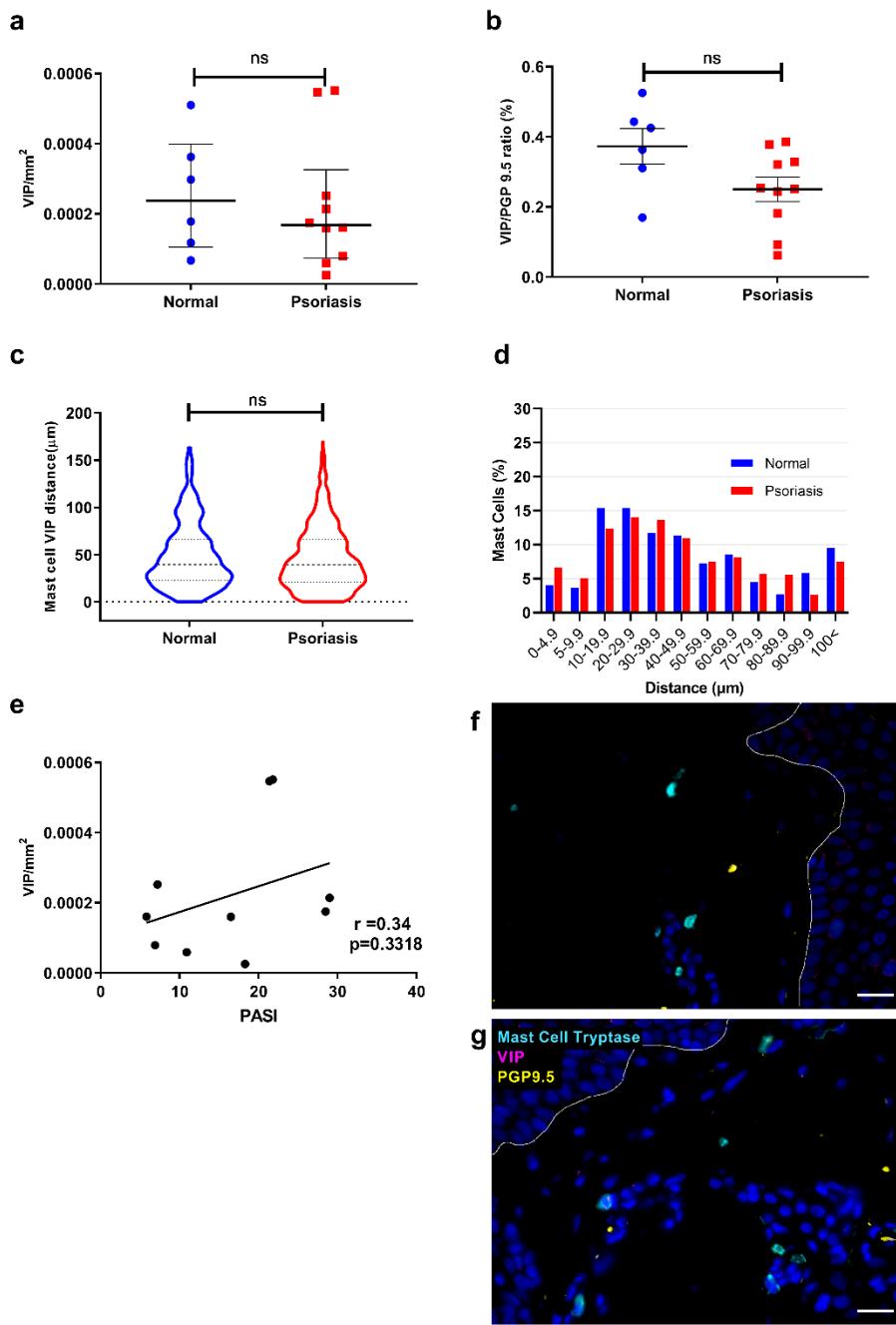
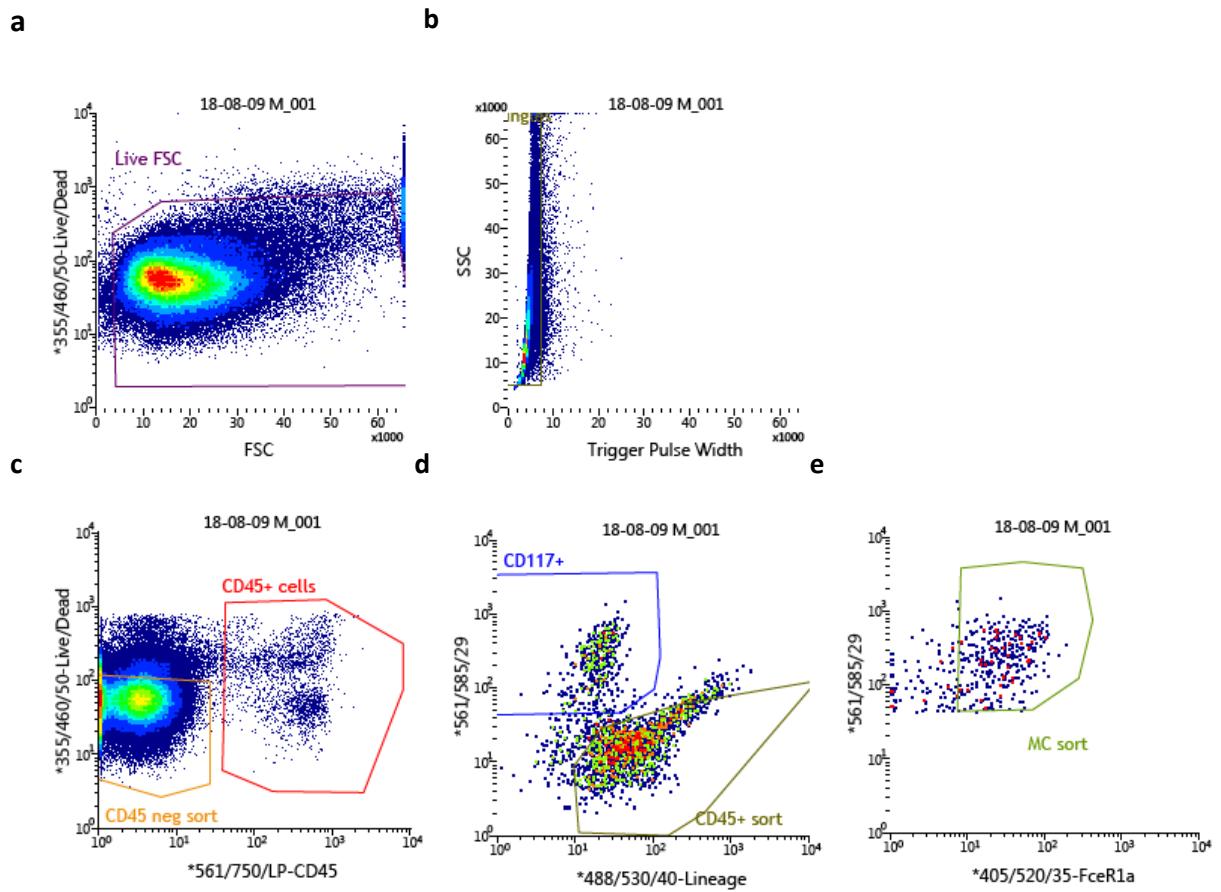


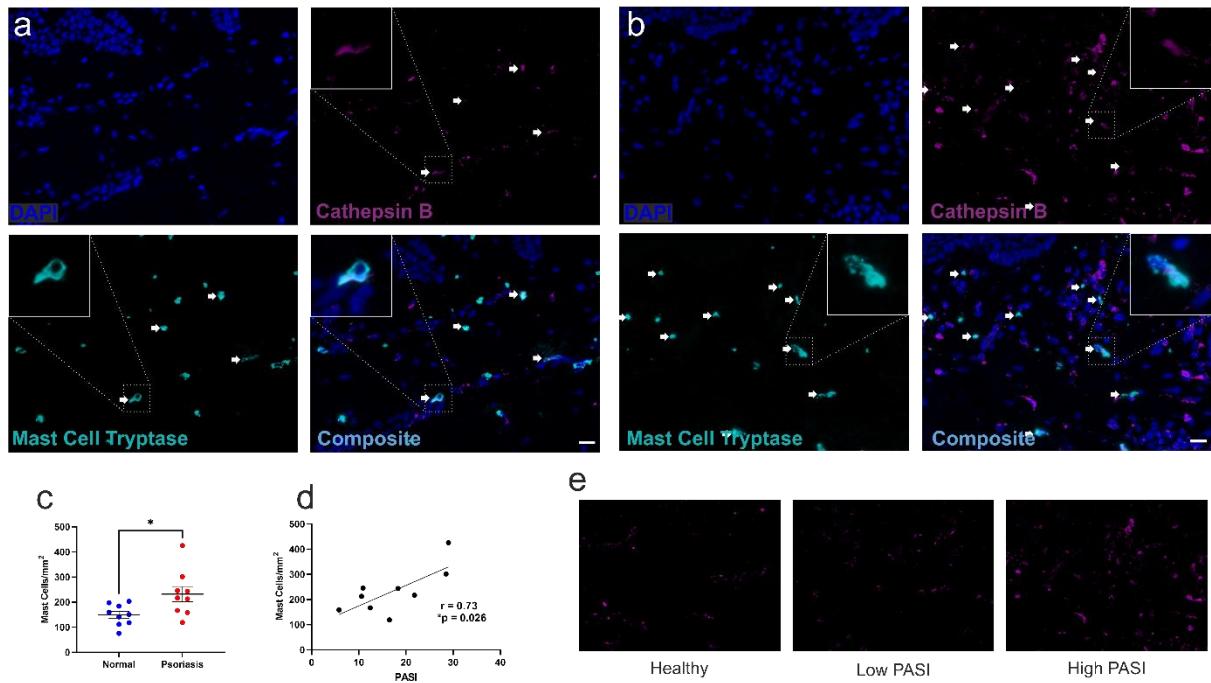
Supplementary Figure S1. Substance P density, spatial association with MCs and correlation to severity of psoriasis. Immunohistochemistry was used to identify MCs (tryptase staining), nerve fibres (PGP 9.5 staining) and substance P (SP staining) in normal skin ($n = 6$) and involved psoriasis skin ($n=9$) in 5 μm paraffin sections. SP density (a) and the ratio of SP positive neuro fibres (b) are not significantly different in involved psoriasis skin compared to normal skin. Distance between MCs and SP positive nerve fibres is not significantly different in the skin of psoriasis and healthy individuals (c). Frequency distribution of MCs and SP distance (d). Pearson correlation analysis for SP density and severity index (PASI) (e). (f,g) Representative photomicrographs of normal (f) and involved (g) skin show MC tryptase (cyan) PGP9.5 (yellow) and SP (magenta). Scale bar 20 μm. Unpaired t-test (a,b), Mann-Whitney U test (c), ns = not significant.



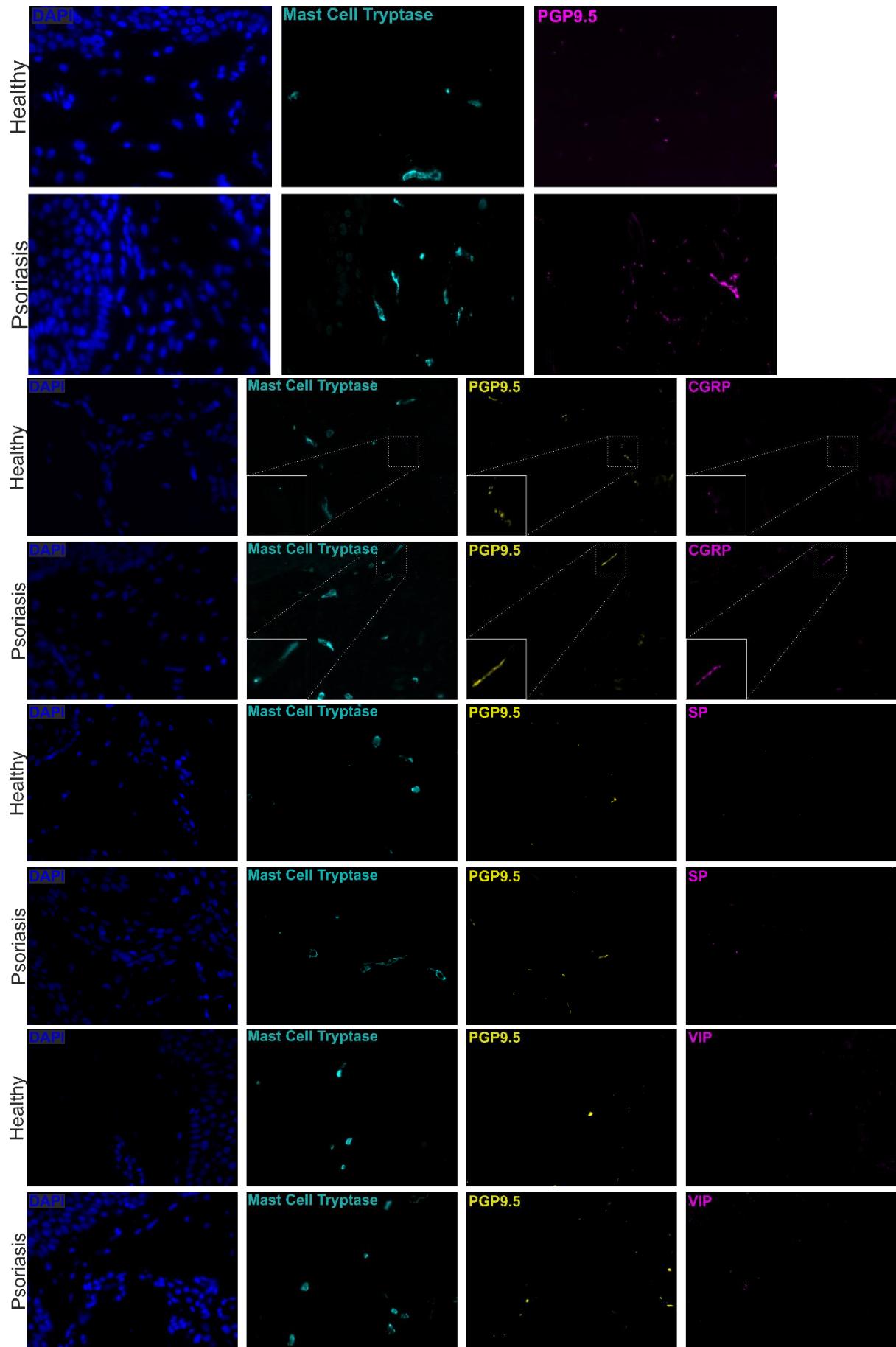
Supplementary Figure S2. Vasoactive intestinal peptide density, spatial association with MCs and correlation to severity of psoriasis. Immunohistochemistry was used to identify MCs (tryptase staining), nerve fibres (PGP 9.5 staining) and Vasoactive intestinal peptide (VIP staining) in normal skin ($n = 6$) and involved psoriasis skin ($n=10$) in 5 μ m paraffin sections. VIP density (a) and the ratio of VIP positive neuro fibres (b) are not significantly different in involved psoriasis skin compared to normal skin. The distance between MCs and VIP positive nerve fibres is not significantly different in the skin of psoriasis and healthy individuals (c). Frequency distribution of MCs and VIP distance (d). Pearson correlation analysis for VIP density and severity index (PASI) (e). (f,g) Representative photomicrographs of normal (f) and involved (g) skin show MC tryptase (cyan) PGP9.5 (yellow) and SP (magenta). Scale bar 20 μ m. Mann-Whitney U test (a, c). Unpaired t-test (b), ns = not significant.



Supplementary Figure S3. Mast cell isolation and gating strategy. **(a)** Exclusion of dead cells by Live/Dead staining. **(b)** Exclusion of doublets by trigger pulse width. **(c)** Cells divided into two gated populations, CD45+ and CD45- cells for sorting. **(d)** CD45+ cells divided into Lineage+ cells for CD45+ sorting, and Lineage- CD117 high cells. **(e)** Lineage- CD117 high Fc ϵ RI α + cells gated for MC sorting.



Supplementary Figure S4. Colocalisation of cathepsin B and tryptase in mast cells in healthy and psoriasis skin. **(a)** DAPI (blue), cathepsin B (magenta) and MC tryptase (cyan) immunofluorescence in skin from a healthy volunteer showing MCs containing cathepsin B (arrows). Upper left inlay shows enlarged section with cathepsin stained MC. **(b)** DAPI (blue), cathepsin B (magenta) and MC tryptase (cyan) immunofluorescence in involved skin from a psoriasis patient showing MC containing cathepsin B (arrows). Upper right inlay shows enlarged section with cathepsin stained MC. **(c)** Number of MCs per area in normal and involved psoriasis skin from patient samples used for cathepsin B staining. Data are mean \pm SEM of n=9 donors in each group (* = p < 0.05 (unpaired t-test)). **(d)** Number of MCs correlated with psoriasis severity index (PASI) ((* = p < 0.05 (Pearson correlation))). **(e)** Cathepsin staining in healthy, low PASI, and high PASI individuals showing greater acellular cathepsin staining with high PASI.



Supplementary figure S5. Single channel images of composite images shown in other figures. Single channel images of composite images from figure 1 showing DAPI (blue), mast cell tryptase (cyan) and PGP9.5 (magenta), from figure 2 showing DAPI (blue), mast cell tryptase (cyan), PGP9.5 (yellow) and CGRP (magenta), from supplementary figure 1 showing DAPI (blue), mast cell tryptase (cyan), PGP9.5 (yellow) and SP β (magenta) and from supplementary figure 2 showing DAPI (blue), mast cell tryptase (cyan), PGP9.5 (yellow) and VIP (magenta). All images are at same scale as labelled in original figures.

Supplementary Table S1. Spatial association of MCs and nerve fibres in normal and lesional psoriasis skin. Dual immunohistochemistry was used to identify dermal MCs (tryptase) and nerve fibres (PGP 9.5) in normal (n = 8) and involved psoriasis skin (n=11) in 5 μ m paraffin sections. Ten areas of interest (AOI) per tissue section were analysed and shortest distance between MCs and neuro fibre was measured. MCs showed significantly increased proximity to nerve fibres in involved psoriasis dermis compared to normal skin (****p<0.0001, see also Figure 1a-h).

a

Subject	Group	MC Density (MC/mm ²)	PGP9.5 Density (PGP9.5/mm ²)	PASI
1	Normal	110.67	0.003183	N/A
2	Normal	195.77	0.002010	N/A
3	Normal	152.60	0.001214	N/A
4	Normal	158.49	0.002671	N/A
5	Normal	188.72	0.000838	N/A
6	Normal	135.15	0.000443	N/A
7	Normal	105.62	0.000117	N/A
8	Normal	89.56	0.002552	N/A
9	Psoriasis	159.96	0.004140	16.5
10	Psoriasis	292.73	0.004867	10.6
11	Psoriasis	225.45	0.007866	21.4
12	Psoriasis	430.23	0.004930	10.9
13	Psoriasis	250.25	0.002672	5.8
14	Psoriasis	551.69	0.008711	29
15	Psoriasis	298.37	0.005481	18.3
16	Psoriasis	498.27	0.007731	28.5
17	Psoriasis	157.86	0.004598	6.9
18	Psoriasis	377.13	0.007368	21.8
19	Psoriasis	193.14	0.003752	7.2

b

MC/PGP9.5	Healthy		Lesional	
	mean \pm SEM(μ m)	35.5 \pm 1.65	mean \pm SEM(μ m)	22.2 \pm 0.66
Distance (μ m)	No. MCs	%	No. MCs	%
0-4.9	44	11.8%	198	19.9%
5-9.9	37	9.9%	141	14.2%
10-19.9	69	18.5%	240	24.1%
20-29.9	49	13.2%	156	15.7%
30-39.9	42	11.3%	92	9.3%
40-49.9	44	11.8%	67	6.7%
50-59.9	26	7.0%	30	3.0%
60-69.9	15	4.0%	34	3.4%
70-79.9	7	1.9%	15	1.5%
80-89.9	9	2.4%	8	0.8%
90-99.9	8	2.2%	7	0.7%
>100	22	5.9%	6	0.6%
N	372		994	

c

MC/PGP9.5	Healthy								N
	Distance (μ m)	1	2	3	4	5	6	7	8
0-4.9	10	9	5	3	6	5	6	0	44
5-9.9	4	5	6	7	6	7	1	1	37
10-19.9	7	12	11	11	11	7	7	3	69
20-29.9	7	11	7	3	10	2	0	9	49
30-39.9	3	4	5	4	11	5	4	6	42
40-49.9	3	6	6	6	9	7	3	4	44
50-59.9	2	6	4	3	5	4	2	0	26
60-69.9	2	1	3	5	2	1	0	1	15
70-79.9	0	0	1	0	0	5	0	1	7
80-89.9	0	2	0	2	0	0	3	2	9
90-99.9	1	1	1	2	0	1	2	0	8
>100	3	6	2	5	0	1	3	2	22
MCs/Subject	42	63	51	51	60	45	31	29	

d

MC/PGP9.5	Lesional										N	
	Distance (μ m)	9	10	11	12	13	14	15	16	17	18	
0-4.9	4	26	15	16	5	48	11	35	2	24	12	198
5-9.9	5	17	8	17	8	28	9	21	6	17	5	141
10-19.9	18	20	12	26	13	46	17	39	10	32	7	240
20-29.9	5	12	14	26	13	15	17	19	8	14	13	156
30-39.9	5	8	6	17	11	8	5	10	7	12	3	92
40-49.9	4	5	9	10	8	9	5	8	4	1	4	67
50-59.9	3	2	2	7	5	2	2	2	2	0	3	30
60-69.9	3	3	3	11	8	0	2	0	2	0	2	34
70-79.9	0	1	2	2	4	1	1	1	1	1	1	15
80-89.9	1	0	0	0	5	1	0	0	0	0	1	8
90-99.9	1	0	1	0	3	0	0	0	1	0	1	7
>100	0	0	2	2	2	0	0	0	0	0	0	6
MCs/Subject	49	94	74	134	85	158	69	135	43	101	52	

Supplementary Table S2. Immunohistochemistry and MC isolation subject demographics.

	Neuronal Immunohistochemistry			Mast cell isolation			Cathepsin Immunohistochemistry		
	Psoriasis	Healthy	p value	Psoriasis	Healthy	p value	Psoriasis	Healthy	p value
N	11	8		7	7		9	9	
Age (mean ± SD)	48 ± 18	48 ± 17	>0.9999	57 ± 21	46 ± 24	0.3794	53 ± 20	44 ± 15	0.2962
Male:female	05:06	04:04	>0.9999	02:05	05:02	0.29	05:04	03:06	0.6372

Significance values calculated using unpaired t-test (Age) or Fisher exact (Male:Female), significance set at p < 0.05

Supplementary Table S3. MC isolation subject itch characteristics.

	PASI	Itch rating	Worst itch in 24 hours rating
Lesional 1	8.2	5	5
Lesional 2a (pooled)	7.5	0	0
Lesional 2b (pooled)	5.8	0	2
Lesional 3	18.3	6	10
Lesional 4	28.5	3	3
Lesional 5	10.9	9	9
Lesional 6	12.4	1	6

Supplementary Table S4. List of differentially expressed genes by mast cells isolated from involved psoriatic skin compared to normal skin

Significantly upregulated genes												Significantly downregulated genes																		
Gene symbol	Log2FC	p value	q value	Gene symbol	Log2FC	p value	q value	Gene symbol	Log2FC	p value	q value	Gene symbol	Log2FC	p value	q value	Gene symbol	Log2FC	p value	q value	Gene symbol	Log2FC	p value	q value							
DDI2	5.18	4.66E-05	0.0245	LRP2	3.35	0.000229	0.0424	EIF5AL1	2.93	0.000359	0.0486	AC022762.2	2.31	0.000139	0.0331	NQO2	-1.77	0.000388	0.0500	SHC1	-1.77	5.33E-05	0.0247							
LMOD2	4.45	2.01E-05	0.0158	PRKCQ-AS1	3.34	0.000299	0.0462	LINC01756	2.91	0.000106	0.0301	EFHB	2.28	0.000187	0.0379	DPY19L2P3	-2.02	0.000208	0.0403	SLC35B2	3.32	0.00032	0.0472							
PRDM2	4.42	1.62E-06	0.0074	GAPD2	3.31	9.68E-05	0.0301	CTSB	2.90	0.000106	0.0301	HAS2	2.28	0.000196	0.0388	NYAP2	-2.05	1.52E-05	0.0153	AC145676.1	2.96	9.66E-05	0.0301							
DCAF4L1	4.32	2.95E-05	0.0179	GPR3	3.31	7.14E-05	0.0283	LINC02363	2.88	8.52E-05	0.0301	OR4N2	2.26	0.000166	0.0357	PPM1F	-2.07	0.000356	0.0486	RAD51D	4.21	5.81E-06	0.0093							
HS1BP3	4.22	1.26E-06	0.0072	ABC10	3.31	0.000342	0.0482	AL731577.1	2.88	0.000207	0.0403	NUDT9	2.20	7.81E-05	0.0292	FCER2	-2.08	0.000363	0.0487	ABCA10	3.31	0.000342	0.0482							
RAD51D	4.21	5.81E-06	0.0093	AL160286.3	3.30	1.72E-05	0.0155	TACR1	2.86	0.000255	0.0433	AL603840.1	2.20	0.000331	0.0481	WIF1	-2.26	0.00016	0.0357	ILDR2	4.07	0.000223	0.0422							
LTA	4.16	0.000177	0.0373	ACSM2A	3.29	2.42E-05	0.0161	NDUFV3	2.83	1.58E-05	0.0153	RBLP1	2.19	0.000236	0.0425	ZNF501	3.29	0.000189	0.0380	BPTF	4.02	0.00025	0.0432							
ILDR2	4.07	0.000223	0.0422	TCF21	3.29	1.91E-05	0.0158	PPM1G	2.82	1.27E-05	0.0137	TFIP11	2.17	0.000243	0.0427	NAT14	3.99	1.07E-05	0.0132	CCNJ	2.82	5.39E-05	0.0247							
NCMAP	3.98	3.69E-06	0.0080	CLDN12	3.28	9.19E-05	0.0301	NIPA1	2.82	0.000235	0.0425	FAM89A	2.04	0.00023	0.0424	IFI44L	3.93	1.57E-05	0.0153	AL603840.1	2.20	0.000331	0.0481							
CNNM2	3.92	0.000166	0.0357	SULT1C2	3.27	9.91E-05	0.0301	TOMM22	2.82	0.000152	0.0347	SLC25A6P5	1.98	1.85E-05	0.0158	AC090114.2	3.87	0.000278	0.0438	CBWD2	2.74	6.04E-05	0.0250							
AC090114.2	3.87	0.000278	0.0438	PTP4A3	3.25	0.000304	0.0462	COPE	2.80	0.000233	0.0425	AL807752.1	1.98	5.24E-05	0.0247	COPE	2.80	0.000233	0.0425	AC073592.3	3.25	5.06E-05	0.0247							
PRDM4	3.84	4.22E-05	0.0226	AC048341.2	3.24	0.000215	0.0413	ATF4	2.79	0.000133	0.0330	AL359697.1	1.96	3.48E-06	0.0080	HDAC9	3.83	2.26E-05	0.0158	OR211	2.79	3.7E-06	0.0080							
PIGN	3.83	2.45E-05	0.0161	ZNF723	3.21	0.000102	0.0301	ARL14EP	2.76	3.73E-06	0.0080	FAM20A	1.93	0.000138	0.0331	IFNAR1	3.81	0.000101	0.0301	PPFIA2	1.88	0.000338	0.0482							
IFNAR1	3.81	0.000101	0.0301	TACC2	3.20	0.000165	0.0357	AC009108.4	2.76	6.39E-06	0.0093	C6	1.88	1.12E-05	0.0134	RPS6KL1	3.79	0.000277	0.0438	CBWD2	2.74	6.04E-05	0.0250							
RPS6KL1	3.79	0.000277	0.0438	LINC01634	3.19	0.000165	0.0357	CBWD2	2.74	6.04E-05	0.0250	AP000343.1	1.78	0.000352	0.0483	CXCL12	3.76	6.18E-06	0.0093	AC106782.2	3.19	0.000247	0.0432							
CXCL12	3.76	6.18E-06	0.0093	AC104792.9	3.19	5.6E-05	0.0247	AC068189.1	2.74	2.12E-05	0.0158	AC131235.4	1.74	0.000239	0.0427	UQCRCB	3.73	0.00025	0.0432	AC104792.9	3.19	5.6E-05	0.0247							
CCDC113	3.71	1.34E-06	0.0072	CACNA2D3-AS1	3.19	0.000127	0.0328	GAPDH75	2.71	4.03E-05	0.0219	RSF1-T1	1.49	0.000223	0.0422	MS4A2	3.71	2.19E-05	0.0158	HEATR4	3.18	0.000194	0.0387							
MS4A2	3.71	2.19E-05	0.0158	ATG10	3.18	5.97E-06	0.0093	PEG10	2.69	0.000326	0.0476	SLC25A6P5	1.98	1.85E-05	0.0158	NSUN5P1	3.64	1.98E-06	0.0080	FAM194-2HG	3.07	7.91E-05	0.0292							
NSUN5P1	3.64	1.98E-06	0.0080	HEATR4	3.18	0.000194	0.0387	FABP5	2.69	0.000341	0.0482	AC07500.2	-3.08	0.000314	0.0469	TLR4	3.59	0.000351	0.0483	AL359851.1	3.17	7.59E-05	0.0287							
TLR4	3.59	0.000351	0.0483	AC023830.3	3.17	1.28E-05	0.0137	CDC42BPG	2.68	9.96E-05	0.0301	HSFX4	-3.01	2.12E-05	0.0158	TMEM17	3.57	6.91E-07	0.0072	FABP5	2.69	0.000341	0.0482							
TMEM17	3.57	6.91E-07	0.0072	RDH8	3.16	0.000136	0.0331	NEDD4L	2.67	9.91E-05	0.0301	MIR194-2HG	-3.07	7.91E-05	0.0292	AP5M1	3.56	0.000269	0.0438	RDH8	3.16	0.000136	0.0331							
AP5M1	3.56	0.000269	0.0438	MXRA5	3.15	0.000118	0.0325	CADM3	2.67	0.000129	0.0328	AC092296.3	-3.19	3.57E-07	0.0072	RAB11FIP5	3.56	9.41E-05	0.0301	SLC12A5	2.65	0.000346	0.0482							
RAB11FIP5	3.56	9.41E-05	0.0301	TMPO-AS1	3.15	5.59E-05	0.0247	RHOJ	2.64	0.000308	0.0464	AC092627.5	-3.20	0.000347	0.0482	FAM46B	3.56	0.000373	0.0491	TMPO-AS1	3.15	5.59E-05	0.0247							
FAM46B	3.56	0.000373	0.0491	PITPNC1	3.15	5.81E-06	0.0093	NUTM2A	2.64	0.000324	0.0475	AC082651.1	-3.24	0.000263	0.0438	AC009078.2	3.53	0.000157	0.0355	FABP5P3	2.62	0.000222	0.0422							
AC009078.2	3.53	0.000157	0.0355	ADNP	3.14	0.000167	0.0357	EIF2AK3	2.62	0.000105	0.0301	YY2	-3.24	2.03E-05	0.0158	CLK4	3.53	0.000243	0.0427	PPP1R26P1	3.09	5.37E-05	0.0247							
CLK4	3.53	0.000243	0.0427	CFAP97	3.14	0.000107	0.0301	FBXL13	2.58	1.11E-06	0.0072	AC104123.1	-3.46	2.51E-05	0.0161	RTL1	3.52	9.28E-05	0.0301	OR4N2	2.64	0.000303	0.0462							
RTL1	3.52	9.28E-05	0.0301	PTEN	3.51	0.000182	0.0379	AL022100.1	2.63	0.000115	0.0323	LINC02403	-3.54	0.000304	0.0462	IFT57	3.48	1.29E-06	0.0072	IGFBP2	3.13	5.38E-05	0.0247							
IFT57	3.48	1.29E-06	0.0072	POM121C	3.13	0.000317	0.0470	INSL3	2.63	0.000346	0.0482	AP002784.1	-3.62	0.000152	0.0347	GTPBP10	3.48	0.00031	0.0465	LRRC77P	3.11	0.000343	0.0482							
GTPBP10	3.48	0.00031	0.0465	AC015818.9	3.09	9.7E-06	0.0129	FABP5P3	2.62	0.000222	0.0422	MAGEB3	-3.62	0.000127	0.0328	PACRG-AS3	3.48	2.94E-06	0.0080	FABP5P3	2.62	0.000222	0.0422							
PACRG-AS3	3.48	2.94E-06	0.0080	AC118758.3	3.07	0.000181	0.0379	GLIS2	2.56	0.000359	0.0486	TOMM20P1	-3.70	5.16E-05	0.0247	ARHGAP20	3.47	0.000121	0.0327	AC104792.9	3.17	5.6E-05	0.0247							
ARHGAP20	3.47	0.000121	0.0327	JAKM1P3	3.05	0.000143	0.0337	SULT4A1	2.56	0.000346	0.0482	AL158166.2	-3.79	9.79E-06	0.0129	NHLH2	3.47	0.000107	0.0301	AC073592.3	3.25	5.06E-05	0.0247							
NHLH2	3.47	0.000107	0.0301	ZNF486	3.44	0.000187	0.0379	DDX18	3.05	3.46E-05	0.0202	AL671511.1	2.55	0.000291	0.0454	RBM22	3.44	6.3E-06	0.0093	AL671511.1	2.55	0.000291	0.0454							
RBM22	3.44	6.3E-06	0.0093	TNK2-AS1	3.04	0.000365	0.0487	GABRB3	2.51	0.000184	0.0379	AC091948.1	-3.92	2.32E-05	0.0158	RPAP2	3.44	0.000374	0.0491	GABRB3	2.51	0.000184	0.0379							
RPAP2	3.44	0.000374	0.0491	ASCC1	3.03	0.000285	0.0446	KLC3	2.48	0.000387	0.0500	SLC35D1	-4.10	0.00023	0.0424	GLDN	3.43	0.000352	0.0483	AB13	3.03	3.83E-05	0.0219	AP002370.1	2.45	0.00027	0.0438			
GLDN	3.43	0.000352	0.0483	RHBD2	3.02	0.000104	0.0301	CNTNAP5	2.45	1.01E-05	0.0129	VDAC1P5	-4.18	7.22E-05	0.0283	AL008638.3	3.43	0.000339	0.0482	CNTNAP5	2.45	1.01E-05	0.0129							
AL008638.3	3.43	0.000339	0.0482	POTEC	3.42	0.000138	0.0331	RPUSD2	3.01	0.000208	0.0403	AC010978.1	2.43	0.000103	0.0301	ELAC2	3.45	7.06E-05	0.0283	ZNF56583.3	-3.83	0.000361	0.0487							
POTEC	3.42	0.000138	0.0331	PHYKPL	3.42	8.23E-05	0.0294	ZNF354A	2.99	0.000139	0.0331	CYP4F8	2.39	0.000265	0.0438	CASC17	3.40	5.81E-06	0.0093	CNGB1	2.99	9.13E-05	0.0301	FRAT1	-4.55	6.69E-05	0.0272			
PHYKPL	3.42	8.23E-05	0.0294	MALAT1	3.39	0.000234	0.0425	PIK3AP1	2.97	9.55E-05	0.0301	GCFC2	2.35	1.74E-05	0.0155	CASC17	3.40	5.81E-06	0.0093	PI4KAP1	2.97	3.75E-06	0.0080	GCFC2	2.35	1.74E-05	0.0155			
MALAT1	3.39	0.000234	0.0425	OR10Z1	3.37	0.000124	0.0327	TIAM1	2.96	0.000124	0.0327	HSPB8	2.35	0.000144	0.0337	TRMT11	2.35	0.000106	0.0301	UBXN4	3.36	0.000119	0.0325	AL133355.1	2.34	5.57E-05	0.0247	ADGRE1	-4.60	0

Supplementary Table S5. List of significant ontology terms across different ontology databases from gene set enrichment analysis (GSEA)

Ontology DB	ID	Description	Set Size	Enrichment Score	Normal Enrichment Score	p value	FDR p adjust
GO	GO:0001525	angiogenesis	465	0.393134823	1.496018605	2.77E-06	0.022269116
	GO:0007389	pattern specification process	421	0.389278851	1.477678076	1.19E-05	0.033684235
	GO:0034702	ion channel complex	281	0.411722289	1.540100953	1.94E-05	0.033684235
	GO:0010975	regulation of neuron projection development	482	0.372872381	1.419529338	2.53E-05	0.033684235
	GO:0090596	sensory organ morphogenesis	249	0.416241802	1.551386667	2.68E-05	0.033684235
	GO:0016741	transferase activity, transferring one-carbon groups	206	0.434353778	1.606311366	2.83E-05	0.033684235
	GO:0008168	methyltransferase activity	197	0.436844599	1.609289131	3.18E-05	0.033684235
	GO:0009952	anterior/posterior pattern specification	204	0.430182524	1.589109094	3.35E-05	0.033684235
	GO:0003002	regionalization	330	0.398298857	1.500966353	4.66E-05	0.034663656
	GO:0046660	female sex differentiation	111	0.494816972	1.737359093	5.03E-05	0.034663656
	GO:0048814	regulation of dendrite morphogenesis	91	0.512226958	1.75124446	5.08E-05	0.034663656
	GO:1902495	transmembrane transporter complex	301	0.40263697	1.514100333	5.18E-05	0.034663656
	GO:0008585	female gonad development	93	0.503280622	1.724897644	6.29E-05	0.038900005
	GO:0046545	development of primary female sexual characteristics	98	0.493830467	1.70758214	8.90E-05	0.042197272
	GO:0015693	magnesium ion transport	17	0.754962807	1.924433624	9.42E-05	0.042197272
	GO:0061001	regulation of dendritic spine morphogenesis	46	0.599365935	1.86343298	9.50E-05	0.042197272
	GO:0001654	eye development	353	0.385708953	1.455272325	0.00010962	0.042197272
	GO:0016782	transferase activity, transferring sulfur-containing groups	63	0.549884063	1.809155608	0.00011166	0.042197272
	GO:0150063	visual system development	357	0.382169876	1.441672211	0.00011201	0.042197272
	GO:0016180	snRNA processing	34	-0.554513098	-2.122626272	0.00011322	0.042197272
	GO:0019933	cAMP-mediated signaling	175	0.432152244	1.578588395	0.00011443	0.042197272
	GO:1990351	transporter complex	308	0.39818474	1.498190214	0.00011554	0.042197272
	GO:0034472	snRNA 3'-end processing	29	-0.575846119	-2.094308634	0.00014275	0.049871013
KEGG	hsa04015	Rap1 signaling pathway	194	0.433561546	1.575940228	0.00011675	0.020506651
REACTOME	hsa04623	Cytosolic DNA-sensing pathway	51	-0.469505669	-1.919639974	0.00012279	0.020506651
	R-HSA-76061	RNA Polymerase III Transcription Initiation From Type 1 Promoter	25	-0.700324679	-2.468287874	3.05E-06	0.002181753
	R-HSA-76066	RNA Polymerase III Transcription Initiation From Type 2 Promoter	25	-0.700324679	-2.468287874	3.05E-06	0.002181753
	R-HSA-2219530	Constitutive Signaling by Aberrant PI3K in Cancer	69	0.544817443	1.79980008	4.66E-05	0.018887428
	R-HSA-5223345	Miscellaneous transport and binding events	22	0.70947703	1.942006209	5.28E-05	0.018887428

Supplementary Table S6. Complete list of shared differentially expressed genes (DEGs) shared across different datasets.

Gene Symbol	Description	Isolated MCs	GDS4602	GSE78097	GSE80047	Log2FC
ABI3	ABI Family Member 3	3.03	0.18	0.00	0.00	> 1
ADGRE1	Adhesion G Protein-Coupled Receptor E1	-4.60	0.00	0.00	0.26	0
ADNP	Activity Dependent Neuroprotector Homeobox	3.14	0.00	0.00	0.09	< -1
AP5M1	Adaptor Related Protein Complex 5 Subunit Mu 1	3.56	0.00	0.00	0.09	q ≥ 0.05
ARL14EP	ADP Ribosylation Factor Like GTPase 14 Effector Protein	2.76	-0.34	0.00	0.00	0
ASCC1	Activating Signal Cointegrator 1 Complex Subunit 1	3.03	0.00	0.00	0.14	> 1
ATF4	Activating Transcription Factor 4	2.79	0.27	0.40	0.00	0
ATG10	Autophagy Related 10	3.18	0.00	0.00	-0.06	< -1
ATP1A4	ATPase Na+/K+ Transporting Subunit Alpha 4	-2.29	0.00	0.00	0.06	0
BPTF	Bromodomain PHD Finger Transcription Factor	4.02	0.00	0.00	-0.04	> 1
C12orf65	Mitochondrial Translation Release Factor In Rescue	-2.30	0.00	0.00	-0.15	0
C6	Complement C6	1.88	-0.27	0.00	0.00	< -1
CADM3	Cell Adhesion Molecule 3	2.67	0.00	0.00	-0.23	q ≥ 0.05
CASC17	Cancer Susceptibility 17	3.40	0.00	0.00	0.06	> 1
CBWD2	COBW Domain Containing 2	2.74	0.00	0.00	0.21	0
CCDC113	Coiled-Coil Domain Containing 113	3.71	-0.60	0.00	-0.13	< -1
CCNJ	Cyclin J	2.82	0.00	0.00	0.14	0
CDC42BPG	CDC42 Binding Protein Kinase Gamma	2.68	0.00	0.00	-0.44	> 1
CENPV	Centromere Protein V	-2.68	0.00	0.00	-0.16	0
CFAP97	Cilia And Flagella Associated Protein 97	3.14	0.00	0.00	0.07	> 1
CLDN12	Claudin 12	3.28	0.25	0.58	0.15	0
CLK4	CDC Like Kinase 4	3.53	0.00	0.00	-0.09	< -1
CNNM2	Cyclin And CBS Domain Divalent Metal Cation Transport Mediator 2	3.92	0.00	0.00	-0.19	0
CNTNAP5	Contactin Associated Protein Family Member 5	2.45	0.00	0.00	0.04	> 1
COPE	COPI Coat Complex Subunit Epsilon	2.80	0.00	0.00	0.06	0
CTSB	Cathepsin B	2.90	0.00	0.00	0.08	> 1
CYP4F8	Cytochrome P450 Family 4 Subfamily F Member 8	2.39	-0.82	0.00	0.00	0
DCAF4L1	DDB1 And CUL4 Associated Factor 4 Like 1	4.32	0.05	0.00	0.12	> 1
DDI2	DNA Damage Inducible 1 Homolog 2	5.18	0.00	0.00	-0.11	0
ELAC2	ElaC Ribonuclease Z 2	3.45	0.00	0.00	0.10	> 1
FABP5	Fatty Acid Binding Protein 5	2.69	1.46	1.03	0.19	0
FAM136A	Family With Sequence Similarity 136 Member A	-3.17	0.00	0.00	-0.02	< -1
FAM20A	FAM20A Golgi Associated Secretory Pathway Pseudokinase	1.93	0.00	0.00	0.09	> 1
FAM46B	Terminal Nucleotidyltransferase 5B	3.56	0.28	0.00	-0.14	0
FAM83E	Family With Sequence Similarity 83 Member E	3.47	0.07	0.00	-0.11	> 1
FBXL13	F-Box And Leucine Rich Repeat Protein 13	2.58	0.00	0.00	-0.16	0
FRAT1	FRAT Regulator Of WNT Signaling Pathway 1	-4.55	0.00	0.00	0.12	0
GDAP2	Ganglioside Induced Differentiation Associated Protein 2	3.31	0.00	0.00	0.13	> 1
GDF3	Growth Differentiation Factor 3	3.09	0.07	0.00	0.00	0
GLIS2	GLIS Family Zinc Finger 2	2.56	-0.63	-1.04	-0.12	< -1
GTPBP10	GTP Binding Protein 10	3.48	0.08	0.00	0.09	> 1
HAS2	Hyaluronan Synthase 2	2.28	0.00	0.00	0.31	0
HDAC9	Histone Deacetylase 9	3.83	0.00	0.00	-0.10	> 1
HEATR3	HEAT Repeat Containing 3	-2.48	0.00	0.00	0.36	0
HEATR4	HEAT Repeat Containing 4	3.18	0.00	0.00	-0.13	> 1
HIST1H4I	H4 Clustered Histone 9	3.08	0.16	0.00	0.00	0
HSPB8	Heat Shock Protein Family B (Small) Member 8	2.35	0.00	0.00	0.20	> 1
IFI44L	Interferon Induced Protein 44 Like	3.93	1.82	2.67	0.81	0
IGFBP2	Insulin Like Growth Factor Binding Protein 2	3.13	0.00	0.00	-0.25	> 1
ILDR2	Immunoglobulin Like Domain Containing Receptor 2	4.07	0.00	0.00	0.11	0
JADE3	Jade Family PHD Finger 3	-4.78	0.00	0.00	0.05	0
JAKMIP3	Janus Kinase And Microtubule Interacting Protein 3	3.05	0.00	0.00	-0.16	> 1
KLC3	Kinesin Light Chain 3	2.48	0.00	0.00	-0.24	0
LINC00298	Long Intergenic Non-Protein Coding RNA 298	2.37	0.00	0.00	0.09	> 1
LMNB2	Lamin B2	-3.13	0.93	2.75	0.23	0
LMOD2	Leiomodin 2	4.45	0.15	0.00	0.00	> 1
LRP2	LDL Receptor Related Protein 2	3.35	0.00	0.00	0.08	0
LTA	Lymphotoxin Alpha	4.16	0.12	0.00	0.00	> 1
MAGEB3	MAGE Family Member B3	-3.62	0.06	0.00	0.05	0
MALAT1	Metastasis Associated Lung Adenocarcinoma Transcript 1	3.39	0.00	0.00	-0.10	> 1
MXRA5	Matrix Remodeling Associated 5	3.15	-0.41	-0.54	-0.08	0

NAT14	N-Acetyltransferase 14 (Putative)	3.99	0.15	-0.42	-0.16
NDUFV3	NADH:Ubiquinone Oxidoreductase Subunit V3	2.83	0.00	0.00	-0.09
NEDD4L	NEDD4 Like E3 Ubiquitin Protein Ligase	2.67	0.00	0.00	-0.07
NEIL2	Nei Like DNA Glycosylase 2	2.22	0.00	0.00	-0.02
NIPA1	NIPA Magnesium Transporter 1	2.82	0.00	0.00	0.13
NQO2	N-Ribosyldihydronicotinamide:Quinone Reductase 2	-1.77	0.00	0.00	-0.14
NSUN5P1	NSUN5 Pseudogene 1	3.64	0.00	0.00	-0.11
NUDT9	Nudix Hydrolase 9	2.20	0.00	0.78	0.09
NYAP2	Neuronal Tyrosine-Phosphorylated Phosphoinositide-3-Kinase Adaptor 2	-2.05	-0.05	0.00	0.00
ORAI1	ORAI Calcium Release-Activated Calcium Modulator 1	2.64	-0.38	-1.34	-0.15
PACRG-AS3	PACRG Antisense RNA 3	3.48	0.08	0.00	-0.07
PDCD1LG2	Programmed Cell Death 1 Ligand 2	-7.20	0.00	0.00	0.09
PEG10	Paternally Expressed 10	2.69	0.00	0.00	-0.15
PHYKPL	5-Phosphohydroxy-L-Lysine Phospho-Lyase	3.42	0.00	0.00	-0.09
PIGN	Phosphatidylinositol Glycan Anchor Biosynthesis Class N	3.83	0.00	0.00	0.17
PIK3AP1	Phosphoinositide-3-Kinase Adaptor Protein 1	2.97	0.00	0.00	0.16
PITPNC1	Phosphatidylinositol Transfer Protein Cytoplasmic 1	3.15	0.00	0.00	0.13
POM121C	POM121 Transmembrane Nucleoporin C	3.13	0.15	-0.40	0.00
PPFIA2	PTPRF Interacting Protein Alpha 2	1.88	0.00	0.00	-0.09
PPM1F	Protein Phosphatase, Mg2+/Mn2+ Dependent 1F	-2.07	0.00	0.00	0.13
PPM1G	Protein Phosphatase, Mg2+/Mn2+ Dependent 1G	2.82	0.29	0.00	-0.07
PRDM2	PR/SET Domain 2	4.42	0.00	0.00	-0.14
PRDM4	PR/SET Domain 4	3.84	0.00	0.00	0.05
PRKCQ-AS1	PRKCQ Antisense RNA 1	3.34	0.00	0.00	0.49
PTDSS2	Phosphatidylserine Synthase 2	-2.73	0.21	0.85	0.00
PTP4A3	Protein Tyrosine Phosphatase 4A3	3.25	0.00	0.00	-0.03
PWARS5	Prader Willi/Angelman Region RNA 5	2.70	-0.44	-1.46	-0.46
RAB11FIP5	RAB11 Family Interacting Protein 5	3.56	-0.25	-0.76	-0.22
RAB5B	RAB5B, Member RAS Oncogene Family	3.08	-0.39	-0.58	0.09
RAD51D	RAD51 Paralog D	4.21	0.00	0.00	0.12
RHOJ	Ras Homolog Family Member J	2.64	0.00	0.00	-0.18
RIMBP2	RIMS Binding Protein 2	2.56	0.00	0.00	0.06
RLBP1	Retinaldehyde Binding Protein 1	2.19	0.23	0.00	0.00
RPAP2	RNA Polymerase II Associated Protein 2	3.43	0.00	0.00	0.08
RPS6KL1	Ribosomal Protein S6 Kinase Like 1	3.79	0.17	0.00	0.00
RPUSD2	RNA Pseudouridine Synthase Domain Containing 2	3.01	0.15	-0.61	-0.09
SEH1L	SEH1 Like Nucleoporin	-2.44	0.00	0.00	0.11
SHC1	SHC Adaptor Protein 1	-1.77	0.00	0.00	0.18
SLC12A5	Solute Carrier Family 12 Member 5	2.65	0.00	0.00	0.10
SLC25A1	Solute Carrier Family 25 Member 1	2.62	-0.13	0.00	0.00
SLC35B2	Solute Carrier Family 35 Member B2	3.32	0.00	0.00	-0.21
SLC35D1	Solute Carrier Family 35 Member D1	-4.10	0.00	0.00	0.09
SRSF6	Serine And Arginine Rich Splicing Factor 6	3.08	0.00	0.00	0.13
SUSD2	Sushi Domain Containing 2	3.35	0.00	0.00	-0.14
TACC2	Transforming Acidic Coiled-Coil Containing Protein 2	3.20	0.00	0.00	-0.08
TACR1	Tachykinin Receptor 1	2.86	0.00	0.00	-0.12
TIAM1	TIAM Rac1 Associated GEF 1	2.96	0.00	0.00	0.13
TMC2	Transmembrane Channel Like 2	-2.92	0.13	0.00	0.07
TMEM167B	Transmembrane Protein 167B	-3.89	-0.60	-0.37	-0.21
TMPO-AS1	TMPO Antisense RNA 1	3.15	0.22	0.00	0.19
TNFRSF10D	TNF Receptor Superfamily Member 10d	2.94	0.00	0.00	0.07
TNFRSF13C	TNF Receptor Superfamily Member 13C	-2.82	0.10	0.00	0.06
TNK2-AS1	TNK2 Antisense RNA 1	3.04	0.00	0.00	0.06
TOMM22	Translocase Of Outer Mitochondrial Membrane 22	2.82	0.00	0.00	-0.05
TOX2	TOX High Mobility Group Box Family Member 2	-2.38	-0.43	0.00	-0.08
TRMT11	TRNA Methyltransferase 11 Homolog	2.35	-0.11	0.56	0.00
TUSC2	Tumor Suppressor 2, Mitochondrial Calcium Regulator	-4.39	0.00	0.00	-0.07
UBXN4	UBX Domain Protein 4	3.36	0.00	0.00	-0.06
UQCRB	Ubiquinol-Cytochrome C Reductase Binding Protein	3.73	0.00	0.00	-0.04
XPO4	Exportin 4	2.95	0.00	0.00	0.13
ZBTB48	Zinc Finger And BTB Domain Containing 48	-2.57	-0.15	0.00	-0.07
ZNF354A	Zinc Finger Protein 354A	2.99	0.00	0.69	0.30
ZNF486	Zinc Finger Protein 486	3.44	-0.14	-0.61	-0.15
ZNF501	Zinc Finger Protein 501	3.29	-0.30	-1.34	-0.11
ZNF627	Zinc Finger Protein 627	-2.27	0.00	0.00	0.13
ZNF683	Zinc Finger Protein 683	-4.64	0.24	0.00	0.00

Supplementary Table S7. Enriched canonical pathways, upstream regulators and causal networks identified in isolated MCs by IPA.

Isolated MCs			
Canonical pathway	z-score	Fisher exact test p value	B-H p adjusted
<i>CLEAR Signaling Pathway</i>	1.633	1.82E-05	0.616
<i>Autophagy</i>	2.236 (biased)	0.0207	0.616
<i>PI3K Signaling in B Lymphocytes</i>	1 (biased)	0.0207	0.616
Upstream regulators	z-score	p value overlap	B-H p adjusted
<i>IL1B</i>	1.792	0.0218	0.236
<i>NFkB complex</i>	0.677 (bias-corrected)	0.0117	0.259
Causal network analysis	z-score	Network bias-corrected p value	B-H p adjusted
<i>IFN</i>	2.023	2.00E-04	0.0958
<i>IL-12 cytokine families</i>	3.024 (biased)	7.90E-03	0.166

Supplementary Table S8. Enriched canonical pathways, upstream regulators and causal networks identified in published microarray datasets by IPA.

GDS4602			
Canonical pathway	Z-score	p value overlap	B-H p adjusted
<i>CLEAR Signaling Pathway</i>	0.258	4.78E-02	0.3
<i>Autophagy</i>	0.7	8.09E-03	0.116
Upstream regulators			
Upstream regulators	Z-score	p value overlap	B-H p adjusted
<i>IL1B</i>	6.234	1.22E-05	1.69E-03
<i>NFkB complex</i>	5.239	6.10E-05	4.66E-03

GSE80047			
Canonical pathway	Z-score	p value overlap	B-H p adjusted
<i>CLEAR Signaling Pathway</i>	-1.414	2.66E-04	1.56E-03
<i>Autophagy</i>	1.26	2.81E-03	0.0102
Upstream regulators			
Upstream regulators	Z-score	p value overlap	B-H p adjusted
<i>IL1B</i>	7.961	3.94E-22	2.45E-19
<i>NFkB complex</i>	7.164	4.67E-11	3.84E-09

GSE78097			
Canonical pathway	Z-score	p value overlap	B-H p adjusted
<i>CLEAR Signaling Pathway</i>	0.649	2.40E-02	0.236
<i>Autophagy</i>	1.061	8.42E-03	0.25
Upstream regulators			
Upstream regulators	Z-score	p value overlap	B-H p adjusted
<i>IL1B</i>	4.893	7.33E-05	5.68E-03
<i>NFkB complex</i>	2.995	0.0133	0.18
Causal network analysis			
Causal network analysis	Z-score	p value overlap	B-H p adjusted
<i>IL-12 cytokine families</i>	4.538	1.24E-08	2.54E-07

Supplementary Table S9. List of itch-associated genes from published literature.

Category	Gene	Species used in study	Reference
Amine receptor	<i>HRH1</i>	Human, Mouse	(Amatya et al., 2010; Darsow et al., 1997; Hägermark & Strandberg, 1977; Inagaki et al., 1999; Oetjen et al., 2017; Rossbach et al., 2011)
Amine receptor	<i>HRH2</i>	Human, Mouse	(Amatya et al., 2010; Darsow et al., 1997; Hägermark & Strandberg, 1977; Inagaki et al., 1999; Nattkemper et al., 2018; Oetjen et al., 2017)
Amine receptor	<i>HRH3</i>	Human, Mouse	(Amatya et al., 2010; Darsow et al., 1997; Hägermark & Strandberg, 1977; Nattkemper et al., 2018; Oetjen et al., 2017; Rossbach et al., 2011)
Amine receptor	<i>HRH4</i>	Human, Mouse	(Amatya et al., 2010; Darsow et al., 1997; Hägermark & Strandberg, 1977; Nattkemper et al., 2018; Oetjen et al., 2017; Rossbach et al., 2009, 2011)
Amine-processing enzyme	<i>HDC</i>	Human	(Amatya et al., 2010; Darsow et al., 1997; Hägermark & Strandberg, 1977; Oetjen et al., 2017)
Calcium-binding protein	<i>S100A14</i>	Human	(Nattkemper et al., 2018)
Calcium-binding protein	<i>S100A2</i>	Human	(Nattkemper et al., 2018)
Calcium-binding protein	<i>S100A7</i>	Human	(Nattkemper et al., 2018)
Calcium-binding protein	<i>S100A9</i>	Human	(Nattkemper et al., 2018)
Calcium-binding protein	<i>S100G</i>	Human	(Nattkemper et al., 2018)
Calcium-binding protein	<i>S100P</i>	Human	(Nattkemper et al., 2018)
Cannabinoid receptor	<i>CNR1</i>	Human	(Nattkemper et al., 2018)
Cannabinoid receptor	<i>CNR2</i>	Human	(Nattkemper et al., 2018)
Cell adhesion molecule	<i>AOC3</i>	Human	(Madej et al., 2007)
Cell adhesion molecule	<i>CADM1</i>	Mouse	(Furuno et al., 2012; Steinhoff et al., 2006)
Cell adhesion molecule	<i>NECTIN3</i>	Mouse	(Furuno et al., 2012; Steinhoff et al., 2006)
Cell adhesion molecule	<i>SELE</i>	Human	(Nakamura et al., 2003)
Chemokine	<i>CCL1</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL14</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL17</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL18</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL2</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL20</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL26</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL27</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL3</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL4</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL7</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CCL8</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CXCL1</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CXCL10</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CXCL11</i>	Human	(Nattkemper et al., 2018)
Chemokine	<i>CXCL3</i>	Human	(Nattkemper et al., 2018)

Chemokine	<i>CXCL8</i>	Human	(Nattkemper et al., 2018)
Chemokine receptor	<i>CXCR1</i>	Human	(Nattkemper et al., 2018)
Chemokine receptor	<i>CXCR3</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IFNG</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL10</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL13</i>	Human, Mouse	(Oetjen et al., 2017; Oh et al., 2013; Zheng et al., 2009)
Cytokine	<i>IL17A</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL17F</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL19</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL2</i>	Human	(Darsow et al., 1997; Nakamura et al., 2003)
Cytokine	<i>IL20</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL22</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL23A</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL26</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL31</i>	Human, Mouse	(Andoh et al., 2017; Cevikbas et al., 2014; Dillon et al., 2004; Nattkemper et al., 2018; Oetjen et al., 2017; Sonkoly et al., 2006)
Cytokine	<i>IL36A</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL36G</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL4</i>	Human, Mouse	(Chan et al., 2001; Nattkemper et al., 2018; Oetjen et al., 2017)
Cytokine	<i>IL6</i>	Human	(Konda et al., 2015; Nattkemper et al., 2018)
Cytokine	<i>IL7</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>IL9</i>	Human	(Nattkemper et al., 2018)
Cytokine	<i>TNF</i>	Human, Mouse	(Kakurai et al., 2006; Miao et al., 2018; Nattkemper et al., 2018)
Cytokine	<i>TSLP</i>	Human, Mouse	(Wilson et al., 2013)
Cytokine receptor	<i>CRLF2</i>	Human, Mouse	(Wilson et al., 2013)
Cytokine receptor	<i>IL13RA1</i>	Human, Mouse	(Oetjen et al., 2017; Oh et al., 2013; Zheng et al., 2009)
Cytokine receptor	<i>IL13RA2</i>	Human, Mouse	(Oetjen et al., 2017; Oh et al., 2013; Zheng et al., 2009)
Cytokine receptor	<i>IL2RA</i>	Human	(Darsow et al., 1997; Nakamura et al., 2003)
Cytokine receptor	<i>IL2RB</i>	Human	(Darsow et al., 1997; Nakamura et al., 2003)
Cytokine receptor	<i>IL31RA</i>	Human, Mouse	(Andoh et al., 2017; Cevikbas et al., 2014; Dillon et al., 2004; Oetjen et al., 2017; Sonkoly et al., 2006)
Cytokine receptor	<i>IL4R</i>	Human, Mouse	(Chan et al., 2001; Oetjen et al., 2017)
Cytokine receptor	<i>IL6R</i>	Human	(Konda et al., 2015)
Cytokine receptor	<i>TNFRSF1A</i>	Mouse	(Kakurai et al., 2006; Miao et al., 2018)
Cytokine receptor	<i>TNFRSF1B</i>	Mouse	(Kakurai et al., 2006; Miao et al., 2018)
Endopeptidase	<i>ECEL1</i>	Human	(Nattkemper et al., 2018)
Hormone	<i>SST</i>	Mouse	(Stantcheva et al., 2016)
Ion channel	<i>CHRNA9</i>	Human	(Nattkemper et al., 2018)

Ion channel	<i>CHRNB3</i>	Human	(Nattkemper et al., 2018)
Ion channel	<i>P2RX3</i>	Mouse, Rat	(Schüttenhelm et al., 2015; Shiratori-Hayashi et al., 2019)
Ion channel	<i>PIEZ02</i>	Mouse	(Feng et al., 2018)
Ion channel	<i>TRPA1</i>	Human, Mouse	(Cevikbas et al., 2014; Nattkemper et al., 2018; Oh et al., 2013; Wilson et al., 2011, 2013)
Ion channel	<i>TRPM8</i>	Human	(Nattkemper et al., 2018)
Ion channel	<i>TRPV1</i>	Human, Mouse	(Cevikbas et al., 2014; Costa et al., 2008; Imamachi et al., 2009; Min et al., 2014; Nattkemper et al., 2018; Rogoz et al., 2014)
Ion channel	<i>TRPV2</i>	Human, Rat	(Nattkemper et al., 2018; Stokes et al., 2004)
Ion channel	<i>TRPV3</i>	Human, Mouse	(Cui et al., 2018; Nattkemper et al., 2018; Yoshioka et al., 2009; Zhao et al., 2020)
Ion channel	<i>TRPV4</i>	Mouse	(Luo et al., 2018)
Kinin autacoid	<i>KNG1</i>	Human	(Hosogi et al., 2006)
Kinin autacoid receptor	<i>BDKRB1</i>	Human	(Hosogi et al., 2006)
Kinin autacoid receptor	<i>BDKRB2</i>	Human	(Hosogi et al., 2006)
Lipid precursor processor	<i>LTA4H</i>	Mouse	(Andoh et al., 2011a, 2017; Andoh & Kuraishi, 1998)
Lipid precursor processor	<i>PTGDS</i>	Mouse	(Sugimoto et al., 2007)
Lipid precursor processor	<i>PTGES</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid precursor processor	<i>PTGES2</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid precursor processor	<i>PTGES3</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid precursor processor	<i>PTGS1</i>	Human	(Hägermark et al., 1977)
Lipid precursor processor	<i>PTGS2</i>	Human	(Hägermark et al., 1977)
Lipid receptor	<i>LTB4R</i>	Mouse	(Andoh et al., 2011a, 2017; Andoh & Kuraishi, 1998)
Lipid receptor	<i>LTB4R2</i>	Mouse	(Andoh et al., 2011a, 2017; Andoh & Kuraishi, 1998)
Lipid receptor	<i>PTGER1</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid receptor	<i>PTGER2</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid receptor	<i>PTGER3</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid receptor	<i>PTGER4</i>	Human	(Fjellner & Hagermark, 1979; Hägermark et al., 1977; Hagermark & Strandberg, 1977; Neisius et al., 2002)
Lipid receptor	<i>TBXA2R</i>	Mouse	(Andoh et al., 2007)
Mas-related G protein-coupled receptor	<i>MRGPRD</i>	Human, Mouse	(Liu et al., 2012; Nattkemper et al., 2018; Qu et al., 2014)
Mas-related G protein-coupled receptor	<i>MRGPRX1</i>	Human, Mouse	(Liu et al., 2009, 2011; Reddy et al., 2015; Sikand et al., 2011; Wilson et al., 2011)
Mas-related G-protein coupled receptor	<i>MRGPRX2</i>	Human, Mouse	(Azimi et al., 2016; Liu et al., 2011; Meixiong et al., 2019a; Nattkemper et al., 2018)
Mas-related G protein-coupled receptor	<i>MRGPRX3</i>	Human	(Nattkemper et al., 2018)
Mas-related G protein-coupled receptor	<i>MRGPRX4</i>	Human, Mouse	(Meixiong et al., 2019b; Yu et al., 2019)
Muscarinic receptor	<i>CHRM1</i>	Human	(Nattkemper et al., 2018)
Muscarinic receptor	<i>CHRM3</i>	Human	(Nattkemper et al., 2018)
Nerve fibre marker	<i>UCHL1</i>	Human, Mouse, Rat	(Kakurai et al., 2006; Nakamura et al., 2003; Schüttenhelm et al., 2015)
Neuropeptide	<i>NGF</i>	Human, Mouse	(Kou et al., 2012; Nakamura et al., 2003; Takano et al., 2005)
Neuropeptide	<i>NMB</i>	Mouse	(Wan et al., 2017)

Neuropeptide	<i>NMU</i>	Mouse	(Mizukawa et al., 2016)
Neuropeptide	<i>NPY</i>	Human, Mouse	(Bourane et al., 2015; Gao et al., 2018; Reich et al., 2007)
Neuropeptide	<i>VIP</i>	Human	(Fjellner & Hagermark, 1981)
Neuropeptide	<i>CALCA</i>	Mouse, Rat	(Kakurai et al., 2006; Rogoz et al., 2014; Schüttenhelm et al., 2015)
Neuropeptide precursor	<i>GRP</i>	Mouse	(Alemi et al., 2013; Andoh et al., 2011b; Wan et al., 2017)
Neuropeptide precursor	<i>NPPA</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide precursor	<i>NPPB</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide precursor	<i>NPPC</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide precursor	<i>PNOC</i>	Mouse	(Andoh et al., 2004)
Neuropeptide precursor	<i>TAC1</i>	Human, Mouse, Rat	(Amatya et al., 2010; Andoh et al., 1998; Azimi et al., 2017; Hägermark et al., 1978; Nakamura et al., 2003; Nattkemper et al., 2018; Schüttenhelm et al., 2015)
Neuropeptide receptor	<i>CALCR1</i>	Mouse, Rat	(Kakurai et al., 2006; Rogoz et al., 2014; Schüttenhelm et al., 2015)
Neuropeptide receptor	<i>GPBAR1</i>	Mouse	(Alemi et al., 2013; Andoh et al., 2011b; Wan et al., 2017)
Neuropeptide receptor	<i>GRPR</i>	Mouse	(Andoh et al., 2011b; Wan et al., 2017)
Neuropeptide receptor	<i>NGFR</i>	Human, Mouse	(Kou et al., 2012; Nakamura et al., 2003; Takano et al., 2005)
Neuropeptide receptor	<i>NMBR</i>	Mouse	(Wan et al., 2017)
Neuropeptide receptor	<i>NPR1</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide receptor	<i>NPR2</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide receptor	<i>NPR3</i>	Human, Mouse	(Shimizu et al., 2014; Solinski et al., 2019)
Neuropeptide receptor	<i>NPY1R</i>	Human, Mouse	(Bourane et al., 2015; Gao et al., 2018; Reich et al., 2007)
Neuropeptide receptor	<i>NPY2R</i>	Human, Mouse	(Bourane et al., 2015; Gao et al., 2018; Reich et al., 2007)
Neuropeptide receptor	<i>NPY4R</i>	Human, Mouse	(Bourane et al., 2015; Gao et al., 2018; Reich et al., 2007)
Neuropeptide receptor	<i>NPY5R</i>	Human, Mouse	(Bourane et al., 2015; Gao et al., 2018; Reich et al., 2007)
Neuropeptide receptor	<i>RAMP1</i>	Mouse, Rat	(Kakurai et al., 2006; McLatchie et al., 1998; Rogoz et al., 2014; Schüttenhelm et al., 2015)
Neuropeptide receptor	<i>TACR1</i>	Human, Mouse, Rat	(Amatya et al., 2010; Andoh et al., 1998; Hägermark et al., 1978; Nakamura et al., 2003; Nattkemper et al., 2018; Schüttenhelm et al., 2015)
Neuropeptide receptor	<i>VIPR1</i>	Human	(Fjellner & Hagermark, 1981)
Neuropeptide receptor	<i>VIPR2</i>	Human	(Fjellner & Hagermark, 1981)
Neurotransmitter precursor processor	<i>CHAT</i>	Human	(Nattkemper et al., 2018)
Neurotransmitter precursor processor	<i>DDC</i>	Human, Mouse, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Weisshaar et al., 1999; Yamaguchi et al., 1999)
Neurotransmitter precursor processor	<i>TPH1</i>	Human, Mouse, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Weisshaar et al., 1999; Yamaguchi et al., 1999)
Neurotransmitter precursor processor	<i>TPH2</i>	Human, Mouse, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Weisshaar et al., 1999; Yamaguchi et al., 1999)
Neurotransmitter receptor	<i>GABRA1</i>	Human	(Nigam et al., 2010)
Neurotransmitter receptor	<i>GABRA2</i>	Human	(Nigam et al., 2010)
Neurotransmitter receptor	<i>GABRA3</i>	Human	(Nigam et al., 2010)
Neurotransmitter receptor	<i>GABRA4</i>	Human	(Nigam et al., 2010)
Neurotransmitter receptor	<i>GABRA5</i>	Human	(Nigam et al., 2010)
Neurotransmitter receptor	<i>GABRA6</i>	Human	(Nigam et al., 2010)

Neurotransmitter receptor	<i>HTR2A</i>	Human, Mouse, Rat	(Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Yamaguchi et al., 1999)
Neurotransmitter receptor	<i>HTR2B</i>	Human, Mouse, Rat	(Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Yamaguchi et al., 1999)
Neurotransmitter receptor	<i>HTR2C</i>	Human, Mouse, Rat	(Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nojima & Carstens, 2003; Thomsen et al., 2001; Yamaguchi et al., 1999)
Neurotransmitter receptor	<i>HTR3A</i>	Human, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Thomsen et al., 2001; Weisshaar et al., 1999)
Neurotransmitter receptor	<i>HTR3B</i>	Human, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nattkemper et al., 2018; Thomsen et al., 2001; Weisshaar et al., 1999)
Neurotransmitter receptor	<i>HTR3C</i>	Human, Rat	(Balaskas et al., 1998; Fjellner & Hagermark, 1979; Hosogi et al., 2006; Nattkemper et al., 2018; Thomsen et al., 2001; Weisshaar et al., 1999)
Neurotransmitter receptor	<i>HTR7</i>	Human	(Nattkemper et al., 2018)
Neurotrophic factor	<i>NRTN</i>	Mouse	(Heuckeroth et al., 1999; Sakai et al., 2017)
Neurotrophic factor	<i>NTF4</i>	Human	(Grewel et al., 2000)
Neurotrophic factor receptor	<i>GFRA1</i>	Mouse	(Heuckeroth et al., 1999; Sakai et al., 2017)
Neurotrophic factor receptor	<i>GFRA2</i>	Mouse	(Heuckeroth et al., 1999; Sakai et al., 2017)
Neurotrophic factor receptor	<i>GFRA3</i>	Mouse	(Heuckeroth et al., 1999; Sakai et al., 2017)
Neurotrophic factor receptor	<i>GFRA4</i>	Mouse	(Heuckeroth et al., 1999; Sakai et al., 2017)
Neurotrophic factor receptor	<i>NTRK1</i>	Human, Mouse	(Nakamura et al., 2003; Stantcheva et al., 2016)
Neurotrophic factor receptor	<i>NTRK2</i>	Human	(Grewel et al., 2000)
Monoxygenase	<i>TBXAS1</i>	Mouse	(Andoh et al., 2007)
Opioid precursor	<i>PDYN</i>	Human	(Taneda et al., 2011)
Opioid precursor	<i>PENK</i>	Human	(Sikand et al., 2011)
Opioid receptor	<i>OPRK1</i>	Human	(Nattkemper et al., 2018; Taneda et al., 2011)
Opioid receptor	<i>OPRL1</i>	Mouse	(Andoh et al., 2004)
Phospholipase	<i>PLA2G4B</i>	Human	(Nattkemper et al., 2018)
Phospholipase	<i>PLA2G4D</i>	Human	(Nattkemper et al., 2018)
Phospholipase	<i>PLA2G4E</i>	Human	(Nattkemper et al., 2018)
Phospholipase	<i>PLCB3</i>	Mouse	(Imamachi et al., 2009)
Phospholipase	<i>PLCG1</i>	Human	(Nattkemper et al., 2018)
Phospholipid receptor	<i>PTAFR</i>	Mouse	(Solinski et al., 2019)
Potassium channel	<i>KCNA1</i>	Mouse	(Lee et al., 2012)
Potassium channel	<i>KCNA2</i>	Mouse	(Lee et al., 2012)
Potassium channel	<i>KCNK2</i>	Mouse	(Lee et al., 2012)
Potassium channel	<i>KCNK4</i>	Mouse	(Lee et al., 2012)
Preproprotein	<i>POMC</i>	Human	(Nattkemper et al., 2018)
Protease	<i>CMA1</i>	Mouse	(Imada et al., 2002; Terakawa et al., 2008)
Protease	<i>CTSB</i>	Human	(Nattkemper et al., 2018)
Protease	<i>CTSF</i>	Human	(Nattkemper et al., 2018)
Protease	<i>CTSG</i>	Human	(Nattkemper et al., 2018)
Protease	<i>CTSH</i>	Human	(Nattkemper et al., 2018)

Protease	<i>CTSS</i>	Human	(Nattkemper et al., 2018; Reddy et al., 2015)
Protease	<i>CTSZ</i>	Human	(Nattkemper et al., 2018)
Protease	<i>ELANE</i>	Human	(Nattkemper et al., 2018)
Protease	<i>KLK13</i>	Human	(Nattkemper et al., 2018)
Protease	<i>KLK14</i>	Human, Rat	(Nattkemper et al., 2018; Oikonomopoulou et al., 2006; Stefansson et al., 2008; Steinhoff et al., 2003)
Protease	<i>KLK5</i>	Human, Rat	(Nattkemper et al., 2018; Oikonomopoulou et al., 2006; Stefansson et al., 2008; Steinhoff et al., 2003)
Protease	<i>KLK6</i>	Human, Rat	(Nattkemper et al., 2018; Oikonomopoulou et al., 2006; Steinhoff et al., 2003)
Protease	<i>KLK7</i>	Human, Mouse	(Ekholm & Egelrud, 1999; Guo et al., 2020; Hansson et al., 2002)
Protease	<i>KLK8</i>	Human	(Nattkemper et al., 2018)
Protease	<i>MMP9</i>	Human	(Takai et al., 2017)
Protease	<i>PRSS1</i>	Human, Mouse	(Costa et al., 2008; Thomsen et al., 2002)
Protease	<i>TPSAB1</i>	Human, Mouse	(Nattkemper et al., 2018; Steinhoff et al., 2003; Tsujii et al., 2009; Uj et al., 2006; Zhu et al., 2015)
Protein kinase	<i>MAPK1</i>	Mouse	(Chen et al., 2016; Zhang et al., 2014)
Protein kinase	<i>RET</i>	Mouse	(Stantcheva et al., 2016)
Protein kinase	<i>ROCK1</i>	Mouse	(Hashimoto et al., 2004)
Protein kinase	<i>ROCK2</i>	Mouse	(Hashimoto et al., 2004)
Proteinase activated receptor	<i>F2R</i>	Mouse	(Tsujii et al., 2008)
Proteinase activated receptor	<i>F2RL1</i>	Human, Mouse	(Costa et al., 2008; Nattkemper et al., 2018; Steinhoff et al., 2003; Tsujii et al., 2008, 2009)
Proteinase activated receptor	<i>F2RL2</i>	Human	(Nattkemper et al., 2018)
Proteinase activated receptor	<i>F2RL3</i>	Mouse	(Nattkemper et al., 2018; Patricio et al., 2015; Tsujii et al., 2008)
Semaphorin	<i>SEMA3A</i>	Human	(Kou et al., 2012)
Sodium channel	<i>SCN11A</i>	Human	(Nattkemper et al., 2018)
Sodium channel	<i>SCN3A</i>	Human	(Nattkemper et al., 2018)
Sodium channel	<i>SCN9A</i>	Human	(Nattkemper et al., 2018)
Toll-like receptor	<i>TLR4</i>	Mouse	(Min et al., 2014)
Toll-like receptor	<i>TLR7</i>	Mouse	(Liu et al., 2010)
Tyrosine kinase	<i>JAK1</i>	Human, Mouse	(Oetjen et al., 2017)
Vasoconstrictor	<i>EDN1</i>	Human	(Katugampola et al., 2000; Nattkemper et al., 2018; Wenzel et al., 1998)
Vasoconstrictor	<i>EDN2</i>	Human	(Katugampola et al., 2000; Wenzel et al., 1998)
Vasoconstrictor	<i>EDN3</i>	Human	(Katugampola et al., 2000; Wenzel et al., 1998)
Vasoconstrictor receptor	<i>EDNRA</i>	Human	(Nattkemper et al., 2018)

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Supplementary Table S10. Expression of itch-associated genes in mast cells isolated from involved psoriatic skin and their expression in datasets GDS4602, GSE80047, and GSE7809.

Values marked in red indicate genes with p value adjusted for false discovery rate (q) < 0.05. NA is not applicable/not available.

Category	Gene Symbol	Isolated MCs			GDS4602			GSE78097			GSE80047		
		log2FC	p value	q value	log2FC	p value	q value	log2FC	p value	q value	log2FC	p value	q value
Cell adhesion molecule	<i>AOC3</i>	1.948225	0.062511	0.289318	-0.70843	1.22E-12	7.02E-12	-1.10886	0.024022	0.083327	-0.233802	1.00E-06	3.99E-06
Kinin autacoid receptor	<i>BDKRB1</i>	0.657231	0.212259	0.464428	0.363231	7.43E-14	4.67E-13	1.546137	8.47E-05	0.000811	0.251533	7.61E-12	9.26E-11
Kinin autacoid receptor	<i>BDKRB2</i>	0.134842	0.891286	0.946325	0.471043	2.11E-13	1.28E-12	0.938355	0.002655	0.013445	0.053201	0.016798	0.028577
Cell adhesion molecule	<i>CADM1</i>	0.047191	0.963785	0.983646	NA	NA	NA	NA	NA	NA	-0.011507	0.41113	0.479864
Neuropeptide	<i>CALCA</i>	0.223845	0.850124	0.924505	NA	NA	NA	NA	NA	NA	0.003467	0.796637	0.833929
Neuropeptide receptor	<i>CALCRL</i>	1.710243	0.112717	0.372069	NA	NA	NA	NA	NA	NA	0.017539	0.624532	0.683377
Chemokine	<i>CCL1</i>	NA	NA	NA	0.139733	1.08E-05	3.14E-05	0.048454	0.483861	0.832112	0.004041	0.873201	0.897529
Chemokine	<i>CCL14</i>	-2.59412	0.009749	0.157004	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chemokine	<i>CCL15-CCL14///CCL14</i>	NA	NA	NA	-0.94391	2.39E-16	1.83E-15	-0.56949	0.155357	0.348335	NA	NA	NA
Chemokine	<i>CCL15-CCL14///CCL15///CCL14</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	-0.135182	2.73E-05	8.17E-05
Chemokine	<i>CCL17</i>	0.0489	0.936155	0.9682	0.29395	9.39E-08	3.5E-07	0.392604	0.57046	0.90092	0.072991	0.124019	0.169634
Chemokine	<i>CCL18</i>	0.699165	0.16898	0.428651	NA	NA	NA	NA	NA	NA	1.021609	1.96E-15	6.05E-14
Chemokine	<i>CCL2</i>	1.107776	0.295525	0.554585	1.25902	9.79E-19	9.15E-18	1.151915	0.000709	0.004629	0.388019	2.04E-09	1.42E-08
Chemokine	<i>CCL20</i>	1.836001	0.041572	0.255626	2.968398	1.80E-44	2.25E-42	6.102654	1.31E-08	1.04E-06	1.234453	5.87E-19	5.45E-17
Cytokine	<i>CCL26</i>	NA	NA	NA	-0.02477	0.560825	0.626521	-0.10884	0.880008	1	-0.196297	7.51E-05	0.000205
Chemokine	<i>CCL27</i>	-1.31221	0.043234	0.259009	-2.94934	9.11E-39	5.81E-37	-2.51549	4.18E-06	7.52E-05	-0.387256	4.15E-10	3.37E-09
Chemokine	<i>CCL3</i>	1.682304	0.028739	0.222687	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chemokine	<i>CCL3L3///CCL3L1///CCL3</i>	NA	NA	NA	0.97173	1.03E-13	6.44E-13	2.903965	6.94E-06	0.000112	0.585391	1.10E-17	6.49E-16
Chemokine	<i>CCL4</i>	1.134742	0.101704	0.352912	0.87589	2.26E-23	3.17E-22	2.716475	2.12E-05	0.000266	0.381216	5.39E-19	5.11E-17
Chemokine	<i>CCL7</i>	NA	NA	NA	0.403647	1.53E-19	1.54E-18	0.697782	0.002132	0.011303	0.38793	1.57E-17	8.81E-16
Chemokine	<i>CCL8</i>	0.453516	0.369958	0.601318	1.007746	1.04E-15	7.52E-15	2.810235	3.79E-05	0.000424	0.677027	8.04E-15	2.15E-13
Neurotransmitter precursor processor	<i>CHAT</i>	-0.03846	0.966679	0.985519	0.044586	0.174257	0.229743	0	1	1	0.05623	0.003181	0.006291
Muscarinic receptor	<i>CHRM1</i>	-0.65146	0.605151	0.77957	-0.26429	1.97E-09	8.64E-09	-0.97572	0.001601	0.008927	-0.208856	4.73E-06	1.64E-05
Muscarinic receptor	<i>CHRM3</i>	1.982842	0.069583	0.298701	NA	NA	NA	NA	NA	NA	-0.211707	1.09E-05	3.52E-05
Ion channel	<i>CHRNA9</i>	1.033663	0.228359	0.482965	2.006807	2.41E-29	5.9E-28	6.82556	8.45E-14	1.06E-10	1.040059	3.61E-13	6.17E-12
Ion channel	<i>CHRNB3</i>	0.911333	0.31242	0.571331	NA	NA	NA	0	1	1	0.083708	6.13E-07	2.55E-06
Protease	<i>CMA1</i>	NA	NA	NA	-0.3095	0.006717	0.012487	-0.11585	0.753192	1	-0.194676	0.000732	0.001649
Cannabinoid receptor	<i>CNR1</i>	1.675035	0.058643	0.284238	NA	NA	NA	NA	NA	NA	0.077538	0.000417	0.000985
Cannabinoid receptor	<i>CNR2</i>	2.012549	0.085555	0.324844	0.052999	0.143528	0.193633	0	1	1	0.124703	1.75E-08	1E-07
Cytokine receptor	<i>CRLF2</i>	NA	NA	NA	0.185443	2.59E-07	9.16E-07	0.263441	0.234112	0.486344	0.287131	6.27E-14	1.3E-12
Protease	<i>CTSB</i>	2.899804	0.000106	0.030081	NA	NA	NA	NA	NA	NA	0.083676	1.26E-06	4.91E-06
Protease	<i>CTSF</i>	1.835881	0.076549	0.309877	-0.57996	2.35E-24	3.61E-23	-1.66688	3.27E-05	0.000377	-0.319692	1.91E-17	1.05E-15
Protease	<i>CTSG</i>	-0.1474	0.853086	0.925719	-0.43349	1.72E-06	5.52E-06	-0.35284	0.329823	0.638156	-0.286953	1.21E-06	4.71E-06
Protease	<i>CTSH</i>	1.137557	0.316245	0.574724	-0.11566	0.059012	0.088146	-0.31091	0.158581	0.354191	-0.03896	0.043235	0.066621
Protease	<i>CTSS</i>	-0.49838	0.597606	0.774177	NA	NA	NA	NA	NA	NA	0.305551	1.45E-12	2.11E-11
Protease	<i>CTSZ</i>	0.831505	0.302866	0.561729	NA	NA	NA	NA	NA	NA	-0.02679	0.182618	0.238432
Chemokine	<i>CXCL1</i>	0.501782	0.400558	0.624638	2.53738	4.31E-28	9.23E-27	6.014307	4.97E-07	1.44E-05	1.333685	9.18E-20	1.2E-17
Chemokine	<i>CXCL10</i>	1.404747	0.055614	0.27934	2.818208	2.24E-30	6.09E-29	6.349982	1.84E-09	2.41E-07	1.417416	8.79E-16	2.97E-14
Chemokine	<i>CXCL11</i>	1.152918	0.05232	0.275008	NA	NA	NA	NA	NA	NA	0.511822	1.40E-11	1.59E-10
Chemokine	<i>CXCL3</i>	-0.8307	0.448935	0.662103	0.286704	2.35E-14	1.53E-13	3.034148	3.45E-08	1.97E-06	0.171358	4.24E-05	0.000122
Chemokine	<i>CXCL8</i>	0.430815	0.473225	0.682122	NA	NA	NA	NA	NA	NA	0.133603	5.02E-05	0.000142

Chemokine receptor	CXCR1	1.010806	0.218667	0.471447	0.118489	0.000101	0.00026	-0.00067	0.491508	0.832112	0.068876	0.001182	0.002551
Chemokine receptor	CXCR3	1.417543	0.163383	0.424884	NA	NA	NA	NA	NA	NA	0.077162	8.77E-06	2.89E-05
Neurotransmitter precursor processor	DDC	0.690746	0.259681	0.516531	NA	NA	NA	NA	NA	NA	-0.080731	0.131604	0.178704
Endopeptidase	ECE1	1.492537	0.030504	0.22794	0.139428	0.00128	0.002726	0	1	1	0.06373	6.02E-06	2.05E-05
Vasoconstrictor	EDN1	0.402145	0.79734	0.894667	NA	NA	NA	NA	NA	NA	-0.031962	0.176865	0.231652
Vasoconstrictor	EDN2	-0.82357	0.380599	0.608415	0.125332	0.000619	0.001391	-0.02977	0.205927	0.437193	-0.042226	0.080746	0.115864
Vasoconstrictor	EDN3	0.959144	0.138915	0.404173	NA	NA	NA	NA	NA	NA	-0.097653	0.019369	0.032452
Vasoconstrictor receptor	EDNRA	0.69453	0.523898	0.722108	NA	NA	NA	NA	NA	NA	-0.095074	0.001752	0.003651
Protease	ELANE	-0.85935	0.12785	0.391739	-0.38933	0.002523	0.005081	-0.17725	0.633393	0.979607	-0.080384	0.043455	0.066932
Proteinase activated receptor	F2R	-1.94496	0.024148	0.207228	NA	NA	NA	NA	NA	NA	-0.033641	0.114345	0.15793
Proteinase activated receptor	F2RL1	1.245995	0.013911	0.173042	NA	NA	NA	NA	NA	NA	0.074976	0.235853	0.298219
Proteinase activated receptor	F2RL2	3.047573	0.001113	0.07715	NA	NA	NA	NA	NA	NA	0.14281	0.000259	0.000639
Proteinase activated receptor	F2RL3	1.951297	0.008419	0.148714	0.080535	7.29E-05	0.000191	0.002738	0.398657	0.729912	-0.005197	0.863375	0.89001
Neurotransmitter receptor	GABRA1	1.511628	0.126321	0.390863	NA	NA	NA	0	1	1	0.079024	0.001254	0.002691
Neurotransmitter receptor	GABRA2	1.305152	0.332379	0.587267	NA	NA	NA	NA	NA	NA	-0.017341	0.320416	0.387651
Neurotransmitter receptor	GABRA3	0.313064	0.658845	0.812804	0.017468	0.435468	0.505756	0.033122	0.276883	0.556528	0.02221	0.265825	0.329761
Neurotransmitter receptor	GABRA4	1.535099	0.0521	0.274768	NA	NA	NA	NA	NA	NA	0.388673	1.10E-09	8.12E-09
Neurotransmitter receptor	GABRA5	0.038397	0.954812	0.978366	NA	NA	NA	NA	NA	NA	0.042233	0.007118	0.013092
Neurotransmitter receptor	GABRA6	1.700464	0.005103	0.125058	0.067065	0.002644	0.005304	0	1	1	0.028398	0.084819	0.121024
Neurotrophic factor receptor	GFRA1	2.623059	0.028995	0.223645	NA	NA	NA	NA	NA	NA	-0.290977	2.88E-08	1.56E-07
Neurotrophic factor receptor	GFRA2	1.43731	0.153788	0.41824	NA	NA	NA	NA	NA	NA	-0.046385	0.064065	0.094328
Neurotrophic factor receptor	GFRA3	-0.01369	0.979983	0.989979	NA	NA	NA	NA	NA	NA	-0.121104	0.012846	0.022389
Neurotrophic factor receptor	GFRA4	0.606424	0.349308	0.597553	NA	NA	NA	0	1	1	-0.001022	0.938653	0.951171
Neuropeptide receptor	GPBAR1	-0.15174	0.89822	0.950325	0.043998	0.191141	0.248871	0.007938	0.457097	0.809461	0.022977	0.467641	0.535692
Neuropeptide	GRP	0.606435	0.382847	0.610238	-0.07326	0.085026	0.12197	-0.02366	0.146557	0.333763	-0.008848	0.862237	0.889053
Neuropeptide receptor	GRPR	NA	NA	NA	-0.05651	0.10305	0.14467	0	1	1	0.04918	0.011096	0.019624
Amine-processing enzyme	HDC	0.186993	0.823656	0.909647	-0.4051	4.79E-08	1.83E-07	2.082389	0.000414	0.002994	0.139637	0.036416	0.057109
Amine receptor	HRH1	2.651148	0.028066	0.220257	NA	NA	NA	NA	NA	NA	0.065779	0.068981	0.100828
Amine receptor	HRH2	-0.31711	0.712076	0.845394	0.313113	7.59E-11	3.76E-10	-0.00097	0.919974	1	0.024421	0.327454	0.395276
Amine receptor	HRH3	-1.59087	0.07448	0.305864	NA	NA	NA	0	1	1	0.046966	0.000327	0.00079
Amine receptor	HRH4	1.948989	0.138745	0.403971	NA	NA	NA	0	1	1	0.108591	2.64E-09	1.79E-08
Neurotransmitter receptor	HTR2A	1.965816	0.044448	0.261766	NA	NA	NA	NA	NA	NA	-0.150005	4.30E-05	0.000123
Neurotransmitter receptor	HTR2B	1.732327	0.127005	0.391137	0.036102	0.547575	0.613497	-0.02097	0.915589	1	0.238513	3.03E-06	1.09E-05
Neurotransmitter receptor	HTR2C	1.303776	0.139256	0.40427	NA	NA	NA	0	1	1	0.035807	0.004124	0.00797
Neurotransmitter receptor	HTR3A	2.746894	0.008607	0.150244	NA	NA	NA	NA	NA	NA	0.321569	3.82E-10	3.12E-09
Neurotransmitter receptor	HTR3B	2.151091	0.005266	0.126976	0.130776	0.000114	0.000292	0.042946	0.497874	0.832112	0.164736	3.02E-08	1.63E-07
Neurotransmitter receptor	HTR3C	-1.65238	0.106972	0.361731	0.072216	0.022221	0.0368	0	1	1	0.028235	0.08495	0.121172
Neurotransmitter receptor	HTR7	0.242115	0.794008	0.892456	NA	NA	NA	NA	NA	NA	0.089605	1.11E-05	3.58E-05
Neurotransmitter receptor	HTR7P1//HTR7	NA	NA	NA	0.073282	0.00301	0.00599	0	1	1	-0.116356	0.002203	0.004498
Cytokine	IFNG	NA	NA	NA	0.479719	2.24E-26	4.09E-25	0.622923	0.047862	0.147201	0.458377	6.60E-18	4.21E-16
Cytokine	IL10	0.261366	0.642564	0.803624	0.111987	1.13E-05	3.28E-05	0.000131	0.512569	0.832112	0.142814	7.42E-08	3.7E-07
Cytokine	IL13	1.687907	0.064054	0.291907	0.167366	4.49E-05	0.00012	0.021877	0.486561	0.832112	-0.084367	0.000982	0.002158
Cytokine receptor	IL13RA1	3.307116	0.002169	0.093875	NA	NA	NA	NA	NA	NA	0.046435	0.038672	0.06032
Cytokine receptor	IL13RA2	NA	NA	NA	-0.02023	0.62059	0.682471	0.361828	0.186841	0.403815	-0.026293	0.69743	0.747978
Cytokine	IL17A	1.235261	0.20236	0.455363	NA	NA	NA	NA	NA	NA	0.294933	3.16E-19	3.27E-17
Cytokine	IL17F	0.472743	0.369432	0.601318	0.302845	1.07E-08	4.34E-08	0.670358	0.120551	0.306235	0.288279	4.03E-09	2.63E-08

Cytokine	<i>IL19</i>	0.128025	0.904318	0.95348	1.912114	4.33E-25	7.11E-24	5.072069	5.95E-05	0.000612	0.995973	5.07E-24	3.36E-21
Cytokine	<i>IL2</i>	1.152907	0.052325	0.275008	NA	NA	NA	0	1	1	0.043512	0.010633	0.018875
Cytokine	<i>IL20</i>	0.172588	0.853297	0.925728	1.092522	4.12E-29	9.67E-28	2.128719	0.004345	0.020126	0.485335	1.06E-21	2.9E-19
Cytokine	<i>IL22</i>	0.175301	0.762838	0.87672	NA	NA	NA	NA	NA	NA	0.14635	1.73E-12	2.47E-11
Cytokine	<i>IL23A</i>	1.695361	0.015433	0.178366	NA	NA	NA	NA	NA	NA	0.165154	3.13E-11	3.28E-10
Cytokine	<i>IL23A///TRBV19</i>	NA	NA	NA	0.420768	1.26E-20	1.4E-19	-0.00311	0.956381	1	0.17868	4.06E-09	2.64E-08
Cytokine	<i>IL26</i>	NA	NA	NA	0.400025	5.92E-22	7.39E-21	4.988873	1.90E-10	3.63E-08	0.749544	1.04E-20	1.91E-18
Cytokine receptor	<i>IL2RA</i>	0.184743	0.895331	0.948769	NA	NA	NA	NA	NA	NA	0.141256	1.39E-09	1.01E-08
Cytokine receptor	<i>IL2RB</i>	4.162673	0.002488	0.098035	0.194622	0.002054	0.004209	-1.32503	0.007382	0.031176	0.054057	0.130754	0.177692
Cytokine	<i>IL31</i>	-0.67511	0.348807	0.597553	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cytokine receptor	<i>IL31RA</i>	0.614046	0.247212	0.504043	NA	NA	NA	NA	NA	NA	0.041572	0.026954	0.043569
Cytokine	<i>IL36A</i>	-0.08958	0.915581	0.95844	1.940991	2.69E-29	6.46E-28	5.438729	3.32E-06	6.29E-05	0.525378	3.80E-17	1.91E-15
Cytokine	<i>IL36G</i>	-0.44902	0.684316	0.828122	5.183424	1.13E-83	4.06E-80	4.815537	7.40E-11	1.86E-08	1.084133	7.67E-17	3.47E-15
Cytokine	<i>IL4</i>	NA	NA	NA	NA	NA	NA	NA	NA	NA	-0.004945	0.802056	0.838361
Cytokine receptor	<i>IL4R</i>	-1.19541	0.162265	0.423974	1.122413	5.10E-44	5.92E-42	2.057644	9.67E-07	2.41E-05	0.258318	4.96E-14	1.06E-12
Cytokine	<i>IL6</i>	0.384028	0.616279	0.787284	0.454902	6.23E-15	4.24E-14	0.25129	0.407343	0.741484	0.24837	1.02E-08	6.12E-08
Cytokine receptor	<i>IL6R</i>	-0.63937	0.2349	0.490574	NA	NA	NA	NA	NA	NA	0.015423	0.518902	0.584965
Cytokine	<i>IL7</i>	0.840512	0.127248	0.391137	-0.34567	0.000227	0.000552	-0.8983	8.32E-06	0.00013	0.045707	0.28379	0.348672
Cytokine	<i>IL9</i>	NA	NA	NA	0.03015	0.096346	0.136429	0.000123	0.512569	0.832112	0.00403	0.876511	0.90017
Tyrosine kinase	<i>JAK1</i>	2.451033	0.005061	0.124806	NA	NA	NA	NA	NA	NA	-0.190959	1.91E-15	5.93E-14
Voltage gated potassium channel	<i>KCNA1</i>	1.08914	0.298314	0.557211	NA	NA	NA	NA	NA	NA	-0.152932	0.004648	0.008886
Voltage gated potassium channel	<i>KCNA2</i>	-1.74753	0.014542	0.174152	NA	NA	NA	NA	NA	NA	0.021783	0.442497	0.511058
Voltage gated Potassium channel	<i>KCNK2</i>	0.891809	0.387463	0.61415	-0.58418	5.31E-08	2.02E-07	-1.90293	0.006497	0.027928	-0.199236	0.004679	0.008938
Potassium channel	<i>KCNK4</i>	-0.55744	0.422005	0.641995	0.125705	0.006595	0.012274	0	1	1	-0.038117	0.039607	0.061621
Protease	<i>KLK13</i>	0.448375	0.532023	0.728337	NA	NA	NA	NA	NA	NA	0.862158	1.63E-22	5.76E-20
Protease	<i>KLK14</i>	NA	NA	NA	0.177861	0.001316	0.002796	-0.13544	0.314838	0.615068	-0.072531	0.056777	0.084909
Protease	<i>KLK5</i>	2.227567	0.066977	0.29549	0.143399	0.126911	0.174045	0.068974	0.670032	1	0.210531	5.08E-05	0.000144
Protease	<i>KLK6</i>	-0.17397	0.822726	0.9094	3.202888	1.26E-31	3.88E-30	5.982933	6.51E-07	1.78E-05	1.348692	3.83E-14	8.44E-13
Protease	<i>KLK7</i>	-0.96658	0.411115	0.633551	NA	NA	NA	NA	NA	NA	0.236977	1.97E-10	1.71E-09
Protease	<i>KLK8</i>	1.972258	0.072615	0.303639	NA	NA	NA	NA	NA	NA	0.227031	4.42E-05	0.000127
Protease	<i>KLK9//KLK8</i>	NA	NA	NA	2.564622	1.09E-52	3.81E-50	4.752066	3.05E-11	8.6E-09	0.552355	5.15E-18	3.35E-16
Kinin autacoid	<i>KNG1</i>	1.480657	0.145105	0.409666	NA	NA	NA	0	1	1	-0.071903	2.00E-10	1.73E-09
Lipid precursor processor	<i>LOC101928830///LTA4H</i>	NA	NA	NA	0.074003	0.020633	0.034418	0.002526	0.975098	1	NA	NA	NA
Lipid precursor processor	<i>LTA4H</i>	2.804361	0.00593	0.131227	NA	NA	NA	NA	NA	NA	0.071721	1.25E-07	5.95E-07
Lipid receptor	<i>LTB4R</i>	2.394749	0.0214	0.198078	NA	NA	NA	NA	NA	NA	0.207296	2.23E-07	1.02E-06
Lipid receptor	<i>LTB4R2</i>	1.649014	0.080447	0.315365	0.61524	6.60E-25	1.06E-23	0.013349	0.069959	0.198694	0.019476	0.585217	0.647667
Protein kinase	<i>MAPK1</i>	1.513852	0.193617	0.447358	NA	NA	NA	NA	NA	NA	0.003817	0.808362	0.843784
Protease	<i>MMP9</i>	0.900806	0.164757	0.426505	1.5588	3.92E-40	3.04E-38	3.314864	1.53E-06	3.45E-05	0.355631	8.66E-09	5.26E-08
Mas-related G-protein coupled receptor	<i>MRGPRX1</i>	0.546196	0.504571	0.707391	0.004744	0.734198	0.783838	0	1	1	0.101148	6.00E-07	2.5E-06
Mas-related G-protein coupled receptor	<i>MRGPRX2</i>	0.279168	0.779569	0.88543	-0.16444	2.14E-05	5.99E-05	0	1	1	0.091641	3.18E-07	1.4E-06
Mas-related G-protein coupled receptor	<i>MRGPRX3</i>	NA	NA	NA	0.207642	1.66E-06	5.35E-06	0	1	1	0.021566	0.194989	0.252686
Mas-related G protein-coupled receptor	<i>MRGPRX4</i>	NA	NA	NA	0.016477	0.618388	0.680397	0	1	1	0.042729	0.022294	0.036824
Cell adhesion molecule	<i>NECTIN3</i>	1.786841	0.201462	0.454658	NA	NA	NA	NA	NA	NA	0.027379	0.555942	0.619866
Neuropeptide	<i>NGF</i>	1.021251	0.3194	0.577367	0.199495	1.70E-05	4.82E-05	0.004506	0.902732	1	-0.061536	0.025403	0.041335
Neuropeptide receptor	<i>NGFR</i>	1.217651	0.146909	0.411226	-0.12718	0.002491	0.005025	-0.7065	0.002359	0.012208	-0.048738	0.188125	0.244804
Neuropeptide	<i>NMB</i>	-1.00898	0.342966	0.595011	0.161619	0.00088	0.001926	0.60749	0.019994	0.071601	-0.108246	0.004539	0.008694

Neuropeptide receptor	NMBR	0.393098	0.428419	0.64575	0.010458	0.506604	0.574155	0	1	1	0.060117	0.064557	0.094957
Neuropeptide	NMU	-1.60177	0.108114	0.363936	0.471487	1.30E-08	5.24E-08	-0.1661	0.302775	0.596801	0.032481	0.406609	0.475523
Natriuretic peptide	NPPA	-1.66189	0.081866	0.317712	0.120414	0.003444	0.006768	-0.01316	0.415557	0.753109	-0.05611	0.12523	0.171013
Hormone	NPPB	0.247277	0.736727	0.861822	0.063626	0.232707	0.295187	7.70E-06	0.512569	0.832112	-0.180619	2.38E-08	1.31E-07
Preproprotein	NPPC	0.160518	0.822563	0.909278	0.000719	0.984036	0.988343	0	1	1	-0.09916	0.000382	0.000911
Natriuretic peptide receptor	NPR1	2.461709	0.064826	0.292982	NA	NA	NA	NA	NA	NA	-0.229078	1.98E-06	7.4E-06
Natriuretic peptide receptor	NPR2	-1.92061	0.105927	0.360132	NA	NA	NA	NA	NA	NA	0.249744	2.75E-09	1.86E-08
Natriuretic peptide receptors	NPR3	2.874786	0.014452	0.173963	NA	NA	NA	NA	NA	NA	-0.033352	0.551444	0.61554
Neuropeptide	NPY	NA	NA	NA	0.029686	0.306295	0.373383	0	1	1	0.094589	5.21E-05	0.000147
Neuropeptide receptor	NPY1R	1.389264	0.031281	0.230009	-0.83591	5.78E-16	4.28E-15	-0.32637	0.212781	0.449125	-0.006852	0.830697	0.862701
Neuropeptide receptor	NPY2R	1.936849	0.035854	0.242661	NA	NA	NA	NA	NA	NA	0.110256	3.60E-08	1.91E-07
Neuropeptide receptor	NPY4R	NA	NA	NA	NA	NA	NA	NA	NA	NA	-0.021808	0.230796	0.292482
Neuropeptide receptor	NPY5R	0.641674	0.574046	0.75758	-0.31783	2.30E-16	1.77E-15	-0.61194	0.06861	0.195578	-0.177388	0.00014	0.000364
Neurotrophic factor	NRTN	0.236686	0.856231	0.927377	-0.2743	0.000261	0.000628	-0.00172	0.08622	0.235059	0.083847	0.122622	0.167954
Neurotrophic factor	NTF4	0.497244	0.577098	0.759361	NA	NA	NA	NA	NA	NA	0.003721	0.907272	0.925603
Neurotrophic factor receptor	NTRK1	1.170401	0.235982	0.491649	0.150811	0.000449	0.001036	0	1	1	-0.01561	0.407998	0.476996
Neurotrophic factor receptor	NTRK2	1.242993	0.033819	0.237521	NA	NA	NA	NA	NA	NA	-0.208003	2.80E-07	1.25E-06
Opioid receptor	OPRK1	1.030102	0.063838	0.2916	NA	NA	NA	0	1	1	0.023027	0.148698	0.199029
Opioid receptor	OPRL1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.011634	0.368478	0.436898
Purinergic receptor	P2RX3	1.099234	0.225637	0.479966	0.094857	0.000579	0.001308	3.08E-05	0.512569	0.832112	-0.055445	0.012012	0.021059
Opioid precursor	PDYN	1.879638	0.018635	0.190056	0.132024	4.38E-05	0.000118	0	1	1	-0.010739	0.541239	0.606082
Opioid precursor	PENK	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.098515	0.036135	0.056734
Ion channel	PIEZ02	1.852126	0.076067	0.309142	NA	NA	NA	NA	NA	NA	-0.022257	0.264664	0.328544
Phospholipase	PLA2G4B	0.186709	0.823488	0.909634	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phospholipase	PLA2G4B///JMJD7-PLA2G4B	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.417269	8.69E-18	5.39E-16
Phospholipase	PLA2G4D	-1.71066	0.088082	0.328764	0.710771	8.41E-35	3.54E-33	5.923484	1.92E-14	3.6E-11	0.888959	1.13E-29	4.13E-26
Phospholipase	PLA2G4E	0.378072	0.464821	0.674608	NA	NA	NA	NA	NA	NA	NA	NA	NA
Enzyme	PLCB3	0.090042	0.902892	0.952695	0.216994	8.68E-06	2.55E-05	0.343342	0.01741	0.063763	0.067829	8.36E-07	3.38E-06
Enzyme	PLCG1	2.60687	0.006618	0.136524	NA	NA	NA	NA	NA	NA	-0.070423	6.21E-08	3.14E-07
Preproprotein	PNOC	1.119744	0.185174	0.441405	0.157686	2.79E-07	9.85E-07	0.019438	0.434931	0.779876	0.190254	5.75E-14	1.2E-12
Preproprotein	POMC	-1.47353	0.142473	0.407533	0.158349	0.000393	0.000921	0.000877	0.363162	0.682418	-0.129011	4.09E-06	1.44E-05
Protease	PRSS1	-0.84994	0.47433	0.682918	NA	NA	NA	NA	NA	NA	0.014812	0.408512	0.477507
Phospholipid receptor	PTAFR	-1.24393	0.122025	0.38635	NA	NA	NA	NA	NA	NA	0.286357	3.77E-14	8.31E-13
Lipid precursor processor	PTGDS	-1.02887	0.264891	0.522243	NA	NA	NA	NA	NA	NA	0.034556	0.414631	0.483384
Lipid receptor	PTGER1	1.332353	0.049271	0.269197	NA	NA	NA	NA	NA	NA	0.037435	0.040178	0.062393
Lipid receptor	PTGER2	0.387773	0.829492	0.91299	-0.21199	0.0001	0.000258	-2.15588	1.93E-08	1.34E-06	0.060633	0.124692	0.170374
Lipid receptor	PTGER3	2.991676	0.009302	0.153832	NA	NA	NA	NA	NA	NA	0.175439	1.00E-06	3.99E-06
Lipid receptor	PTGER4	-1.17005	0.188169	0.442924	NA	NA	NA	NA	NA	NA	0.12092	4.87E-05	0.000138
Lipid precursor processor	PTGES	0.921421	0.117366	0.379671	NA	NA	NA	NA	NA	NA	0.046858	0.014775	0.025444
Lipid precursor processor	PTGES2	0.166283	0.851808	0.92497	0.433373	4.22E-22	5.31E-21	0.867672	8.90E-05	0.000844	0.026266	0.134925	0.182715
Lipid precursor processor	PTGES3	-2.04646	0.007421	0.141781	0.057834	0.001665	0.003466	-0.22581	0.001619	0.008998	0.005665	0.487177	0.554574
Lipid precursor processor	PTGS1	1.554054	0.057353	0.282311	NA	NA	NA	NA	NA	NA	-0.042929	0.092948	0.131331
Lipid precursor processor	PTGS2	-0.04321	0.965944	0.984974	NA	NA	NA	NA	NA	NA	0.274895	1.51E-07	7.12E-07
Neuropeptide receptor	RAMP1	0.491249	0.390609	0.616673	0.093915	0.005165	0.009804	0.038977	0.86382	1	-0.10431	0.000127	0.000334
Oncogene Protein kinase	RET	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.081657	0.009486	0.017011
Protein kinase	ROCK1	-0.2527	0.688347	0.830079	NA	NA	NA	NA	NA	NA	0.023182	0.200724	0.259193

Protein kinase	ROCK2	1.991843	0.04129	0.25534	NA	NA	NA	NA	NA	NA	NA	-0.053193	0.080598	0.115679
Calcium-binding protein	S100A14	-2.42515	0.044943	0.263137	0.636258	8.35E-29	1.91E-27	0.130551	0.128118	0.319771	-0.011924	0.530112	0.595618	
Calcium binding protein	S100A2	0.678292	0.498935	0.702626	1.637603	1.44E-48	2.88E-46	0.87032	1.13E-05	0.000163	0.029012	0.024627	0.040222	
Calcium binding protein	S100A7	NA	NA	NA	4.194487	1.29E-43	1.41E-41	2.507282	1.05E-06	2.59E-05	0.566343	3.58E-08	1.9E-07	
Calcium binding protein	S100A9	NA	NA	NA	5.822775	1.58E-74	2.14E-71	8.202938	2.81E-14	4.53E-11	1.220865	5.43E-21	1.12E-18	
Calcium-binding protein	S100G	NA	NA	NA	0.03276	0.201139	0.260099	0	1	1	0.095994	4.96E-05	0.000141	
Calcium binding protein	S100P	1.157456	0.186108	0.441889	1.263062	8.06E-13	4.7E-12	2.03594	0.0013	0.007556	0.182192	0.002357	0.004789	
Sodium channel	SCN11A	1.448908	0.144162	0.409209	NA	NA	NA	NA	NA	NA	-0.021274	0.394098	0.462943	
Sodium channel	SCN3A	1.730374	0.101778	0.353013	NA	NA	NA	NA	NA	NA	0.228517	3.61E-06	1.28E-05	
Sodium channel	SCN9A	2.591475	0.000735	0.064646	NA	NA	NA	NA	NA	NA	0.13348	0.00025	0.000618	
Cell adhesion molecule	SELE	0.302558	0.671358	0.820313	1.517957	1.15E-17	9.81E-17	1.984328	0.000278	0.002148	0.354604	5.23E-07	2.21E-06	
Semaphorin	SEMA3A	1.153962	0.19591	0.449932	NA	NA	NA	NA	NA	NA	-0.046767	0.024775	0.040419	
Hormone	SST	NA	NA	NA	0.166071	0.000279	0.000666	0.003346	0.456931	0.80942	0.018427	0.761271	0.803547	
Neuropeptide precursor	TAC1	0.677359	0.463992	0.673942	-0.41161	8.83E-08	3.3E-07	-3.60961	1.93E-06	4.21E-05	-0.125496	0.119846	0.164636	
Neuropeptide receptor	TACR1	2.861333	0.000255	0.043294	NA	NA	NA	NA	NA	NA	-0.122631	4.44E-08	2.32E-07	
Lipid receptor	TBXA2R	1.367008	0.064215	0.292048	NA	NA	NA	NA	NA	NA	0.087472	0.000241	0.000598	
Monooxygenase	TBXAS1	-0.147	0.880109	0.939946	NA	NA	NA	NA	NA	NA	-0.000151	0.996608	0.997017	
Toll-like receptor	TLR4	3.586356	0.000351	0.048303	NA	NA	NA	NA	NA	NA	0.046314	0.26022	0.323889	
Toll-like receptor	TLR7	0.705429	0.497381	0.701402	NA	NA	NA	NA	NA	NA	0.292512	5.03E-07	2.13E-06	
Cytokine	TNF	1.887683	0.047924	0.267249	0.342811	1.01E-14	6.78E-14	1.645224	0.001039	0.006376	0.22136	2.25E-07	1.02E-06	
Cytokine receptor	TNFRSF1A	-1.16489	0.07863	0.312439	0.323594	1.69E-16	1.32E-15	0.012167	0.857356	1	0.008444	0.360378	0.428453	
Cytokine receptor	TNFRSF1B	3.086932	0.020835	0.197454	0.397734	2.03E-12	1.15E-11	0.676837	0.006059	0.026419	0.058097	0.015316	0.026286	
Neurotransmitter precursor processor	TPH1	0.473837	0.594354	0.771946	NA	NA	NA	NA	NA	NA	0.111535	0.017596	0.029804	
Neurotransmitter precursor processor	TPH2	1.055258	0.232288	0.48791	-0.02962	0.156118	0.208583	0	1	1	0.044128	0.067269	0.098537	
Protease	TPSAB1	0.609135	0.517191	0.717079	NA	NA	NA	NA	NA	NA	-0.113214	0.029341	0.047069	
Ion channel	TRPA1	-0.47238	0.372892	0.603469	NA	NA	NA	0	1	1	0.040926	0.001801	0.003741	
Ion channel	TRPM8	0.837212	0.402286	0.626151	NA	NA	NA	NA	NA	NA	-0.144634	1.26E-10	1.14E-09	
Ion channel	TRPV1	-1.44675	0.078857	0.312728	NA	NA	NA	NA	NA	NA	0.21604	6.73E-12	8.28E-11	
Ion channel	TRPV2	0.757091	0.367827	0.601318	NA	NA	NA	NA	NA	NA	-0.002348	0.885195	0.907356	
Ion channel	TRPV3	-1.0022	0.093736	0.338057	NA	NA	NA	NA	NA	NA	0.087349	6.05E-05	0.000168	
Ion channel	TRPV4	0.789619	0.333981	0.589184	0.04254	0.458748	0.528695	-0.0034	0.145591	0.333033	-0.144138	8.91E-09	5.39E-08	
Cytokine	TSLP	-0.17176	0.885689	0.943314	0.389038	5.76E-08	2.19E-07	0.9582	0.003145	0.015495	0.39251	9.21E-10	6.93E-09	
Nerve fibre marker	UCHL1	0.373584	0.577153	0.759402	NA	NA	NA	NA	NA	NA	-0.063184	0.10559	0.147155	
Neuropeptide	VIP	NA	NA	NA	-0.09622	2.03E-05	5.7E-05	0.001154	0.453049	0.803932	-0.138538	0.023603	0.038773	
Neuropeptide receptor	VIPR1	1.469427	0.167699	0.428595	0.068235	0.350225	0.419399	0.458606	0.030573	0.101257	0.136294	1.35E-06	5.2E-06	
Neuropeptide receptor	VIPR2	0.817799	0.154462	0.419112	NA	NA	NA	NA	NA	NA	-0.038557	0.036934	0.057847	