Source:MGI Symbol;Acc:MGI:98385]	6.6	7.1	5.6	5.5	-2.5
ENSMUSG0000017400	Stac2	SH3 and cysteine rich domain 2 [Source:MGI Symbol;Acc:MGI:2144518]	7.1	7.2	6.2	6.3	-1.8
ENSMUSG0000031027	Stk33	serine/threonine kinase 33 [Source:MGI Symbol;Acc:MGI:2152419]	9.0	9.0	9.4	9.4	1.3
ENSMUSG0000041479	Syt15	synaptotagmin XV [Source:MGI Symbol;Acc:MGI:2442166]	8.4	8.2	8.9	9.1	1.7
ENSMUSG0000001983	Taco1	translational activator of mitochondrially encoded cytochrome c oxidase I [Source:MGI Symbol;Acc:MGI:1917457]	9.1	8.9	8.6	8.6	-1.3
ENSMUSG0000002781	Tmem143	transmembrane protein 143 [Source:MGI Symbol;Acc:MGI:1917459]	8.8	8.7	9.1	9.1	1.3
ENSMUSG0000049526	Tmem202	transmembrane protein 202 [Source:MGI Symbol;Acc:MGI:1921143]	4.8	4.7	5.3	5.3	1.5
ENSMUSG0000048572	Tmem252	transmembrane protein 252 [Source:MGI Symbol;Acc:MGI:3583948]	11.7	11.7	11.0	10.9	-1.8
ENSMUSG0000005628	Tmod4	tropomodulin 4 [Source:MGI Symbol;Acc:MGI:1355285]	6.0	5.9	5.4	5.5	-1.4

ENSMUSG0000032268	Tmprss5	transmembrane protease, serine 5 (spinesin) [Source:MGI Symbol;Acc:MGI:1933407]	5.6	5.6	5.2	5.1	-1.4
ENSMUSG0000073400	Trim10	tripartite motif-containing 10 [Source:MGI Symbol;Acc:MGI:1338757]	6.6	7.4	4.6	4.3	-6.0
ENSMUSG0000035601	Trmt10b	tRNA methyltransferase 10B [Source:MGI Symbol;Acc:MGI:1917184]	8.5	8.5	8.8	8.9	1.3
ENSMUSG0000025272	Tro	trophinin [Source:MGI Symbol;Acc:MGI:1928994]	7.4	7.5	7.8	7.8	1.3
ENSMUSG0000022510	Trp63	transformation related protein 63 [Source:MGI Symbol;Acc:MGI:1330810]	5.8	6.0	5.3	5.3	-1.5
ENSMUSG0000027716	Trpc3	transient receptor potential cation channel, subfamily C, member 3 [Source:MGI Symbol;Acc:MGI:109526]	8.6	8.7	8.1	7.9	-1.6
ENSMUSG0000022388	Ttl8	tubulin tyrosine ligase-like family, member 8 [Source:MGI Symbol;Acc:MGI:1922902]	6.5	6.5	6.2	6.1	-1.3
ENSMUSG0000062380	Tubb3	tubulin, beta 3 class III [Source:MGI Symbol;Acc:MGI:107813]	7.7	7.7	7.1	7.3	-1.4
ENSMUSG0000034485	Uaca	uveal autoantigen with coiled-coil domains and ankyrin repeats [Source:MGI Symbol;Acc:MGI:1919815]	13.0	12.9	12.6	12.5	-1.3
ENSMUSG0000027300	Ubox5	U box domain containing 5 [Source:MGI Symbol;Acc:MGI:2154658]	8.6	8.7	9.1	9.2	1.4
ENSMUSG0000020099	Unc5b	unc-5 homolog B (C. elegans) [Source:MGI Symbol;Acc:MGI:894703]	11.8	11.7	11.4	11.3	-1.3
ENSMUSG0000037989	Wnk2	WNK lysine deficient protein kinase 2 [Source:MGI Symbol;Acc:MGI:1922857]	7.5	7.4	6.9	6.6	-1.6
ENSMUSG0000048728	Zfp454	zinc finger protein 454 [Source:MGI Symbol;Acc:MGI:2679253]	6.2	6.1	6.7	6.7	1.4
ENSMUSG0000055202	Zfp811	zinc finger protein 811 [Source:MGI Symbol;Acc:MGI:2682944]	4.4	4.3	5.5	5.1	2.0

Table S3. List of Fluidigm and Biolegend antibodies used for mass immunophenotyping

	Metal	Target
1	89Y	CD45
2	141Pr	CCR6
3	142Nd	CD19
4	143Nd	anti-CX3CR1-biotin + anti-biotin-143
5	144Nd	CD11b
6	145Nd	CD4
7	146Nd	IgD
8	147Sm	CD11c
9	148Nd	CD16
10	149Sm	CD127
11	150Nd	CD86
12	151Eu	HLA-DR
13	152Sm	CD21
14	153Eu	CXCR5
15	154Sm	TIGIT
16	155Gd	PD-1
17	156Gd	CXCR3
18	158Gd	CCR4
19	159Tb	CCR7
20	160Gd	CD14
21	162Dy	CD27
22	163Dy	CD34
23	164Dy	CD45RO
24	165Ho	anti-CD133-PE + anti-PE
25	166Er	CD24
26	167Er	CD38
27	168Er	CD8
28	169Tm	CD25
29	170Er	CD3
30	171Yb	CD68
31	172Yb	IgM
32	173Yb	CXCR4
33	174Yb	anti-CCR2-FITC + anti-FITC
34	175Lu	Rabbit anti-BTK + anti-rabbit IgG
35	176Yb	anti-CD28-APC + anti-APC
36	191/193	Nucleic acid Intercalator
37	198Pt	Cisplatin

Table S4. Immuno cell type surface markers used in the CyTOF study

































POPULATION	PHENOTYPE
 CD16+ NK Cells	CD16+ CD14- HLADR-
 CD16- NK Cells	CD16- CD14- HLADR-
 Non-Classical Monocytes	CD16+CD14 ^{lo} HLA-DR+CD11b+CD4 ^{lo}
 Classical Monocytes	CD16-CD14+HLA-DR+CD11b ^{hi} CD4 ^{lo}
 Island 1	CD25+CD38+CD45RO+
 mDCs	CD14-CD16-HLA-DR+CD11c+CD4 ^{lo}
 pDCs	CD14-CD16-HLA-DR+CD11c-CD4 ^{lo}
 Plasmablasts	CD19+CD38 ^{HI} CD27 ^{HI}
 Island 5	CD38+CD27+TIGIT+CD16 ^{lo}
 Island 6	CD38+CD27+CXCR3+CD11c+CD11b+
 Island 7	CD25+CD27+CCR4+CD127+
 Naive B Cells	CD19+CD27-IgD+
 US Memory B Cells	CD19+CD27-IgD+CD133+CCR7+
 CD133+ Island 2	CD19+CD21+IgD+IgM+CD133+
 CD133+ Island 3	CD19+CD21+IgD+IgM+CCR6+CD133+
 T and B Cell Doublets	CD3+CD8+CD19+
 DP T Cells (Memory)	CD3+CD4+CD8+CD45RO+CCR7-
 DP T Cells (2) (Naive)	CD3+CD4+CD8+CD45RO-CCR7+
 HSCs	CD133+CD34+CD38+CD45 ^{lo}
 CD8+ Tnaive Cels	CD3+CD8+CD45RO-CCR7+
 CD8+ Tcm Cells	CD3+CD8+CD45RO+CCR7+
 CS Memory B Cells	CD19+CD27+IgD-
 CD8+ Tem Cells	CD3+CD8+CD45RO+CCR7-
 CD8+ Temra Cells	CD3+CD8+CD45RO-CCR7-
 CD4+ Tnaive Cells	CD3+CD4+CD45RO-CCR7+
 CD4+ Tcm Cells	CD3+CD4+CD45RO+CCR7+
 CD4+ Tem Cells	CD3+CD4+CD45RO+CCR7-
 Tfh Cells	CD3+CD4+CXCR5+PD1+
 Naive DN T Cells(TCRgd)	CD3+CD4-CD8-CD45RO-CCR7+
 Memory DN T Cells(TCRgd)	CD3+CD4-CD8-CD45RO+CCR7-
 CD8+ Tem Cells (2)	CD3+CD8+CD45RO+CCR7-
 CD8+ Temra Cells (2)	CD3+CD8+CD45RO-CCR7-

Table S5. Demographics of volunteers/patients served in the CyTOF study

Clinical subjects	Age	Sex
Healthy Volunteer 1	7	Male
Healthy Volunteer 2	13	Male
PAH patient with KCNK3 mutation	9	Male
PAH patient with KCNK3 mutation	11	Male

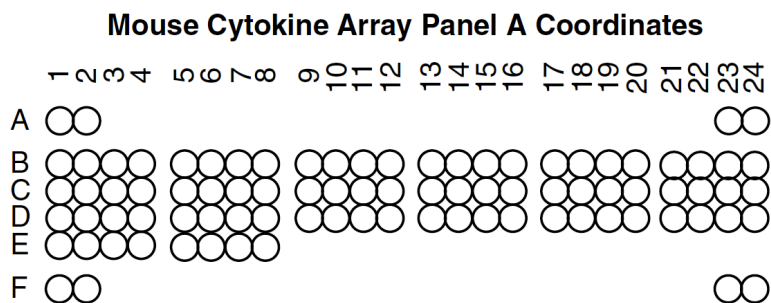
Table S6. List of antibodies used in conventional flow cytometry

ThermoFisher Scientific	Catalog details
eBioscience™ Mouse Hematopoietic Lineage Biotin Panel	88-7774-75
eBioscience™ Streptavidin eFluor™ 450 Conjugate	48-4317-82
Ly-6A/E (Sca-1) Monoclonal Antibody (D7), PE, eBioscience™	12-5981-82
CD117 (c-Kit) Monoclonal Antibody (2B8), APC-eFluor 780, eBioscience™	47-1171-82
CD135 (Flt3) Monoclonal Antibody (A2F10), PE-Cyanine5, eBioscience™	15-1351-82
CD34 Monoclonal Antibody (RAM34), eFluor 660, eBioscience™	50-0341-82
CD16/CD32 Monoclonal Antibody (93), PE-Cyanine7, eBioscience™	25-0161-82
Ly-6G/Ly-6C Monoclonal Antibody (RB6-8C5), PE-Cyanine7, eBioscience™	25-5931-82
CD11b Monoclonal Antibody (M1/70), PE, eBioscience™	12-0112-82
CD4 Monoclonal Antibody (RM4-5), eFluor 450, eBioscience™	48-0042-82
CD8a Monoclonal Antibody (53-6.7), APC-eFluor 780, eBioscience™	47-0081-82
CD45R (B220) Monoclonal Antibody (RA3-6B2), APC, eBioscience™	17-0452-82

Table S7. Surface Master Mix

Conjugate	Target	Clone	Vendor	Volume/test (uL)
89Y	CD45	HI30	Fluidigm	0.25
141Pr	CCR6	G034E3	Fluidigm	1.25
142Nd	CD19	HIB19	Fluidigm	0.25
Biotin	CX3CR1	2A91	Biolegend	2
144Nd	CD11b	ICRF44	Fluidigm	0.1
145Nd	CD4	RPA-T4	Fluidigm	0.25
146Nd	IgD	IA6-2	Fluidigm	0.1
147Sm	CD11c	Bu15	Fluidigm	0.25
148Nd	CD16	3G8	Fluidigm	0.25
149Sm	CD127	A019D5	Fluidigm	2.5
150Nd	CD86	IT2.2	Fluidigm	1.5
151Eu	HLA-DR	G46-6	Fluidigm	0.1
152Sm	CD21	BL13	Fluidigm	1
153Eu	CXCR5	RF8B2	Fluidigm	1
154Sm	TIGIT	MBSA43	Fluidigm	1
155Gd	PD-1	EH12.2H7	Fluidigm	2
156Gd	CXCR3	G025H7	Fluidigm	2
158Gd	CCR4	L291H4	Fluidigm	1
159Tb	CCR7	G043H7	Fluidigm	0.75
160Gd	CD14	M5E2	Fluidigm	1
162Dy	CD27	L128	Fluidigm	0.5
163Dy	CD34	581	Fluidigm	1
164Dy	CD45RO	UCHL1	Fluidigm	0.5
PE	CD133	clone 7	Biolegend	2
166Er	CD24	ML5	Fluidigm	1.5
167Er	CD38	HIT2	Fluidigm	0.5
168Er	CD8	SKI1	Fluidigm	0.05
169Tm	CD25	2A3	Fluidigm	0.5
170Er	CD3	UCHT1	Fluidigm	0.25
172Yb	IgM	MHM-88	Fluidigm	0.1
173Yb	CXCR4	12G5	Fluidigm	1
APC	CD28	CD28.2	Biolegend	2
PBS/1% BSA				71.55
Total Per Test				100

Table S8. Mouse Cytokine Array coordinates



Coordinate	Target	Alternate Nomenclature
A1, A2	Reference Spot	-
A23, A24	Reference Spot	-
B1, B2	BLC	CXCL13/BCA-1
B3, B4	C5/C5a	Complement Component 5a
B5, B6	G-CSF	-
B7, B8	GM-CSF	-
B9, B10	I-309	CCL1/TCA-3
B11, B12	Eotaxin	CCL11
B13, B14	sICAM-1	CD54
B15, B16	IFN- γ	-
B17, B18	IL-1 α	IL-1F1
B19, B20	IL-1 β	IL-1F2
B21, B22	IL-1ra	IL-1F3
B23, B24	IL-2	-
C1, C2	IL-3	-
C3, C4	IL-4	-
C5, C6	IL-5	-
C7, C8	IL-6	-
C9, C10	IL-7	-
C11, C12	IL-10	-
C13, C14	IL-13	-
C15, C16	IL-12 p70	-
C17, C18	IL-16	-
C19, C20	IL-17	-
C21, C22	IL-23	-
C23, C24	IL-27	-

D1, D2	IP-10	CXCL10/CRG-2
D3, D4	I-TAC	CXCL11
D5, D6	KC	CXCL1
D7, D8	M-CSF	-
D9, D10	JE	CCL2/MCP-1
D11, D12	MCP-5	CCL12
D13, D14	MIG	CXCL9
D15, D16	MIP-1 α	CCL3
D17, D18	MIP-1 β	CCL4
D19, D20	MIP-2	CXCL2
D21, D22	RANTES	CCL5
D23, D24	SDF-1	CXCL12
E1, E2	TARC	CCL17
E3, E4	TIMP-1	-
E5, E6	TNF- α	-
E7, E8	TREM-1	-
F1, F2	Reference Spot	-
F23, F24	PBS (Negative Control)	Control (-)

Table S9. Secondary Surface Master Mix

Conjugate	Target	Clone	Vendor	Volume/test (uL)
143Nd	Biotin	ID4-C5	Fluidigm	2
165Ho	PE	PE001	Fluidigm	1
176Yb	APC	APC003	Fluidigm	1
PBS/1% BSA				96
Total Per Test				100

Table S10. Primary Intracellular Master Mix

Conjugate	Target	Clone	Vendor	Volume/test (uL)
171Yb	CD68	Y1/82A	Fluidigm	1
FITC	CCR2	K036C2	Biolegend	1
---	Rabbit anti-BTK	D3H5	Cell Signaling	0.5
Fix/Perm Buffer				97.5
Total Per Test				100

Table S11. Secondary Intracellular Master Mix

Conjugate	Target	Clone	Vendor	Volume/test (uL)
174Yb	anti-FITC	FIT-22	Fluidigm	0.2
175Lu	Goat anti-Rabbit IgG	Polyclonal	Fluidigm	0.5
Fix/Perm Buffer				99.3
Total Per Test				100