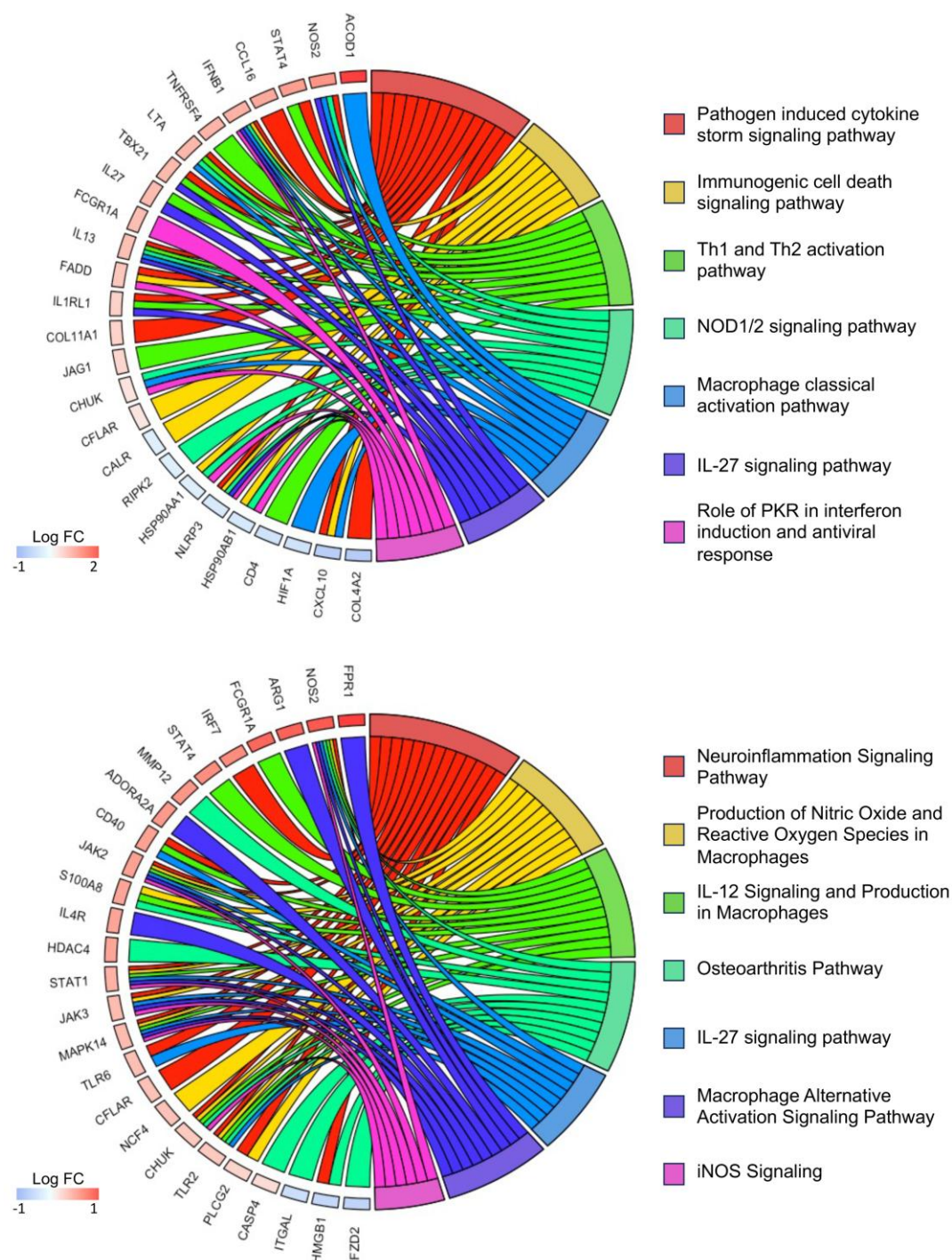




Supplementary Figure S1. Top canonical pathways and enriched genes of monocytes of RA (top panel) and IPF (bottom panel) patients. Chord diagram of combined differentially expressed genes (DEGs) from myeloid innate and fibrosis panel of top canonical pathways (adj $p < 0.05$) and their top enriched genes ($p < 0.05$).

Supplementary Table S1. Characteristics of RA and RA-ILD subjects

	RA N=5	RA-ILD N=5
RA disease duration , y, median (quartiles)	17 (9-20)	9 (5-31)
ILD disease duration , y, median (quartiles)	-	7 (3-9)
Rheumatoid factor positive , n (%)	5 (100)	5 (100)
Anti-CCP positive , n (%)	5 (100)	5 (100)
Erythrocyte sedimentation rate , mm/hr, median (quartiles)	14 (9-18.5)	19.5 (16.3-28.8)
C-reactive protein , mg/dl, median (quartiles)	0.6 (0.3-1.2)	1.4 (0.6-3.4)
Swollen joint count (0-28) , median (quartiles)	1.0 (0-2.5)	0 (0-1)
Tender joint count (0-28) , median (quartiles)	1 (0-1)	0 (0-3.5)
Patient global assessment (0-100) , median (quartiles)	30 (22.5-50)	41.5 (5.8-87)
Physician's global assessment (0-100) , median (quartiles)	20 (9.5-24)	3.5 (0.5-65)
Clinical disease activity index , median (quartiles)	9.0 (0.6-9.4)	4.5 (0.6-20.5)
Medications , n (%)		
Hydroxychloroquine	3 (60)	4 (80)
Leflunomide	0 (0)	1 (20)
Methotrexate	4 (80)	1 (20)
Minocycline	0 (0)	2 (40)
Sulfasalazine	0 (0)	2 (40)
Abatacept	1 (20)	0 (0)
Adalimumab	1 (20)	0 (0)
Etanercept	0 (0)	2 (40)
Nintedanib	0 (0)	1 (20)
NSAIDs	1 (20)	1 (20)
Corticosteroid (prednisone equivalent ≤ 5 mg)	2 (40)	2 (40)

Values: median (interquartile range 25th-75th) or n (%). Missing data: ESR, C-reactive protein, patient and physician global assessment and CDAI (1 RA-ILD). If CRP<0.5, assigned value of 0. Abbreviations: RA, rheumatoid arthritis; DMARDs, disease-modifying anti-rheumatic drugs.

Supplementary Table S2. Upregulated DEGs for RA-ILD vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
SOCS3	1.62	1.369	KDM5D	3.11	1.921
YES1	1.49	1.817	GBP5	1.50	1.50
LTB4R2	1.14	1.843	OGT	1.26	2.566
FCGR1A	1.04	1.396	KMT2D	1.08	2.250
CD38	1.00	1.884	TPR	0.97	2.350
CLEC7A	0.96	1.905	ITPR2	0.95	3.097
NECTIN2	0.84	2.961	PHYKPL	0.78	2.598
IRF7	0.83	1.603	PTPRC	0.73	2.204
CEACAM1	0.82	1.449	APC	0.71	2.224
HIVEP1	0.72	1.717	RAPGEF2	0.69	2.668
PTPRC	0.65	2.194	LRP1	0.68	2.174
GK5	0.64	2.270	RIPK3	0.67	2.957
ANOS1	0.52	1.659	JAK2	0.67	2.755
SERPINE3	0.52	1.459	TRRAP	0.66	1.992
JAK3	0.49	1.637	SOS1	0.65	1.759
IL4R	0.46	2.119	PLCB2	0.64	1.964
NOS2	0.46	2.286	SMURF1	0.63	1.906
AKAP13	0.43	1.794	ADCY7	0.61	3.082
ACAD10	0.42	1.406	ZFYVE16	0.60	2.219
RICTOR	0.41	1.304	HDAC4	0.60	1.950
CD274	0.39	1.740	LPCAT1	0.59	2.623
NCOR1	0.38	1.692	ERC1	0.59	1.593
B4GALT4	0.31	1.414	ATG2B	0.59	1.361
MAPK14	0.31	2.927	KDM2A	0.57	3.164
MS4A2	0.29	1.580	SLC25A13	0.57	1.959
ANXA1	0.24	1.468	NF1	0.56	2.538
IFNAR2	0.2	1.446	EP400	0.56	1.636
			JAG2	0.54	2.518
			ATF4	0.53	1.500
			MTMR4	0.5	2.185
			CREBBP	0.5	1.783
			PRKAB2	0.5	1.709
			EP300	0.47	1.996
			IKBKB	0.47	1.929
			NPHP4	0.47	1.329

	EHMT1	0.46	2.797
	CIITA	0.46	1.929
	FLT1	0.46	1.393
	ARHGAP35	0.45	3.137
	IRAK3	0.45	1.852
	XIAP	0.45	1.513
	MTOR	0.44	2.178
	ROCK2	0.44	2.011
	KAT6A	0.43	1.349
	CFLAR	0.42	2.704
	FGD2	0.42	1.782
	CBL	0.40	1.858
	RAPGEF1	0.39	1.697
	GCNT1	0.38	1.518
	STAT3	0.37	2.588
	DOCK2	0.37	2.339
	PRKDC	0.37	1.887
	NFAM1	0.37	1.746
	TLR2	0.34	1.351
	CHUK	0.33	2.542
	MAML1	0.33	1.595
	AP1S1	0.33	1.353
	PTPN1	0.32	2.249
	FNIP2	0.32	1.536
	CASP4	0.31	1.514
	NCOA2	0.31	1.429
	PIK3CA	0.31	1.390
	PRKAG2	0.3	1.743
	FRS2	0.29	2.367
	ADPGK	0.29	1.940
	PTPN12	0.27	2.614
	CDKN2C	0.27	1.389
	TLN1	0.25	2.468
	PTPN6	0.25	1.976
	NUMB	0.25	1.720
	CSNK1D	0.25	1.672
	KDM3B	0.25	1.582
	MEF2A	0.25	1.538
	KANSL1	0.24	1.398
	PTPN11	0.21	1.582

	SIL1	0.2	1.582
	E2F4	0.18	1.853

Supplementary Table S3. Downregulated DEGs for RA-ILD vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
FGF18	-1.03	1.462	SERPINF1	-1.00	3.028
PTGDS	-0.93	1.685	CD4	-0.60	1.736
CYP1B1	-0.85	1.479	ALAD	-0.37	1.515
MMP1	-0.83	1.323	XBP1	-0.37	1.500
CCL22	-0.82	2.559	GNG2	-0.36	1.720
RGS1	-0.81	1.856	CD86	-0.36	1.685
COL4A2	-0.73	2.737	SSR2	-0.30	2.517
CD1C	-0.69	1.465	ADA2	-0.28	1.599
CCL2	-0.68	1.485	SSR4	-0.25	1.545
YAP1	-0.64	1.510	HVCN1	-0.22	2.040
CXCR3	-0.63	2.380	ERP29	-0.22	1.705
CD27	-0.62	1.454	RPLP0	-0.22	1.654
RAB3D	-0.58	2.616	TIMP1	-0.21	1.635
CD34	-0.50	2.552	HADH	-0.19	1.428
CYP3A4	-0.50	1.360	HSD17B4	-0.17	1.648
IL1R1	-0.48	1.455	NUBP1	-0.17	1.402
APOE	-0.44	1.714	AP2S1	-0.15	1.303
SELE	-0.44	1.489			
PRRX1	-0.44	1.314			
C5AR1	-0.43	1.764			
TGFB1	-0.42	1.835			
LAPTM5	-0.41	2.611			
CD68	-0.41	1.887			
TLR3	-0.40	1.388			
ERCC1	-0.39	1.747			
CYSLTR1	-0.37	1.629			
CD44	-0.37	1.370			
LGALS3	-0.36	1.470			
CCR6	-0.34	1.550			
ZMPSTE24	-0.33	1.859			
CD14	-0.33	1.605			
MAN2B1	-0.33	1.534			
IGF1	-0.33	1.311			
SQSTM1	-0.32	1.728			
CEBPA	-0.31	1.347			

GRN	-0.3	1.798	
CD86	-0.3	1.552	
TMEM173	-0.3	1.399	
MCM5	-0.26	1.764	
TYROBP	-0.26	1.647	
S100A11	-0.23	1.583	
TLR5	-0.21	2.025	
NCF2	-0.21	1.908	
MAP2K1	-0.21	1.745	
RHOG	-0.21	1.361	
IRF2	-0.21	1.335	
MAP2K4	-0.19	1.409	
IRF8	-0.19	1.399	
NFYC	-0.17	1.679	
TWISTNB	-0.16	1.302	

Supplementary Table S4. Upregulated DEGs for RA vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
ACOD1	1.5	1.566	ARG1	0.85	1.858
ARG1	1.15	1.986	TBX21	0.6	1.324
ADAMTS9-AS2	1.05	1.637	ITGA1	0.57	2.255
PGLYRP1	1.03	1.603	CR1	0.52	1.413
FBXL7	1.02	1.321	HDAC4	0.5	1.584
CEACAM1	0.97	2.628	TLR2	0.4	1.581
NOS2	0.9	1.856	ADAM9	0.39	1.831
NOX4	0.84	1.707	NCF4	0.33	1.356
ANOS1	0.83	2.817	GCNT1	0.26	1.373
STAT4	0.83	1.411	CHUK	0.24	1.863
SERPINE3	0.83	1.330	STAT3	0.24	1.633
CETP	0.8	1.354	NUMB	0.22	1.723
NECTIN2	0.77	1.674	CFLAR	0.22	1.498
TIMP3	0.74	1.546	KDM3B	0.21	1.407
CCL16	0.73	1.369	PTPN1	0.19	1.415
BIRC5	0.7	1.407			
ARHGEF28	0.7	1.376			
IFNB1	0.66	1.494			
IL15RA	0.66	1.438			
MMP10	0.64	2.782			
TNFRSF4	0.64	1.345			
LTA	0.62	1.415			
IL27	0.58	2.011			
FCGR1A	0.56	2.714			
IL13	0.55	1.931			
CXCR5	0.53	1.992			
VTCN1	0.51	1.897			
PTPN14	0.5	1.994			
SERPINB7	0.49	1.471			
FADD	0.48	1.669			
FOSL1	0.41	1.379			
IL1RL1	0.4	1.627			
COL11A1	0.38	1.322			
JAG1	0.35	1.605			
HDAC6	0.33	1.328			

Supplementary Table S5. Downregulated DEGs for RA vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
COL4A2	-0.68	2.077	AMOTL1	-0.48	2.536
CXCL10	-0.64	1.778	CD4	-0.36	1.705
CD1C	-0.41	2.016	HSP90AB1	-0.30	1.388
HIF1A	-0.38	1.303	HSP90AA1	-0.21	1.626
NLRP3	-0.29	1.489	DAXX	-0.15	1.465
SERPINB6	-0.27	1.462			
GOLIM4	-0.25	2.042			
RIPK2	-0.2	1.710			
CALR	-0.2	1.508			

Supplementary Table S6. Upregulated DEGs for IPF vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
ACOD1	1.44	1.453	KDM5D	2.22	1.415
FPR1	0.99	1.448	FPR1	0.81	1.570
NOS2	0.89	1.652	CR1	0.74	1.935
ARG1	0.85	1.433	JAK2	0.53	2.220
LAG3	0.85	1.354	STAT1	0.53	1.797
FCGR1A	0.83	2.532	HDAC4	0.5	1.587
CEACAM1	0.7	1.319	EP400	0.46	1.513
IRF7	0.64	2.135	TLR2	0.4	1.723
STAT4	0.63	1.718	TNFSF10	0.37	3.006
MMP12	0.59	2.400	CFLAR	0.35	1.919
CXCL14	0.57	2.163	CUL1	0.35	1.755
ADORA2A	0.57	1.780	NCF4	0.34	1.352
IL15RA	0.55	1.521	ADAM9	0.34	1.331
CD40	0.53	1.927	S100A12	0.33	1.628
COASY	0.53	1.437	GCNT1	0.33	1.622
IL4R	0.51	2.644	PSMB8	0.31	4.342
S100A8	0.51	2.232	CHUK	0.3	2.422
ANOS1	0.51	1.855	STAT3	0.3	2.052
PRG2	0.5	2.579	CCR1	0.28	1.327
FPR2	0.47	2.092	PTPN1	0.25	1.747
CXCR5	0.46	1.508	PLCG2	0.24	1.336
STAT1	0.44	1.331	CDKN2C	0.21	1.425
MOB3C	0.42	1.357	CASP4	0.2	1.823
JAK3	0.39	1.666	TXN	0.2	1.360
MAPK14	0.38	1.840	NUMB	0.19	1.544
TLR6	0.36	1.540	CSNK1D	0.19	1.330
RICTOR	0.36	1.439	PGK1	0.16	1.708
TUBA1A	0.36	1.320	RBX1	0.16	1.647
LOXL2	0.35	1.824	DERL2	0.16	1.342
PTPRC	0.34	1.573	ATOX1	0.16	1.310
VRK2	0.30	1.716	COX7B	0.13	1.631
TLR2	0.30	1.548	SKP1	0.1	1.390
ACAD10	0.29	1.920			
HAVCR2	0.25	2.744			
TNFSF10	0.25	1.673			
PSMB8	0.23	2.156			
SEMA4B	0.21	1.770			

Supplementary Table S7. Downregulated DEGs for IPF vs. control

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
CD1C	-0.58	1.360	ALAD	-0.48	1.499
SGPP1	-0.57	2.335	AMOTL1	-0.45	1.668
CD34	-0.44	2.048	HADH	-0.43	3.585
PTGS1	-0.42	2.026	FZD2	-0.38	2.026
HMGB1	-0.34	1.606	CD4	-0.38	1.517
SF3A3	-0.32	3.050	GNG2	-0.33	1.702
NOL7	-0.29	4.004	SELENOS	-0.32	1.602
ITGAL	-0.28	1.352	SERPINF1	-0.29	1.449
AOAH	-0.19	1.381	RPLP0	-0.26	1.900
CNOT10	-0.18	2.411	ARRB1	-0.25	1.763
NFYC	-0.15	1.380	CDK4	-0.23	1.351
			CSNK2A1	-0.19	1.353
			LGALS3	-0.16	1.310
			ARHGEF6	-0.14	2.296

Supplementary Table S8. Upregulated DEGs for RA-ILD vs. IPF

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
NFKBIZ	1.05	1.737	RAPGEF2	0.75	1.376
HIVEP1	0.43	1.506	LRP1	0.72	1.597
BCL6	0.28	1.491	CPT1A	0.68	1.347
			ITPR2	0.59	1.583
			ADCY7	0.57	2.303
			ERC1	0.53	1.381
			RAPGEF1	0.5	1.563
			SOS1	0.42	1.785
			DAPK1	0.38	1.687
			KDM2A	0.38	1.600
			FNIP2	0.35	2.123
			CBL	0.29	1.310
			HCFC1	0.28	1.730
			NOTCH2	0.26	1.440
			SIL1	0.17	1.481

Supplementary Table S9. Downregulated DEGs for RA-ILD vs. IPF

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
CCR7	-2.71	1.511	SERPINF1	-2.48	1.411
IFNA2	-2.05	1.310	SOD1	-0.31	1.732
TNFRSF12A	-1.93	1.426	DYNLL1	-0.25	1.733
CYP1B1	-0.8	1.816	RBX1	-0.22	2.512
CLEC5A	-0.79	1.374	SEH1L	-0.22	1.612
MIF	-0.62	2.819	NDUFB6	-0.22	1.432
CYSLTR1	-0.41	1.528	NUBP1	-0.2	1.415
HAVCR2	-0.39	2.256	NDUFC1	-0.19	2.031
RAB3D	-0.39	1.301	PPIA	-0.19	1.775
TUBB	-0.36	1.441	NDUFB5	-0.19	1.678
S100A11	-0.35	1.553	COX7C	-0.18	1.536
SEMA4B	-0.29	1.561	AP2S1	-0.17	1.882
SLC16A6	-0.29	1.480	SKP1	-0.17	1.790
MCM5	-0.26	1.841	SEC61B	-0.17	1.750
ERCC1	-0.24	1.769	SSR2	-0.16	2.487
LTB4R	-0.24	1.674	COX6A1	-0.16	1.345
CD14	-0.24	1.570	UBE2N	-0.15	1.615
NUBP1	-0.18	2.093	COX6B1	-0.14	1.386
PGGT1B	-0.17	1.970	TXNDC5	-0.13	1.353
			PPP2CA	-0.12	1.386

Supplementary Table S10. Upregulated DEGs for RA-ILD vs. RA

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
FCER2	4.06	1.328	KMT2D	1.26	1.517
CD38	3.29	1.368	BRPF3	1.06	1.802
ENPP2	1.3	1.336	PRKAB2	1.03	1.484
GK5	1.26	2.747	TRAF2	0.85	1.582
NFKBIZ	0.95	1.516	SLC25A13	0.77	1.483
HIVEP1	0.68	1.574	ITPR2	0.72	1.851
ACAD10	0.5	1.401	IKBKB	0.69	1.471
PTPRC	0.45	1.527	APC	0.69	1.309
AKAP13	0.43	1.700	RAPGEF2	0.64	1.428
NCOR1	0.39	1.514	TRRAP	0.62	1.621
EIF2B4	0.3	1.662	LPCAT1	0.61	1.744
GOLIM4	0.25	1.823	PTPRC	0.6	1.487
NFKB1	0.21	1.342	ERC1	0.58	2.243
ZNRF2	0.18	1.675	PSMC3	0.56	1.467
MRPS5	0.14	1.621	SOS1	0.55	1.555
			CREB3	0.53	1.559
			LILRB2	0.49	1.407
			RAPGEF1	0.49	1.321
			ICAM1	0.41	1.382
			HCFC1	0.3	1.556
			CASP4	0.26	1.683
			SIL1	0.2	1.679
			CHMP4B	0.2	1.564
			SUGT1	0.14	2.510
			NDUFB8	0.09	1.474

Supplementary Table S11. Downregulated DEGs for RA-ILD vs. RA

Myeloid innate immune profile panel			Fibrosis profile panel		
Gene	Log ₂ -fold change	-Log ₁₀ p-value	Gene	Log ₂ -fold change	-Log ₁₀ p-value
PLAU	-2.47	1.394	CXCL12	-0.44	1.753
IFNA2	-2.15	1.340	CAT	-0.31	1.530
RHOJ	-1.36	1.495	ALDH9A1	-0.29	1.489
IL3	-1.14	1.356	TLR8	-0.22	1.410
IER3	-0.83	2.257	AP2S1	-0.21	1.584
SERINC2	-0.7	1.396	RAC1	-0.2	1.775
C5AR1	-0.69	3.043	TIMP1	-0.19	1.636
CD163	-0.67	1.613	BANF1	-0.17	1.414
TGFA	-0.65	1.858	ANAPC7	-0.16	1.801
TUBB	-0.59	2.682	PPP2CA	-0.16	1.526
TNFSF4	-0.59	1.404	NOL7	-0.13	1.380
TMEM173	-0.47	2.032	ACTR1A	-0.11	1.456
ERCC1	-0.46	2.273			
RAB3D	-0.45	1.696			
LTB4R	-0.43	1.736			
MIF	-0.4	1.674			
CCL17	-0.39	1.744			
CD68	-0.35	1.774			
TNFRSF1A	-0.33	1.324			
TLR8	-0.31	1.384			
IL27RA	-0.31	1.371			
MAP2K3	-0.3	2.001			
NCF2	-0.3	1.963			
S100A11	-0.3	1.709			
LAPTM5	-0.3	1.404			
TGFB1	-0.29	1.892			
IL6R	-0.26	1.473			
GRN	-0.26	1.467			
SLC16A6	-0.25	1.557			
CEBPB	-0.23	1.479			
HAVCR2	-0.23	1.307			
TFCP2	-0.22	1.537			
MAP2K1	-0.22	1.398			
ADGRE5	-0.21	1.598			
SF3A3	-0.2	1.375			
USP39	-0.15	2.562			
MTMR14	-0.14	2.389			
PGGT1B	-0.1	1.308			