Targetable driver mutations in multicentric reticulohistiocytosis

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Supplemental materials

Supplemental Methods

Patients

We studied specimens from the two patients with multicentric reticulohistiocytosis (MRH) and from 13 patients (eight men and five women) with Langerhans cell histiocytosis (LCH). We adopted universally accepted diagnostic criteria.[1, 2] We based our diagnoses of MRH on characteristic histopathological findings of affected tissues including diffuse histiocytic infiltrates, multinucleated giant cells, eosinophilic ground-glass appearance of the cytoplasm with PAS positivity, positive immunohistochemical staining for CD68, and negativity for Langerhans cell markers such as CD1a and Langerin. We considered two major clinical features (symmetrical aggressive erosive polyarthritis and papulonodular skin lesions) to support the diagnosis of MRH. The polyarticular erosive arthritis seen in MRH may mimic that in rheumatoid arthritis (RA); with the difference being that the distal interphalangeal joints are commonly affected in patients with MRH, but not in those with RA. One of our patients with MRH has been reported elsewhere.[3] We obtained written informed consents from the patients or patients' parents. The Ethics Committee of the Nagoya University Graduate School of Medicine approved this study conducted in accordance with the principles of the Declaration of Helsinki.

Immunohistochemistry

Immunohistochemical staining was performed using anti-CD68 (clone KP1, M0814, Agilent, Santa Clara, CA), anti-CD1a (clone 010, M3571, Agilent), anti-Langerin (clone 12D6, NCL-L-LANGERIN, Leica Biosystems, Buffalo Grove, IL) , anti-S100 (polyclonal, Z0311, Agilent, Santa Clara, CA), anti-αSMA (clone 1A4, M0851, Agilent, Santa Clara, CA), and anti-CD34 (clone QBEnd-10, M7165, Agilent, Santa Clara, CA) antibodies according to manufacturers' instructions.

Sample preparation

We extracted genomic DNA and total RNA from biopsy specimens containing histiocytic cells and peripheral blood mononuclear cells (PBMC) using a QIAamp DNA Blood Mini Kit and an RNeasy

Mini Kit (QIAGEN, Hilden, Germany) according to the manufacturer's instructions. We assessed the quality of the extracted RNA using an RNA ScreenTape and an Agilent 2200 TapeStation system (Agilent, Santa Clara, CA).

Whole-exome sequencing

We performed whole-exome sequencing (WES) of paired biopsy and PBMC samples as previously described.[4] Exome capture and library preparation were performed using a SureSelect XT Target Enrichment System and SureSelect Human All Exon V5 bait (Agilent). The prepared libraries were sequenced using a HiSeq 2500 with a 2 ×150-bp paired end-reads option, according to the manufacturer's instructions. We aligned the obtained sequences (250× for biopsy specimen and 100× for PBMC) to the hg19 reference genome using the Burrows–Wheeler Aligner with default parameters and a –mem option (http://bio-bwa.sourceforge.net/). We detected putative germline and somatic variants using the VarScan2 software (http://varscan.sourceforge.net/) after removing PCR duplicates using Picard tools (http://broadinstitute.github.io/picard/).[5] For germline variants, a variant allele frequency (VAF) >0.25 was defined as the cut-off value. Using the ACMG recommendations,[6] we classified all variants according to their pathogenicity. We used The Human Genome Mutation Database (http://www.hgmd.cf.ac.uk/) to identify pathogenic missense variants. A genetic diagnosis was considered according to the pathogenic or likely pathogenic variants based on the mode of inheritance of each disease. For somatic mutations, putative variants with *P* values <0.01 (provided by VarScan2) were further filtered using the mean VAF of identical variants obtained from the data of 12 unrelated germline samples; if the mean VAF of the 12 samples exceeded 0.01, we considered the variant to be an artifact. All of the remaining variants were validated by PCR-based deep sequencing. Genomic regions containing candidate variants were amplified using PrimeSTAR GXL DNA Polymerase and primers having a recognition sequence for the *Not*I restriction enzyme at their 5'-ends. We combined PCR products into two pools (tumor and germline), digested them with *Not*I (New England Biolabs, Ipswich, MA), and concatemerized them using T4 DNA Ligase (New England Biolabs). The concatemers were ultrasonicated to fragments with 300-bp average length using a Covaris M220 apparatus (Covaris,

Woburn, MA), and prepared using an NEBNext Ultra DNA Prep Kit for Illumina (New England Biolabs) according to manufacturers' instructions. A candidate variant was considered present if the variant allele frequency was ≥0.02 in tumor and <0.005 in germline samples. Primer sequences are available upon request.

Targeted deep sequencing

PCR-amplicon-based target deep sequencing covering *BRAF* and *MAP2K1* had been performed for 6 patients with LCH as described.[7] Primer sequences are available upon request.

RNA sequencing

We used a NEBNext Ultra RNA Prep Kit for Illumina with a NEBNext Poly(A) mRNA Magnetic Isolation Module or a NEBNext rRNA Depletion Kit (New England Biolabs) to prepare non-directional sequencing libraries according to the manufacturer's instructions. Prepared libraries were run on HiSeq 2500 with a 2 × 100-bp paired end-reads option. We analyzed obtained reads using TopHat-Fusion (for fusion gene detection) [8], HTSeq (for expression analysis),[9] GFOLD (for differential expression analysis), and DESeq (for differential expression analysis).[10] We performed reverse transcription–PCR (RT-PCR) using a ThermoScript reverse transcription system (Life Technologies, Carlsbad, CA, USA) and PrimeSTAR GXL DNA Polymerase (TaKaRa Bio, Kusatsu, Japan) to validate candidate fusion genes. We performed gene set enrichment analysis (GSEA) using differential expression values calculated by GFOLD and the Molecular Signature Database (v6.1, http://www.broad.mit.edu/gsea/, accessed at 18/05/2018) as described.[11] We used the hallmark gene sets (50 gene sets), and we considered a false discovery rate (FDR) of less than 0.1 as statistically significant.

References

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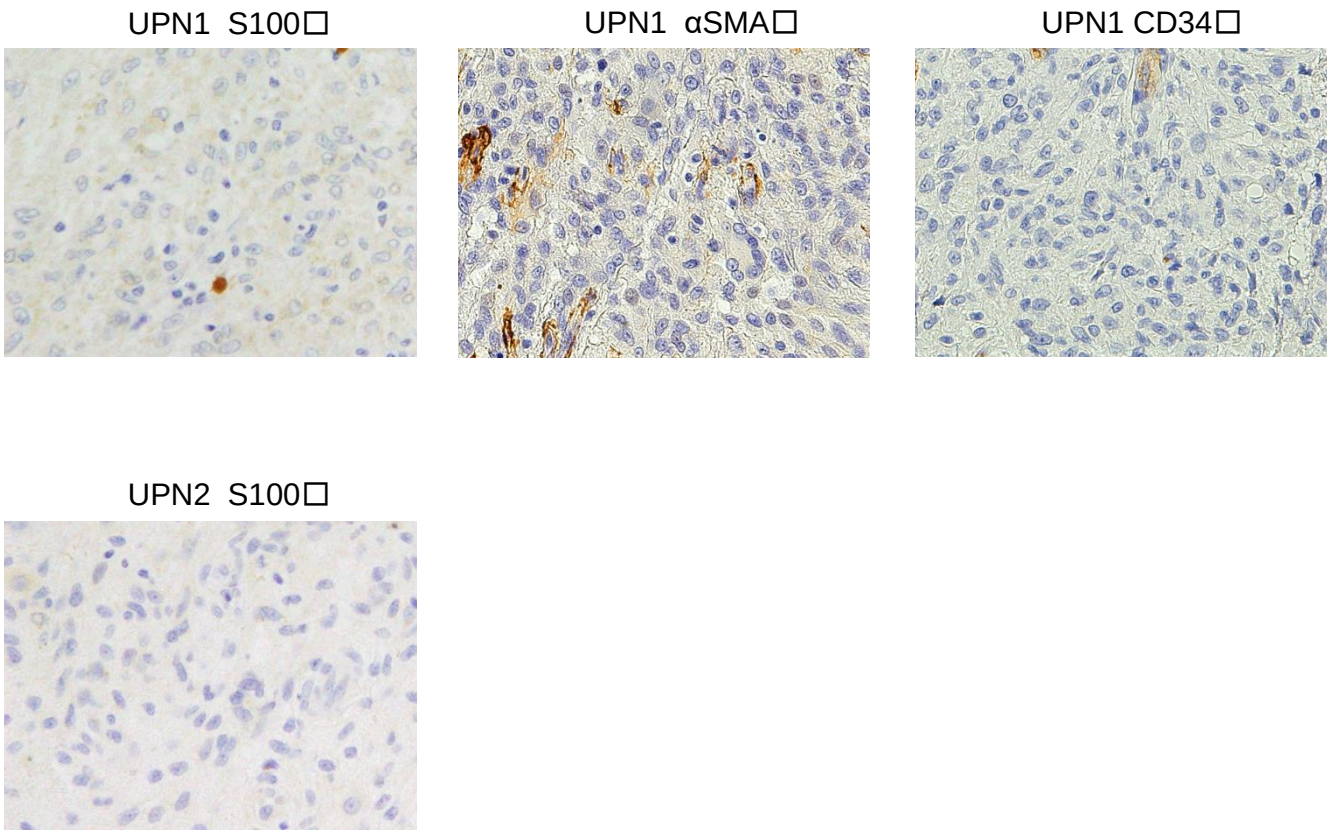
Supplemental Figures

Supplemental Figure 1

Supplemental Figure 1. Skin lesions of UPN2.

This picture shows erythematous papules in the back of UPN2.

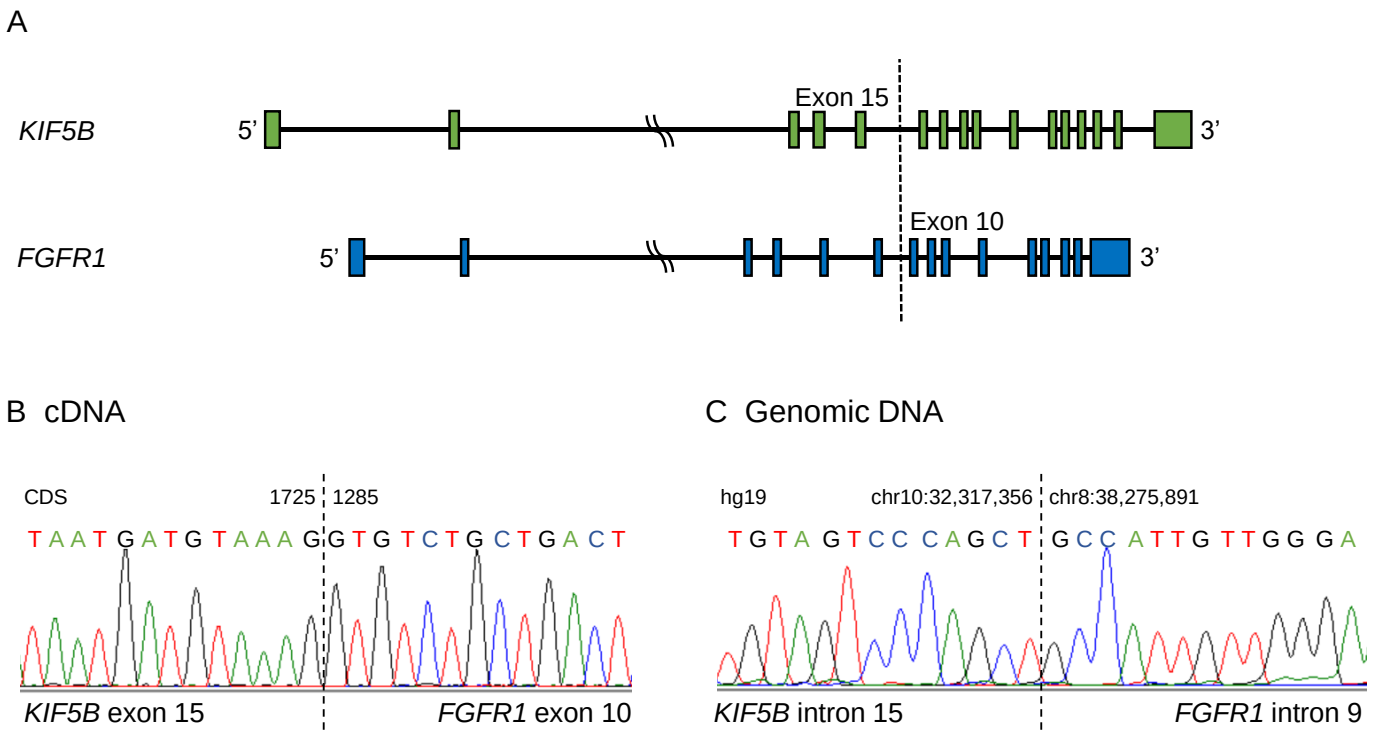
Supplemental Figure 2



Supplemental Figure 2. Additional histopathological findings of patient with MRH.

Histopathology of UPN1 was negative for S100, CD34, and α-smooth muscle actin. Histopathology of UPN2 was negative for S100.

Supplemental Figure 3

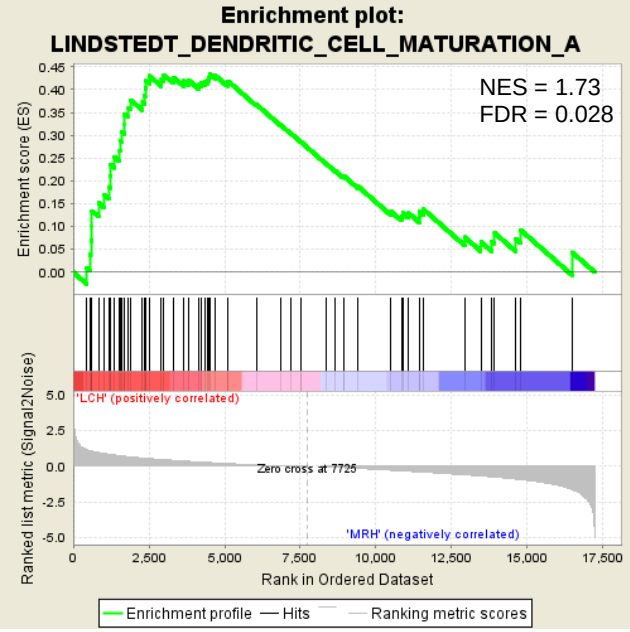


Supplemental Figure 3. Validation of the *KIF5B-FGFR1* fusion gene.

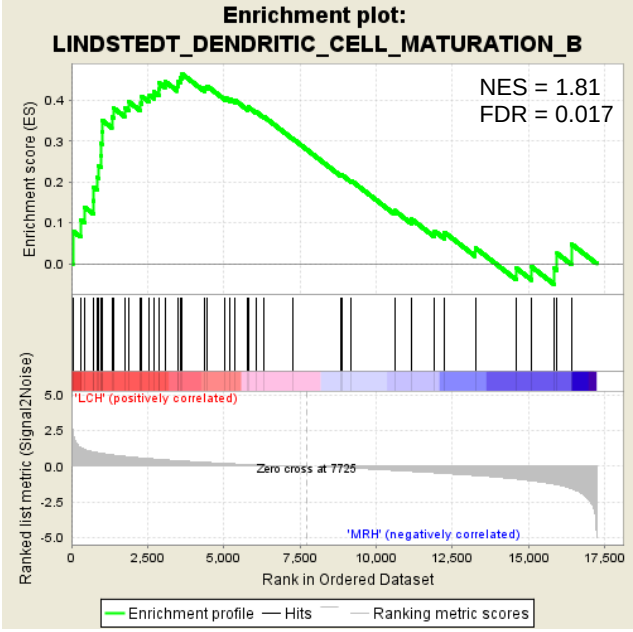
(A) Schema of the *KIF5B-FGFR1* fusion gene detected in UPN1. Boxes indicate exons, and the dotted line indicates genomic breakpoints. The fusion transcript contained exons 1–15 of *KIF5B* and exons 10–18 of *FGFR1*. (B,C) Validation of the *KIF5B-FGFR1* fusion gene using complementary DNA (cDNA) (B) and genomic DNA (C).

Supplemental Figure 4

A



B



Supplemental Figure 4. Comparison of expression levels between LCH and MRH.

(A, B) Gene set enrichment analysis using C2 curated gene set between LCH and MRH. LCH showed significant enrichment of genes associated with (A) LINDSTEDT_DENDRITIC_CELL_MATURATION_A (genes upregulated at 8 hours after inflammatory signals in maturation of dendritic cells), and (B) LINDSTEDT_DENDRITIC_CELL_MATURATION_B (genes upregulated at 8 and 48 hours after inflammatory signals in maturation of dendritic cells). NES; normalized enrichment score, FDR; false discovery rate.

Supplemental Tables

Supplemental Table 1. Blood examination results of MRH patients

	UPN1	UPN2	Normal range
Red blood cells, $\times 10^9$/L	42.6	46.8	36 - 50
Hemoglobin, g/dL	13.2	12.8	11 - 16
Platelets, $\times 10^9$/L	180	438	160 - 410
White blood cells, $\times 10^6$/L	4.9	14.3	3.8 - 8.5
Lymphocytes, %	47.0	22.6	14 - 55
Neutrophils, %	46.5	74.7	40 - 69
Basophilis, %	0.4	0	0 - 4
Eosinophilis, %	1.8	1.0	1 - 6
Monocytes, %	4.3	1.0	2 - 16
Promyelocytes, %	Not detected	Not detected	0
Myelocytes, %	Not detected	3.0	0
Metamyelocytes, %	Not detected	1.0	0
Atypical lymphocytes, %	Not detected	Not detected	0 - 0.9
Erythroblasts, %	Not detected	Not detected	0
Blasts, %	Not detected	Not detected	0

Supplemental Table 2. Primers used to validate the *KIF5B-FGFR1* fusion gene

Name	F/R	Sequences (5' - 3')
cDNA primer	Forward	CAGGAGGAGCTTTTGGCATCT
	Reverse	TGCGTCCGACTTCAACATCT
Genomic DNA primer	Forward	AAGCTGAGCTGAATCGCCTT
	Reverse	ACGGTTGGGTTTGTCCTTGT

Supplemental Table 3. Genes with significant differential expression between MRH patients

Upregulated in	Gene	Fold change	Adjusted p value	Gene sets
UPN1	*CXCR2P1*	269.39	2.38E-26	
UPN1	*PCSK1*	218.72	3.44E-23	
UPN1	*XIST*	1018.41	1.33E-22	
UPN1	*STMN2*	57.14	8.49E-19	
UPN1	*PTGDS*	19.17	1.16E-15	
UPN1	*CD177*	18.73	2.36E-15	
UPN1	*PTN*	25.45	7.86E-12	
UPN1	*HLA-DQB2*	28.4	6.62E-11	
UPN1	*NRCAM*	57.43	7.63E-11	
UPN1	*IGLL5*	11.24	1.28E-07	
UPN1	*ADAMDEC1*	8.26	2.33E-07	HALLMARK_KRAS_SIGNALING_UP
UPN1	*GBP5*	7.65	6.75E-07	
UPN1	*KRT75*	463.94	1.19E-06	
UPN1	*INPP5J*	Inf	5.50E-06	
UPN1	*STAT1*	5.59	1.15E-05	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*IFI27*	4.75	1.03E-04	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*JCHAIN*	8.56	1.39E-04	
UPN1	*MME*	6.31	1.39E-04	
UPN1	*CCL8*	5.6	4.10E-04	
UPN1	*AOX1*	5.12	4.98E-04	
UPN1	*PTGFR*	6.42	6.10E-04	
UPN1	*IFITM10*	5.83	6.51E-04	
UPN1	*ANK1*	10.37	9.14E-04	
UPN1	*FCER1A*	7.72	1.29E-03	
UPN1	*PGBD5*	7.51	1.33E-03	
UPN1	*SFRP1*	6.69	1.48E-03	
UPN1	*JAKMIP2*	16.23	2.04E-03	
UPN1	*GZMA*	4.79	5.41E-03	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*CCR2*	5.03	5.64E-03	
UPN1	*SCARA5*	3.54	5.79E-03	
UPN1	*LAMC3*	7.25	5.99E-03	
UPN1	*DIRAS3*	23.01	7.30E-03	
UPN1	*TNFRSF19*	5.64	7.67E-03	
UPN1	*TCHH*	5.98	7.89E-03	
UPN1	*LVRN*	10.47	9.51E-03	
UPN1	*HLA-DRB1*	3.38	1.03E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*HLA-DQA2*	3.77	1.17E-02	
UPN1	*SCG2*	5.97	1.29E-02	

UPN1	*POPDC3*	Inf	1.31E-02	
UPN1	*BARX1*	208.21	1.32E-02	
UPN1	*HLA-DRA*	3.03	1.45E-02	
UPN1	*IGSF21*	4.25	1.64E-02	
UPN1	*MEOX1*	4.13	2.01E-02	
UPN1	*KCNJ10*	17.17	2.26E-02	
UPN1	*FRMD3*	7.4	2.65E-02	
UPN1	*NEGR1*	4.12	2.85E-02	
UPN1	*SPINK5*	25.37	3.23E-02	
UPN1	*CSGALNACT1*	3.23	3.43E-02	
UPN1	*SLAMF7*	3.67	3.50E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*PID1*	4.51	3.56E-02	
UPN1	*TNFSF13B*	3.78	3.85E-02	
UPN1	*CYP19A1*	9.59	3.85E-02	
UPN1	*PSMB9*	3.1	4.10E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*SBSN*	4.4	4.34E-02	
UPN1	*FGL2*	2.92	4.37E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*HLA-DPA1*	2.76	4.67E-02	
UPN1	*CD74*	2.68	5.03E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*CPXM1*	2.79	5.35E-02	
UPN1	*MUC20*	23.2	5.89E-02	
UPN1	*ADAMTSL1*	3.64	5.97E-02	
UPN1	*PLXDC1*	2.92	6.02E-02	
UPN1	*TBX4*	51.77	6.04E-02	
UPN1	*CIITA*	3.08	6.06E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*NKG7*	3.51	6.90E-02	
UPN1	*TCP10L*	88.26	7.15E-02	
UPN1	*IL2RB*	3.1	8.46E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN1	*PHLDB2*	3.15	9.11E-02	
UPN1	*CADPS*	14.4	9.64E-02	
UPN1	*MEDAG*	2.81	9.80E-02	
UPN2	*RPS4Y1*	Inf	2.40E-36	
UPN2	*SPP1*	96.19	1.06E-32	HALLMARK_KRAS_SIGNALING_UP
UPN2	*WNT2*	Inf	2.54E-32	
UPN2	*LYVE1*	157.89	1.99E-28	
UPN2	*ADH1B*	Inf	7.77E-22	
UPN2	*MMP13*	56.77	6.76E-20	
UPN2	*H19*	24.52	1.28E-17	
UPN2	*COMP*	18.76	3.18E-16	
UPN2	*PDK4*	58.02	4.73E-16	
UPN2	*KDM5D*	98.3	3.69E-15	
UPN2	*ALDH1A3*	23.44	3.75E-15	HALLMARK_KRAS_SIGNALING_UP

UPN2	*CXCL5*	93.42	1.49E-14	
UPN2	*PLIN4*	74.76	3.43E-13	
UPN2	*MARCO*	12.73	8.98E-12	
UPN2	*CILP*	12.13	2.00E-11	
UPN2	*GSTT1*	Inf	5.85E-11	
UPN2	*CCL18*	10.79	6.62E-11	
UPN2	*ADIPOQ*	Inf	1.09E-10	
UPN2	*C7*	43.33	1.33E-10	
UPN2	*PCSK6*	20.38	2.28E-10	
UPN2	*FCER2*	81.54	1.34E-09	
UPN2	*DDX3Y*	33.67	1.40E-09	
UPN2	*PLIN1*	54.61	1.69E-09	
UPN2	*GPD1*	Inf	1.89E-09	
UPN2	*MAMDC2*	15.53	2.05E-09	
UPN2	*IGFBP2*	10.21	1.53E-08	
UPN2	*ATP6V0D2*	157.75	2.18E-08	
UPN2	*ITGA11*	9.3	2.36E-07	
UPN2	*RAMP1*	249.21	2.81E-07	
UPN2	*MOXD1*	33.11	2.81E-07	
UPN2	*SP6*	31.57	4.45E-07	
UPN2	*C10orf10*	7.84	4.45E-07	
UPN2	*HMCN2*	13.7	6.98E-07	
UPN2	*CNTN4*	Inf	7.60E-07	
UPN2	*FABP4*	7.99	1.46E-06	
UPN2	*CLEC4G*	25.96	1.81E-06	
UPN2	*FNDC1*	6.31	1.85E-06	
UPN2	*CIDEC*	Inf	3.18E-06	
UPN2	*BGN*	5.47	4.94E-06	
UPN2	*LIPE*	24.16	1.18E-05	
UPN2	*MMP1*	13.53	1.27E-05	
UPN2	*RBP4*	8.15	1.89E-05	HALLMARK_KRAS_SIGNALING_UP
UPN2	*USP9Y*	33.58	3.32E-05	
UPN2	*CFD*	5.18	4.40E-05	
UPN2	*THBS4*	5.66	6.05E-05	
UPN2	*ANGPTL4*	33.37	6.56E-05	HALLMARK_KRAS_SIGNALING_UP
UPN2	*FCGBP*	4.97	8.06E-05	
UPN2	*FAM3B*	Inf	8.12E-05	
UPN2	*INHBA*	18.07	9.19E-05	HALLMARK_KRAS_SIGNALING_UP
UPN2	*RGS4*	68.93	1.03E-04	
UPN2	*CD36*	6.25	1.06E-04	
UPN2	*TNXB*	5.06	1.25E-04	
UPN2	*IGFBP3*	5.08	1.39E-04	HALLMARK_KRAS_SIGNALING_UP

UPN2	*HP*	Inf	1.40E-04	
UPN2	*STAB1*	4.48	1.41E-04	
UPN2	*NUDT10*	296.93	1.93E-04	
UPN2	*MGP*	4.58	1.93E-04	
UPN2	*CCL11*	Inf	2.04E-04	
UPN2	*PXDN*	4.6	2.18E-04	
UPN2	*DHRS9*	7.42	2.39E-04	
UPN2	*SFRP4*	4.22	2.67E-04	
UPN2	*EDIL3*	9.7	3.32E-04	
UPN2	*PLA2G7*	12	3.91E-04	
UPN2	*TIMD4*	82.63	5.62E-04	
UPN2	*TNFAIP6*	9.34	5.85E-04	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN2	*EIF1AY*	Inf	6.80E-04	
UPN2	*ALOX15B*	13.6	6.81E-04	
UPN2	*TFPI*	5.47	7.34E-04	HALLMARK_KRAS_SIGNALING_UP
UPN2	*CHL1*	58.47	7.40E-04	
UPN2	*IL1B*	7.14	7.59E-04	HALLMARK_KRAS_SIGNALING_UP
UPN2	*COL12A1*	3.99	7.76E-04	
UPN2	*GPC3*	45.95	9.63E-04	
UPN2	*HLA-DQA1*	4.15	9.75E-04	HALLMARK_INTERFERON_GAMMA_RESPONSE
UPN2	*CLDN5*	6.03	1.18E-03	
UPN2	*PDE2A*	7.31	1.46E-03	
UPN2	*LOXL1*	4.48	1.48E-03	
UPN2	*CD22*	9.31	1.48E-03	
UPN2	*CPM*	3.82	1.79E-03	
UPN2	*CEBPD*	4.11	1.81E-03	
UPN2	*TAGLN*	3.8	2.00E-03	
UPN2	*CETP*	4.09	2.10E-03	
UPN2	*LGI2*	4.66	2.14E-03	
UPN2	*ADAMTS16*	Inf	2.16E-03	
UPN2	*COL5A1*	3.59	2.24E-03	
UPN2	*SERPINE1*	4.58	2.29E-03	
UPN2	*VNN1*	7.13	2.36E-03	
UPN2	*TMEM132A*	6.17	2.36E-03	
UPN2	*TXLNGY*	126.37	2.46E-03	
UPN2	*C1QTNF1*	4.13	2.46E-03	
UPN2	*TNFRSF8*	9.12	2.56E-03	
UPN2	*HS3ST2*	3.95	2.67E-03	
UPN2	*APOE*	3.49	2.67E-03	
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UPN2	*SLIT3*	3.99	3.56E-03	
UPN2	*TPPP3*	4.25	4.11E-03	

UPN2	*MMP9*	3.91	4.50E-03	HALLMARK_KRAS_SIGNALING_UP
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UPN2	*DDIT4*	3.89	5.32E-03	
UPN2	*NPR1*	6.35	5.56E-03	
UPN2	*FBXO32*	4.51	5.73E-03	
UPN2	*CXCL8*	8.36	5.77E-03	
UPN2	*PPDPF*	4.01	5.86E-03	
UPN2	*FIBIN*	4.58	5.86E-03	
UPN2	*C6*	Inf	7.47E-03	
UPN2	*MDFI*	8.06	7.57E-03	
UPN2	*COL11A1*	3.65	7.57E-03	
UPN2	*ABCA6*	6.04	8.91E-03	
UPN2	*IL1RN*	10.16	9.74E-03	
UPN2	*SRPX2*	4.67	9.84E-03	
UPN2	*MATN2*	4.82	9.84E-03	
UPN2	*VSIG4*	3.21	9.91E-03	
UPN2	*TUSC5*	60.54	1.11E-02	
UPN2	*CFI*	5.03	1.11E-02	
UPN2	*TIE1*	3.73	1.16E-02	
UPN2	*BIRC7*	18.87	1.17E-02	
UPN2	*PIK3IP1*	3.47	1.37E-02	
UPN2	*COL8A1*	4.11	1.39E-02	
UPN2	*NKD2*	34.47	1.50E-02	
UPN2	*BOK*	6.05	1.52E-02	
UPN2	*OLR1*	5.08	1.53E-02	
UPN2	*ADAMTSL2*	6.9	1.53E-02	
UPN2	*PODNL1*	6.23	1.59E-02	
UPN2	*RGS16*	4.78	1.63E-02	HALLMARK_KRAS_SIGNALING_UP
UPN2	*PCOLCE2*	6.94	1.69E-02	
UPN2	*ADAMTS5*	4.12	1.86E-02	
UPN2	*RGS1*	3.53	1.99E-02	
UPN2	*CIDEA*	56.12	2.01E-02	HALLMARK_KRAS_SIGNALING_UP
UPN2	*PRND*	40.95	2.06E-02	
UPN2	*ENPP1*	8.66	2.10E-02	
UPN2	*EMID1*	9.74	2.16E-02	
UPN2	*WWC1*	177.63	2.19E-02	
UPN2	*UTY*	55.23	2.26E-02	
UPN2	*CFB*	3.17	2.76E-02	HALLMARK_INTERFERON_GAMMA_RESPONSE HALLMARK_KRAS_SIGNALING_UP
UPN2	*LPL*	3.32	2.85E-02	
UPN2	*PRKY*	25.31	2.87E-02	

UPN2	*CYP27A1*	3.15	2.87E-02	
UPN2	*COL22A1*	Inf	3.13E-02	
UPN2	*TFRC*	3.79	3.18E-02	
UPN2	*KCNN4*	3.94	3.23E-02	HALLMARK_KRAS_SIGNALING_UP
UPN2	*FMO1*	4.01	3.23E-02	
UPN2	*NOV*	6.08	3.36E-02	
UPN2	*CCL21*	8.08	3.36E-02	
UPN2	*PLIN2*	3.21	3.39E-02	
UPN2	*SULF1*	2.85	3.51E-02	
UPN2	*CDKN2A*	3.66	3.85E-02	
UPN2	*HPSE*	3.28	3.93E-02	
UPN2	*DACT1*	4.13	4.12E-02	
UPN2	*ASPN*	2.88	4.12E-02	
UPN2	*RASL11B*	7.11	4.12E-02	
UPN2	*IL2RA*	5.38	4.12E-02	
UPN2	*FBLN5*	3.28	4.19E-02	
UPN2	*PCK1*	Inf	4.46E-02	
UPN2	*ITGA3*	3.2	4.47E-02	
UPN2	*IER5L*	3.56	4.47E-02	
UPN2	*FN1*	2.72	4.47E-02	
UPN2	*FMO2*	4.58	4.47E-02	
UPN2	*ELOVL2*	22.31	4.47E-02	
UPN2	*ABCA9*	7.95	4.68E-02	
UPN2	*C3*	2.71	4.73E-02	
UPN2	*L1TD1*	14.07	4.73E-02	
UPN2	*UTS2*	157.3	4.75E-02	
UPN2	*AOC3*	3.26	5.25E-02	
UPN2	*FZD8*	5.55	5.33E-02	
UPN2	*CD163*	2.72	5.49E-02	
UPN2	*DTX1*	5.25	5.51E-02	
UPN2	*BTNL9*	10.75	5.78E-02	
UPN2	*APOC1*	2.68	5.95E-02	
UPN2	*PRSS3*	Inf	5.97E-02	
UPN2	*CELSR1*	4.14	6.02E-02	
UPN2	*SSC5D*	3.59	6.04E-02	
UPN2	*TPM2*	2.99	6.11E-02	
UPN2	*LHX6*	7.58	6.22E-02	
UPN2	*P2RY12*	82.63	6.26E-02	
UPN2	*ZFY*	15.58	6.39E-02	
UPN2	*LOX*	3.04	6.41E-02	
UPN2	*GDF15*	4.43	7.07E-02	
UPN2	*WT1-AS*	Inf	7.15E-02	

UPN2	*CCL20*	18.62	7.44E-02	HALLMARK_KRAS_SIGNALING_UP
UPN2	*CDA*	5.02	7.85E-02	
UPN2	*TMEM132C*	Inf	8.06E-02	
UPN2	*MFGE8*	2.71	8.06E-02	
UPN2	*DTX4*	4.54	8.06E-02	
UPN2	*PROCR*	3.12	8.46E-02	
UPN2	*MN1*	5.53	8.57E-02	
UPN2	*TLL1*	7.43	8.68E-02	
UPN2	*AQP7*	Inf	8.71E-02	
UPN2	*KCNJ5*	3.15	9.11E-02	
UPN2	*TPM1*	2.85	9.52E-02	
UPN2	*PAMR1*	9.13	9.80E-02	
UPN2	*MLXIPL*	Inf	9.80E-02	

Inf, infinite

Supplemental Table 4. Somatic mutations identified in LCH patients

UPN	Mutation	VAF
101	*BRAF* c.1799T>A, p.V600E	0.084
103	*BRAF* c.1799T>A, p.V600E	0.032
105	*BRAF* c.1799T>A, p.V600E	0.186
111	-	-
115	*BRAF* c.1799T>A, p.V600E	0.119
116	*BRAF* c.1799T>A, p.V600E	0.242
123	*BRAF* c.1799T>A, p.V600E	0.238
124	*BRAF* c.1799T>A, p.V600E	0.265
125	*BRAF* c.1799T>A, p.V600E	0.187
126	*MAP2K1* c.302_307delTGGAGA, p.102_103delEI	0.024
127	*MAP2K1* c.304_309delGAGATC, p.102_103delEI	0.126
129	-	-
130	-	-

VAF, variant allele frequency

Supplemental Table 5. Genes with significant differential expression between MRH and LCH

Upregulated in	Gene	Fold change	Adjusted p value	Gene sets
MRH	*PRG4*	65.22	5.57.E-23	
LCH	*KIAA0125*	0.05	9.65.E-19	
LCH	*SPIB*	0.06	2.55.E-18	
LCH	*MS4A1*	0.04	2.55.E-18	
LCH	*FCRL3*	0.07	8.70.E-16	
LCH	*PAX5*	0.04	9.58.E-16	
LCH	*HBB*	0.01	1.06.E-15	
LCH	*ALAS2*	0.01	4.57.E-15	
MRH	*MFAP5*	39.45	1.61.E-14	
MRH	*PTGIS*	23.02	2.80.E-14	
LCH	*BMS1P20*	0.06	6.39.E-14	
LCH	*BANK1*	0.09	9.39.E-14	
LCH	*TNFRSF13C*	0.02	1.83.E-13	
MRH	*KCNF1*	59.63	2.34.E-13	
MRH	*SYT7*	16.62	2.72.E-13	
LCH	*FCRLA*	0.04	3.83.E-12	
LCH	*BCL11A*	0.14	4.65.E-12	
MRH	*LRRN4CL*	34.18	7.34.E-12	
LCH	*FAM129C*	0.03	1.00.E-11	
LCH	*ITGA2B*	0.02	2.09.E-11	
LCH	*TNFRSF13B*	0.06	2.09.E-11	
MRH	*NBL1*	12.39	2.76.E-11	
LCH	*FCRL1*	0.03	3.27.E-11	
LCH	*KIAA0101*	0.08	3.58.E-11	
LCH	*VPREB3*	0.05	3.58.E-11	
LCH	*CXCR5*	0.07	8.33.E-11	
MRH	*SNED1*	6.69	1.03.E-10	
LCH	*RPSA*	0.18	1.17.E-10	
LCH	*CD24*	0.06	6.76.E-10	
LCH	*PTGS2*	0.03	8.71.E-10	
MRH	*CEMIP*	13.72	9.64.E-10	
LCH	*S100P*	0.03	9.70.E-10	
MRH	*NXPH3*	8.61	1.39.E-09	
LCH	*HIST1H2BG*	0.02	1.39.E-09	
LCH	*MMP25*	0.15	1.57.E-09	
LCH	*BIRC3*	0.20	1.71.E-09	LINDSTEDT_DENDRITIC_CELL_MATURATION_B
LCH	*SLC4A1*	0.02	1.71.E-09	
LCH	*NPM1*	0.29	1.86.E-09	

MRH	*LINC01524*	40.19	1.97.E-09
MRH	*SEC14L2*	5.70	2.20.E-09
LCH	*CR2*	0.02	3.31.E-09
LCH	*CXCL13*	0.02	3.72.E-09
LCH	*TFF3*	0.02	4.19.E-09
MRH	*CD177*	26.11	4.86.E-09
MRH	*DSG2*	16.85	5.52.E-09
LCH	*PLAC8*	0.10	7.33.E-09
LCH	*OIP5*	0.04	8.50.E-09
LCH	*SLC16A10*	0.03	8.92.E-09
MRH	*EMX2*	43.51	1.05.E-08
MRH	*SUSD2*	5.80	1.21.E-08
LCH	*GCA*	0.28	1.36.E-08
LCH	*CD19*	0.04	1.78.E-08
LCH	*DERL3*	0.07	4.36.E-08
LCH	*CD79B*	0.19	4.49.E-08
LCH	*TLR10*	0.07	8.52.E-08
MRH	*SBSN*	31.36	1.43.E-07
MRH	*ECM1*	8.94	1.43.E-07
MRH	*THBS4*	24.40	1.54.E-07
LCH	*MYBL2*	0.08	1.64.E-07
MRH	*GLIS2*	7.04	2.15.E-07
LCH	*CLEC17A*	0.07	2.70.E-07
LCH	*RHAG*	0.03	3.80.E-07
LCH	*CCNB2*	0.10	4.11.E-07
LCH	*TREML2*	0.08	4.25.E-07
MRH	*ROR1-AS1*	26.98	4.56.E-07
LCH	*TMEM156*	0.21	5.92.E-07
LCH	*CD79A*	0.10	7.27.E-07
MRH	*FMO1*	20.36	8.38.E-07
MRH	*C3*	10.57	8.40.E-07
LCH	*POU2AF1*	0.08	8.93.E-07
LCH	*GYLTL1B*	0.06	9.63.E-07
MRH	*THBS3*	3.82	1.02.E-06
LCH	*MTHFD2*	0.30	1.34.E-06
LCH	*CA1*	0.03	1.39.E-06
LCH	*TESC*	0.33	1.76.E-06
LCH	*FCMR*	0.26	1.84.E-06
MRH	*LINC00698*	24.33	2.59.E-06
MRH	*SRPX*	5.54	2.88.E-06
LCH	*EEF1A1*	0.29	3.10.E-06
LCH	*PGLYRP1*	0.04	3.10.E-06

MRH	*SYBU*	7.28	3.35.E-06
LCH	*SELL*	0.20	3.35.E-06
LCH	*MGAM*	0.10	3.74.E-06
LCH	*IDO1*	0.08	3.96.E-06
LCH	*FCRL2*	0.05	4.12.E-06
LCH	*SIGLEC10*	0.20	6.37.E-06
LCH	*MCM10*	0.11	6.37.E-06
LCH	*TCL1A*	0.05	7.12.E-06
LCH	*FCRL5*	0.06	7.21.E-06
LCH	*S100A12*	0.06	7.52.E-06
LCH	*CYSLTR1*	0.20	7.53.E-06
MRH	*SDK1*	6.06	7.95.E-06
MRH	*LGI2*	8.06	8.73.E-06
LCH	*CENPU*	0.21	8.73.E-06
LCH	*HBA1*	0.07	8.73.E-06
MRH	*BMP7*	15.10	8.83.E-06
LCH	*RRM2*	0.11	8.83.E-06
MRH	*PI16*	19.94	9.18.E-06
LCH	*RAP1B*	0.29	9.34.E-06
LCH	*LOC613266*	0.04	9.39.E-06
MRH	*SLITRK4*	5.66	9.66.E-06
MRH	*NUPR1*	8.58	1.03.E-05
LCH	*CDC6*	0.14	1.03.E-05
MRH	*CDON*	5.67	1.09.E-05
MRH	*XPNPEP2*	11.18	1.10.E-05
LCH	*RPS14P3*	0.19	1.24.E-05
MRH	*PODN*	13.54	1.26.E-05
MRH	*EMX2OS*	19.77	1.32.E-05
LCH	*CNTNAP2*	0.04	1.52.E-05
MRH	*F2RL2*	15.07	1.67.E-05
LCH	*CNR2*	0.10	1.87.E-05
MRH	*SLC12A8*	4.80	1.89.E-05
LCH	*RPL7*	0.22	1.89.E-05
LCH	*MIR4539*	0.05	1.89.E-05
MRH	*CRMP1*	4.04	1.89.E-05
MRH	*LOC101927481*	23.35	2.00.E-05
LCH	*CCL24*	0.05	2.05.E-05
MRH	*COMP*	17.62	2.06.E-05
MRH	*LINC01048*	25.27	2.08.E-05
MRH	*GALNT12*	4.60	2.10.E-05
MRH	*SLC1A7*	13.09	2.14.E-05
LCH	*CDC20*	0.11	2.14.E-05

MRH	*ANO1*	5.46	2.28.E-05
LCH	*EXO1*	0.10	2.35.E-05
MRH	*CNTN3*	19.19	2.35.E-05
LCH	*KCNH2*	0.07	2.39.E-05
MRH	*DUOXA1*	16.93	2.44.E-05
MRH	*FAM180A*	14.55	2.47.E-05
LCH	*DLGAP5*	0.10	2.60.E-05
LCH	*MND1*	0.08	2.63.E-05
LCH	*PDK1*	0.20	2.71.E-05
MRH	*AHNAK2*	8.79	2.76.E-05
MRH	*ISM1*	10.23	2.83.E-05
LCH	*RALGPS2*	0.27	2.83.E-05
LCH	*ADGRG5*	0.25	2.83.E-05
MRH	*MDGA1*	3.97	2.94.E-05
LCH	*DEPDC1B*	0.08	3.15.E-05
MRH	*KIAA1755*	3.34	3.25.E-05
LCH	*CA2*	0.08	3.25.E-05
LCH	*STRBP*	0.34	3.26.E-05
LCH	*HBD*	0.05	3.32.E-05
MRH	*TMEM30B*	7.44	3.45.E-05
LCH	*HPGD*	0.14	3.54.E-05
LCH	*KIRREL2*	0.05	3.59.E-05
LCH	*RPL23P8*	0.18	3.82.E-05
MRH	*MIR31HG*	20.96	3.92.E-05
LCH	*EGR3*	0.14	3.93.E-05
LCH	*MT1G*	0.06	4.07.E-05
LCH	*BUB1*	0.10	4.09.E-05
LCH	*WNT5A*	0.06	4.13.E-05
MRH	*NYNRIN*	2.94	4.22.E-05
LCH	*JAK3*	0.31	4.25.E-05
LCH	*CEACAM3*	0.09	4.29.E-05
MRH	*TBC1D16*	2.90	4.37.E-05
LCH	*JCHAIN*	0.11	4.48.E-05
MRH	*PRUNE2*	5.43	5.52.E-05
LCH	*HIST1H2AE*	0.14	5.52.E-05
LCH	*MTL5*	0.10	5.52.E-05
MRH	*MLIP*	14.89	6.23.E-05
MRH	*CD248*	5.61	6.59.E-05
MRH	*IL17RD*	4.41	6.59.E-05
LCH	*PF4*	0.06	6.69.E-05
LCH	*DDIAS*	0.29	7.03.E-05
LCH	*LOC102723766*	0.05	7.03.E-05

LCH	*IRF4*	0.17	7.13.E-05
MRH	*UCHL1*	9.02	7.24.E-05
LCH	*HIST2H2BE*	0.16	7.79.E-05
LCH	*MEP1A*	0.08	8.15.E-05
LCH	*ADM2*	0.12	8.25.E-05
LCH	*SDK2*	0.05	8.37.E-05
MRH	*PTGFRN*	5.39	8.39.E-05
LCH	*CCR7*	0.36	8.44.E-05
LCH	*PKHD1L1*	0.06	9.16.E-05
LCH	*SEMA7A*	0.25	1.00.E-04
LCH	*SLC16A9*	0.06	1.01.E-04
LCH	*NETO2*	0.27	1.02.E-04
LCH	*TSHR*	0.06	1.09.E-04
LCH	*NPTX1*	0.06	1.09.E-04
LCH	*STAR*	0.07	1.09.E-04
MRH	*NOV*	8.36	1.22.E-04
LCH	*BRSK1*	0.21	1.30.E-04
MRH	*SORCS2*	8.33	1.31.E-04
LCH	*CENPM*	0.15	1.38.E-04
LCH	*FAM111B*	0.10	1.38.E-04
LCH	*GPR27*	0.12	1.40.E-04
MRH	*CMYA5*	7.52	1.43.E-04
LCH	*RAC2*	0.37	1.47.E-04
MRH	*PTCH2*	3.42	1.54.E-04
MRH	*SAMD4A*	3.32	1.64.E-04
MRH	*SORBS3*	2.50	1.64.E-04
LCH	*MIXL1*	0.08	1.66.E-04
LCH	*BLM*	0.21	1.71.E-04
LCH	*FKBP1AP1*	0.13	1.74.E-04
LCH	*PKMYT1*	0.13	1.74.E-04
LCH	*COL7A1*	0.12	1.74.E-04
MRH	*FAM180B*	16.94	1.78.E-04
MRH	*GAS7*	2.54	1.78.E-04
LCH	*IDI2-AS1*	0.13	2.04.E-04
LCH	*HIST1H2BJ*	0.06	2.04.E-04
LCH	*CD38*	0.30	2.05.E-04
LCH	*E2F2*	0.14	2.07.E-04
MRH	*CSMD2*	8.14	2.09.E-04
MRH	*COL6A3*	5.10	2.14.E-04
MRH	*SOCS6*	3.66	2.14.E-04
MRH	*KIF1C*	2.08	2.31.E-04
LCH	*FAM46C*	0.13	2.31.E-04

LCH	*GINS2*	0.12	2.31.E-04	
LCH	*PADI4*	0.07	2.31.E-04	
LCH	*ELANE*	0.06	2.36.E-04	
MRH	*LOC101929331*	7.05	2.44.E-04	
MRH	*MARK1*	5.68	2.50.E-04	
MRH	*DPT*	13.01	2.53.E-04	
MRH	*FBLN2*	5.40	2.53.E-04	
MRH	*RMDN3*	2.50	2.64.E-04	
MRH	*HHIPL1*	4.12	2.80.E-04	
LCH	*PSAT1*	0.18	2.80.E-04	
LCH	*LINC01550*	0.07	2.83.E-04	
LCH	*HMSD*	0.07	2.84.E-04	
LCH	*KLHL14*	0.10	2.85.E-04	
MRH	*GCHFR*	5.21	2.86.E-04	
LCH	*SNX22*	0.10	2.94.E-04	
LCH	*ZBTB32*	0.08	2.98.E-04	
LCH	*CASS4*	0.16	3.17.E-04	
LCH	*RGS13*	0.07	3.22.E-04	
LCH	*CKS2*	0.27	3.23.E-04	
MRH	*MCOLN3*	7.12	3.26.E-04	
LCH	*DBF4*	0.35	3.26.E-04	
LCH	*TMEM154*	0.24	3.30.E-04	
LCH	*PGAM1*	0.27	3.30.E-04	
LCH	*PRKCB*	0.27	3.30.E-04	
LCH	*FAM65B*	0.27	3.40.E-04	
LCH	*S100B*	0.08	3.40.E-04	
LCH	*CASP5*	0.12	3.45.E-04	
LCH	*LAMP3*	0.12	3.48.E-04	LINDSTEDT_DENDRITIC_CELL_MATURATION_B
MRH	*HRCT1*	6.66	3.49.E-04	
LCH	*LOC100131564*	0.23	3.49.E-04	
MRH	*SERPING1*	3.20	3.52.E-04	
LCH	*KCNG1*	0.08	3.56.E-04	
LCH	*BHLHA15*	0.07	3.69.E-04	
LCH	*BCAS4*	0.16	3.72.E-04	
LCH	*P2RX1*	0.19	3.73.E-04	
LCH	*BUB1B*	0.14	3.73.E-04	
LCH	*HEMGN*	0.06	3.73.E-04	
MRH	*PTHLH*	11.98	3.75.E-04	
LCH	*KIF2C*	0.12	3.92.E-04	
LCH	*RGS2*	0.10	3.93.E-04	
LCH	*RPS10*	0.11	4.01.E-04	
MRH	*PRSS36*	4.80	4.11.E-04	

LCH	*RASAL1*	0.07	4.12.E-04
MRH	*NFIX*	4.10	4.17.E-04
MRH	*C2*	3.86	4.22.E-04
MRH	*ARNT2*	4.79	4.53.E-04
LCH	*NUP88*	0.50	4.53.E-04
MRH	*FOXP2*	10.29	4.63.E-04
LCH	*MXD1*	0.17	4.64.E-04
LCH	*BLK*	0.12	4.72.E-04
LCH	*ATF7IP2*	0.34	4.99.E-04
LCH	*TRAF4*	0.31	5.09.E-04
LCH	*CDC45*	0.10	5.15.E-04
LCH	*HIST1H3D*	0.16	5.24.E-04
LCH	*CCR6*	0.13	5.34.E-04
MRH	*ALDH1A1*	5.84	5.35.E-04
MRH	*ATP9A*	3.80	5.35.E-04
MRH	*MRC2*	3.62	5.39.E-04
MRH	*A4GALT*	3.66	5.72.E-04
LCH	*MS4A3*	0.07	5.81.E-04
LCH	*SP110*	0.36	6.00.E-04
LCH	*TFPI2*	0.12	6.00.E-04
LCH	*TUBA8*	0.10	6.00.E-04
LCH	*GFI1B*	0.07	6.00.E-04
LCH	*SNORD15B*	0.07	6.05.E-04
LCH	*BPI*	0.07	6.11.E-04
LCH	*PIM2*	0.16	6.37.E-04
LCH	*CDC42SE1*	0.49	6.64.E-04
LCH	*LTF*	0.08	6.64.E-04
MRH	*C1S*	3.94	6.66.E-04
LCH	*RPL26*	0.26	6.67.E-04
MRH	*PTRF*	2.81	6.78.E-04
MRH	*CDO1*	5.78	6.86.E-04
LCH	*AHSP*	0.10	6.95.E-04
LCH	*BIK*	0.07	6.95.E-04
LCH	*CRB2*	0.07	6.95.E-04
LCH	*ESCO2*	0.12	6.99.E-04
LCH	*ANKLE1*	0.15	7.11.E-04
MRH	*CPE*	3.50	7.29.E-04
LCH	*LINC00926*	0.15	7.39.E-04
LCH	*ANKRD55*	0.15	7.56.E-04
MRH	*CACNB4*	6.19	7.63.E-04
LCH	*TNFAIP8*	0.48	7.65.E-04
LCH	*GLCCI1*	0.34	7.65.E-04

LCH	*CDCA7*	0.24	7.69.E-04
MRH	*LINC00856*	16.30	7.69.E-04
LCH	*HBM*	0.07	7.74.E-04
MRH	*TNFSF12*	3.11	7.83.E-04
LCH	*E2F5*	0.19	8.09.E-04
MRH	*IGFBP5*	3.56	8.25.E-04
LCH	*SNORD2*	0.08	8.28.E-04
LCH	*MPO*	0.08	8.32.E-04
MRH	*ARHGAP24*	3.61	8.36.E-04
MRH	*C1R*	3.42	8.58.E-04
LCH	*HSPD1*	0.40	8.69.E-04
LCH	*CDC25C*	0.09	8.69.E-04
LCH	*HIST1H4C*	0.09	8.74.E-04
LCH	*RUFY4*	0.09	8.99.E-04
LCH	*NOMO2*	0.10	9.03.E-04
LCH	*CCNA2*	0.23	9.06.E-04
LCH	*CASC5*	0.12	9.22.E-04
LCH	*MIR5195*	0.08	9.41.E-04
LCH	*CEACAM1*	0.25	9.59.E-04
LCH	*KEL*	0.11	9.59.E-04
LCH	*DNAJA4*	0.38	9.64.E-04
MRH	*ZNF668*	2.16	9.64.E-04
LCH	*ADGRE3*	0.11	1.04.E-03
MRH	*CCDC92*	2.50	1.04.E-03
MRH	*ALDH1L2*	2.69	1.06.E-03
MRH	*C6orf132*	4.78	1.11.E-03
LCH	*CEACAM4*	0.28	1.12.E-03
MRH	*COL2A1*	4.92	1.12.E-03
LCH	*DUSP2*	0.17	1.19.E-03
MRH	*LMX1B*	12.64	1.20.E-03
LCH	*CKS1B*	0.14	1.21.E-03
MRH	*LRRC17*	5.87	1.24.E-03
LCH	*CDK1*	0.20	1.24.E-03
LCH	*FAM159A*	0.20	1.26.E-03
LCH	*SIGLEC12*	0.10	1.28.E-03
LCH	*TPX2*	0.21	1.29.E-03
MRH	*EVC*	3.21	1.31.E-03
LCH	*IL18R1*	0.21	1.31.E-03
LCH	*P2RX5*	0.18	1.31.E-03
MRH	*FBXO36*	3.87	1.31.E-03
LCH	*PLCG2*	0.49	1.32.E-03
MRH	*GRM1*	7.64	1.37.E-03

LCH	*PABPC3*	0.42	1.38.E-03	
MRH	*AURKC*	4.95	1.39.E-03	
MRH	*NUAK1*	3.34	1.39.E-03	
MRH	*SCN4B*	6.63	1.40.E-03	
MRH	*RBMS2*	2.26	1.42.E-03	
MRH	*SLC15A3*	3.16	1.44.E-03	
LCH	*TLR9*	0.35	1.46.E-03	
MRH	*KIF7*	2.71	1.46.E-03	
MRH	*C15orf52*	3.18	1.50.E-03	
MRH	*MMP11*	5.17	1.52.E-03	
MRH	*RPLP0P2*	7.22	1.52.E-03	
MRH	*SYP*	3.86	1.52.E-03	
LCH	*TYMS*	0.25	1.52.E-03	
LCH	*CCNB1*	0.21	1.52.E-03	
LCH	*CEP55*	0.16	1.53.E-03	
LCH	*IL1RL1*	0.12	1.55.E-03	
LCH	*ANKRD36BP2*	0.10	1.60.E-03	
MRH	*TSR2*	2.11	1.64.E-03	
MRH	*KIAA1217*	4.40	1.66.E-03	
LCH	*C4orf29*	0.32	1.66.E-03	
MRH	*SCD*	3.86	1.68.E-03	
MRH	*AZIN2*	7.00	1.73.E-03	
MRH	*STRA6*	5.06	1.73.E-03	
LCH	*NT5C3A*	0.33	1.73.E-03	
LCH	*SEMA3D*	0.10	1.73.E-03	
MRH	*DEGS2*	11.86	1.74.E-03	
MRH	*MYO5B*	6.96	1.75.E-03	
MRH	*MAN1B1*	1.89	1.77.E-03	
LCH	*ANLN*	0.17	1.85.E-03	
LCH	*XRCC2*	0.12	1.85.E-03	
LCH	*NPHS1*	0.08	1.85.E-03	
LCH	*C17orf47*	0.08	1.88.E-03	
MRH	*PALM*	4.50	1.93.E-03	
LCH	*SGOL1*	0.19	1.93.E-03	
LCH	*LINC01215*	0.18	1.96.E-03	
LCH	*MPZL3*	0.33	2.06.E-03	
LCH	*SLC7A5*	0.15	2.08.E-03	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*KRT18*	0.13	2.08.E-03	
LCH	*NUSAP1*	0.21	2.08.E-03	
MRH	*SNX33*	2.24	2.10.E-03	
MRH	*MTURN*	2.28	2.13.E-03	
MRH	*TNXB*	7.70	2.14.E-03	

MRH	*NGEF*	10.30	2.16.E-03	
LCH	*STARD4*	0.26	2.16.E-03	
LCH	*NRXN1*	0.08	2.18.E-03	
MRH	*PLBD2*	2.75	2.20.E-03	
MRH	*PLA2G16*	2.70	2.21.E-03	
LCH	*LYPLA1*	0.53	2.22.E-03	
LCH	*BEND4*	0.14	2.22.E-03	
LCH	*DMP1*	0.08	2.22.E-03	
LCH	*RPL39*	0.17	2.22.E-03	
MRH	*PCDH19*	6.70	2.23.E-03	
MRH	*LDHD*	6.64	2.23.E-03	
LCH	*TIA1*	0.52	2.23.E-03	
MRH	*KLHDC8B*	5.49	2.25.E-03	
LCH	*TSPAN13*	0.25	2.25.E-03	
LCH	*ASPM*	0.14	2.26.E-03	
MRH	*OTOA*	4.74	2.34.E-03	
MRH	*FGF10-AS1*	12.52	2.36.E-03	
MRH	*SDC3*	3.86	2.41.E-03	
MRH	*PLTP*	3.46	2.41.E-03	
LCH	*TNFRSF6B*	0.19	2.41.E-03	
LCH	*TIFAB*	0.17	2.42.E-03	
LCH	*SNORD44*	0.09	2.53.E-03	
LCH	*IRF7*	0.36	2.54.E-03	
MRH	*PCSK1*	10.31	2.55.E-03	
MRH	*CTD-2201I18.1*	8.32	2.55.E-03	
LCH	*CYTIP*	0.34	2.55.E-03	LINDSTEDT_DENDRITIC_CELL_MATURATION_B
LCH	*S100A8*	0.13	2.57.E-03	
MRH	*GAA*	2.51	2.60.E-03	
LCH	*PNOC*	0.16	2.62.E-03	
LCH	*LINC00877*	0.14	2.62.E-03	
LCH	*CD1C*	0.10	2.66.E-03	
MRH	*EXPH5*	6.11	2.67.E-03	
MRH	*C14orf132*	4.32	2.71.E-03	
LCH	*ADGRG3*	0.14	2.71.E-03	
MRH	*OSR2*	7.44	2.73.E-03	
LCH	*PABPC1L*	0.23	2.74.E-03	
MRH	*SGSH*	2.28	2.75.E-03	
MRH	*ACOT4*	3.19	2.77.E-03	
LCH	*FANCE*	0.39	2.77.E-03	
LCH	*TMEM161B*	0.42	2.77.E-03	
MRH	*LYRM9*	3.83	2.82.E-03	
LCH	*GYPA*	0.09	2.84.E-03	

MRH	*CLN8*	2.03	2.84.E-03
MRH	*SNX9*	2.31	2.84.E-03
LCH	*UCHL3*	0.48	2.84.E-03
LCH	*MEMO1*	0.33	2.84.E-03
LCH	*HMGN2*	0.38	2.89.E-03
MRH	*CD9*	3.40	2.92.E-03
MRH	*OAF*	4.02	2.94.E-03
LCH	*NLRP7*	0.11	3.01.E-03
LCH	*CENPA*	0.18	3.02.E-03
MRH	*PLA2G2A*	12.77	3.02.E-03
LCH	*UHRF1*	0.18	3.02.E-03
LCH	*HSH2D*	0.19	3.02.E-03
MRH	*EDA2R*	2.65	3.03.E-03
MRH	*HTR1F*	5.91	3.09.E-03
MRH	*PLS1*	5.86	3.10.E-03
LCH	*GATA1*	0.09	3.11.E-03
MRH	*CYTH3*	2.40	3.22.E-03
LCH	*SUCNR1*	0.25	3.22.E-03
LCH	*AFF3*	0.16	3.22.E-03
LCH	*CEACAM8*	0.09	3.24.E-03
MRH	*PHLDA3*	2.77	3.30.E-03
LCH	*KSR1*	0.41	3.31.E-03
MRH	*LOC100506258*	5.93	3.42.E-03
LCH	*CDCA2*	0.16	3.42.E-03
MRH	*GJB3*	11.78	3.43.E-03
LCH	*DNA2*	0.13	3.43.E-03
LCH	*ZRANB3*	0.27	3.43.E-03
MRH	*PIPOX*	5.29	3.44.E-03
LCH	*C1orf228*	0.21	3.45.E-03
LCH	*NEK2*	0.13	3.46.E-03
MRH	*LVRN*	10.62	3.47.E-03
LCH	*KIAA1958*	0.16	3.47.E-03
LCH	*LAMP5*	0.17	3.53.E-03
LCH	*PRKCZ*	0.27	3.55.E-03
MRH	*PNMA2*	5.06	3.57.E-03
MRH	*GIPC1*	2.02	3.57.E-03
LCH	*CDT1*	0.20	3.59.E-03
MRH	*HOXB7*	3.48	3.66.E-03
LCH	*RPS3A*	0.31	3.67.E-03
LCH	*MMP9*	0.10	3.69.E-03
MRH	*MXRA5*	4.85	3.69.E-03
LCH	*CYCS*	0.40	3.69.E-03

LCH	*ITGB1BP2*	0.12	3.69.E-03
LCH	*GABRR2*	0.12	3.71.E-03
LCH	*MIR6087*	0.28	3.86.E-03
MRH	*PPFIBP2*	2.67	3.88.E-03
LCH	*P2RY10*	0.31	3.91.E-03
LCH	*SNORA63*	0.22	3.93.E-03
MRH	*TCTN2*	2.95	4.06.E-03
MRH	*GAS6*	2.42	4.06.E-03
LCH	*CFAP58-AS1*	0.11	4.07.E-03
LCH	*HIST1H2BD*	0.22	4.21.E-03
LCH	*EPB42*	0.09	4.21.E-03
MRH	*CADM3*	4.93	4.24.E-03
MRH	*CD99L2*	2.24	4.34.E-03
LCH	*NCBP1*	0.50	4.34.E-03
LCH	*RPL6*	0.32	4.34.E-03
LCH	*TTN-AS1*	0.20	4.34.E-03
LCH	*PRELID1*	0.35	4.38.E-03
LCH	*TAS1R3*	0.17	4.44.E-03
MRH	*ZFYVE28*	2.83	4.49.E-03
LCH	*DDX26B*	0.40	4.49.E-03
LCH	*LIMD2*	0.44	4.51.E-03
LCH	*MT1X*	0.32	4.52.E-03
MRH	*CAV1*	2.69	4.52.E-03
LCH	*PLEKHF2*	0.55	4.52.E-03
LCH	*CPNE5*	0.21	4.55.E-03
MRH	*PCOLCE2*	5.89	4.57.E-03
LCH	*GNG10*	0.10	4.62.E-03
MRH	*CTHRC1*	5.51	4.68.E-03
LCH	*WFDC21P*	0.13	4.70.E-03
MRH	*CBX7*	2.33	4.71.E-03
LCH	*TTK*	0.14	4.72.E-03
MRH	*ITLN1*	6.06	4.79.E-03
MRH	*VEGFB*	2.84	4.80.E-03
MRH	*RANBP3L*	10.86	4.83.E-03
MRH	*ZCCHC24*	2.32	4.83.E-03
LCH	*FGFR1OP*	0.43	4.83.E-03
LCH	*BOP1*	0.33	4.83.E-03
LCH	*KCNH7*	0.12	4.83.E-03
LCH	*RSPH4A*	0.11	4.83.E-03
LCH	*SPINK2*	0.11	4.85.E-03
LCH	*LIN9*	0.34	4.95.E-03
LCH	*ROPN1L*	0.10	5.00.E-03

MRH	*DAG1*	2.44	5.07.E-03
LCH	*DLGAP3*	0.15	5.07.E-03
LCH	*SNRPE*	0.37	5.13.E-03
LCH	*CCDC102B*	0.29	5.13.E-03
LCH	*STC2*	0.19	5.21.E-03
MRH	*AOX1*	5.21	5.25.E-03
MRH	*GCNT3*	4.71	5.27.E-03
MRH	*LOC283731*	8.27	5.31.E-03
LCH	*DNASE1L3*	0.13	5.31.E-03
MRH	*ABCG1*	2.41	5.34.E-03
LCH	*FAM72B*	0.10	5.36.E-03
MRH	*MYCN*	4.30	5.48.E-03
MRH	*RGMA*	4.07	5.48.E-03
MRH	*FMOD*	2.33	5.55.E-03
LCH	*DNAH8*	0.10	5.55.E-03
LCH	*CBWD1*	0.10	5.56.E-03
MRH	*AEBP1*	4.33	5.57.E-03
MRH	*LINC00883*	2.79	5.69.E-03
MRH	*LINC01140*	4.28	5.69.E-03
LCH	*LDLR*	0.19	5.79.E-03
MRH	*FZD7*	4.18	5.80.E-03
LCH	*ZWINT*	0.27	5.84.E-03
LCH	*SCARNA9*	0.23	5.85.E-03
MRH	*ITGBL1*	4.63	5.98.E-03
MRH	*DPYSL3*	3.64	5.98.E-03
MRH	*ALDH3A1*	5.28	6.01.E-03
LCH	*PMAIP1*	0.17	6.01.E-03
MRH	*ABI3BP*	6.15	6.02.E-03
LCH	*TOP2A*	0.19	6.07.E-03
LCH	*GPR88*	0.10	6.08.E-03
LCH	*BMP8B*	0.15	6.16.E-03
MRH	*MRGPRF*	4.28	6.16.E-03
MRH	*FZD10-AS1*	3.75	6.28.E-03
LCH	*RNF138P1*	0.33	6.28.E-03
LCH	*FOLH1*	0.10	6.28.E-03
MRH	*ISLR*	5.18	6.29.E-03
LCH	*CMTM2*	0.14	6.48.E-03
MRH	*BMPR1B*	8.68	6.48.E-03
LCH	*PPM1N*	0.16	6.55.E-03
MRH	*LRIG3*	3.94	6.59.E-03
LCH	*DDX11*	0.16	6.59.E-03
LCH	*LOC283710*	0.11	6.65.E-03

LCH	*NCAPG*	0.17	6.66.E-03
LCH	*HIST1H2AG*	0.13	6.68.E-03
MRH	*GCSAML-AS1*	10.78	6.71.E-03
MRH	*NAP1L6*	10.71	6.71.E-03
MRH	*LOC101927765*	3.74	6.71.E-03
MRH	*SOWAHD*	2.47	6.75.E-03
LCH	*CLECL1*	0.19	6.83.E-03
MRH	*CTB-12O2.1*	10.73	6.86.E-03
MRH	*LOC101928304*	7.96	6.86.E-03
MRH	*NLGN2*	2.20	6.86.E-03
LCH	*SNORA24*	0.17	6.86.E-03
MRH	*FN3K*	2.35	6.86.E-03
MRH	*FAM149A*	5.28	6.88.E-03
MRH	*BBC3*	2.60	6.88.E-03
LCH	*SMOC1*	0.16	6.88.E-03
MRH	*CRABP2*	6.94	6.91.E-03
MRH	*ERBB2*	2.67	6.92.E-03
LCH	*PARM1*	0.20	6.94.E-03
LCH	*GOLGA8N*	0.10	6.96.E-03
MRH	*LINC01546*	10.86	7.02.E-03
MRH	*IGIP*	2.67	7.02.E-03
MRH	*KIF6*	6.86	7.02.E-03
MRH	*ADCK2*	2.12	7.02.E-03
LCH	*CCDC26*	0.10	7.02.E-03
LCH	*KIF18A*	0.15	7.02.E-03
LCH	*UBE2C*	0.20	7.13.E-03
LCH	*RPL36A*	0.18	7.14.E-03
LCH	*HRK*	0.10	7.14.E-03
MRH	*SPINK5*	10.23	7.20.E-03
MRH	*CFD*	4.82	7.29.E-03
LCH	*CCDC144B*	0.10	7.29.E-03
MRH	*ZNF788*	2.56	7.35.E-03
LCH	*XAF1*	0.31	7.41.E-03
MRH	*PCDHGA2*	4.99	7.44.E-03
LCH	*ISL2*	0.10	7.44.E-03
MRH	*KRT80*	7.88	7.47.E-03
LCH	*NFKBID*	0.24	7.59.E-03
MRH	*P3H3*	3.53	7.62.E-03
LCH	*FOXM1*	0.24	7.63.E-03
LCH	*LOC100289511*	0.25	7.75.E-03
LCH	*MYB*	0.12	7.75.E-03
MRH	*C1QTNF3*	5.55	7.76.E-03

LCH	*SNORD29*	0.11	7.76.E-03
MRH	*UBAC2*	1.81	7.76.E-03
LCH	*TRPC6*	0.27	7.83.E-03
MRH	*FLNC*	6.34	7.86.E-03
MRH	*VGLL3*	4.57	7.86.E-03
MRH	*ZNF219*	2.54	7.99.E-03
LCH	*RPS12*	0.32	7.99.E-03
LCH	*TNFRSF17*	0.13	7.99.E-03
MRH	*YPEL4*	3.06	8.00.E-03
MRH	*EYA2*	5.51	8.04.E-03
LCH	*LOC102724050*	0.11	8.04.E-03
LCH	*FCAR*	0.15	8.04.E-03
MRH	*HECTD3*	1.88	8.09.E-03
LCH	*HLA-DOB*	0.21	8.12.E-03
MRH	*TRPC2*	4.58	8.12.E-03
LCH	*RPL18A*	0.25	8.12.E-03
LCH	*TAPT1-AS1*	0.29	8.19.E-03
MRH	*CTIF*	2.33	8.20.E-03
LCH	*SLC30A2*	0.11	8.20.E-03
MRH	*SCG2*	6.49	8.25.E-03
MRH	*P4HA3*	5.06	8.25.E-03
LCH	*ZNF800*	0.47	8.25.E-03
LCH	*ADGRE2*	0.29	8.26.E-03
MRH	*LGI4*	3.65	8.30.E-03
LCH	*SNORD10*	0.28	8.30.E-03
MRH	*C17orf51*	2.71	8.37.E-03
MRH	*ZNF469*	4.08	8.42.E-03
LCH	*MXD3*	0.34	8.50.E-03
MRH	*GLI3*	3.26	8.52.E-03
LCH	*C1orf186*	0.17	8.52.E-03
MRH	*STXBP6*	4.38	8.52.E-03
MRH	*ADAMTS2*	2.68	8.64.E-03
MRH	*SEPN1*	1.90	8.65.E-03
LCH	*TTC41P*	0.14	8.65.E-03
LCH	*FOSB*	0.12	8.65.E-03
MRH	*LAMB2*	3.03	8.66.E-03
MRH	*HLA-H*	2.41	8.66.E-03
MRH	*NAGLU*	2.34	8.66.E-03
MRH	*SULF1*	5.17	8.73.E-03
MRH	*FSTL1*	2.99	8.74.E-03
LCH	*GK3P*	0.12	8.74.E-03
LCH	*MIR6753*	0.11	8.74.E-03

MRH	*SLC47A1*	3.72	8.77.E-03	
LCH	*DCAF10*	0.54	8.79.E-03	
LCH	*ARL6IP6*	0.54	8.91.E-03	
LCH	*COL19A1*	0.13	8.91.E-03	
MRH	*LINC01605*	3.65	8.93.E-03	
LCH	*LTA*	0.31	8.95.E-03	
LCH	*TRIM10*	0.11	9.02.E-03	
LCH	*IFI6*	0.23	9.13.E-03	
MRH	*SYNGR1*	2.80	9.17.E-03	
LCH	*HBG1*	0.12	9.17.E-03	
MRH	*COL1A1*	3.84	9.30.E-03	
LCH	*LRG1*	0.18	9.30.E-03	
LCH	*MEIKIN*	0.14	9.30.E-03	
LCH	*FAM60A*	0.42	9.41.E-03	
MRH	*SLC6A9*	2.87	9.48.E-03	
LCH	*MCM8*	0.28	9.50.E-03	
MRH	*PHKA1*	4.93	9.52.E-03	
LCH	*CD33*	0.47	9.52.E-03	
MRH	*CDH23*	3.45	9.53.E-03	
MRH	*C1orf21*	2.04	9.53.E-03	
LCH	*ZNF281*	0.44	9.63.E-03	
LCH	*CKB*	0.13	9.63.E-03	
LCH	*ORM1*	0.11	9.65.E-03	
MRH	*TUBB2A*	3.04	9.66.E-03	
MRH	*AKR1B1*	2.88	9.70.E-03	
LCH	*EGR4*	0.11	9.70.E-03	
MRH	*SV2B*	7.11	9.81.E-03	
LCH	*IL6*	0.12	9.82.E-03	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
MRH	*VSTM4*	3.30	9.93.E-03	
MRH	*LOC101929076*	7.29	9.95.E-03	
LCH	*UBE2S*	0.19	1.00.E-02	
MRH	*TNS1*	3.42	1.00.E-02	
LCH	*TROAP*	0.18	1.00.E-02	
LCH	*SLCO4A1*	0.16	1.01.E-02	
LCH	*HERC5*	0.23	1.02.E-02	
LCH	*P3H2*	0.18	1.03.E-02	
LCH	*RGL4*	0.46	1.03.E-02	
LCH	*PRR7*	0.24	1.03.E-02	
MRH	*DHRS3*	2.98	1.04.E-02	
MRH	*KRBA1*	2.05	1.05.E-02	
LCH	*PSTPIP2*	0.28	1.05.E-02	
MRH	*CPM*	3.23	1.05.E-02	

LCH	*GPR89B*	0.14	1.06.E-02
LCH	*VASP*	0.39	1.07.E-02
LCH	*CP*	0.15	1.07.E-02
LCH	*EAF2*	0.30	1.07.E-02
LCH	*IGLL1*	0.11	1.07.E-02
LCH	*SKA1*	0.17	1.07.E-02
MRH	*MEDAG*	5.04	1.09.E-02
LCH	*IQGAP3*	0.16	1.10.E-02
MRH	*SCN10A*	9.63	1.10.E-02
MRH	*LOC401463*	8.37	1.10.E-02
MRH	*HOXB6*	4.06	1.10.E-02
MRH	*MAP1A*	3.92	1.10.E-02
MRH	*KREMEN1*	3.05	1.10.E-02
LCH	*MZT1*	0.50	1.11.E-02
MRH	*RBPMS2*	2.97	1.11.E-02
MRH	*LPPR4*	3.57	1.11.E-02
MRH	*COL6A1*	2.08	1.12.E-02
MRH	*NHLH2*	7.77	1.13.E-02
LCH	*ATF3*	0.17	1.13.E-02
LCH	*FCGR3B*	0.13	1.13.E-02
MRH	*COL8A2*	3.33	1.14.E-02
LCH	*GHRL*	0.15	1.14.E-02
MRH	*PDIA5*	2.16	1.15.E-02
MRH	*ADAMTSL1*	5.52	1.15.E-02
LCH	*SNORA40*	0.19	1.15.E-02
MRH	*NACC2*	2.09	1.15.E-02
MRH	*ANXA4*	2.00	1.15.E-02
MRH	*CLN6*	1.89	1.16.E-02
MRH	*LTBP3*	2.36	1.16.E-02
LCH	*SLCO5A1*	0.21	1.16.E-02
MRH	*POMT1*	1.91	1.16.E-02
LCH	*DTL*	0.22	1.18.E-02
MRH	*AKR1C2*	6.48	1.19.E-02
MRH	*TMEM109*	1.71	1.19.E-02
MRH	*VAT1*	3.40	1.19.E-02
MRH	*GNB5*	1.76	1.20.E-02
MRH	*NAGK*	1.83	1.21.E-02
LCH	*HS3ST1*	0.27	1.23.E-02
LCH	*ATP8A1*	0.32	1.23.E-02
LCH	*TCL6*	0.12	1.23.E-02
MRH	*ADAMTS15*	3.51	1.23.E-02
LCH	*SPCS2*	0.41	1.24.E-02

LCH	*CLEC5A*	0.21	1.24.E-02
MRH	*CA5B*	2.65	1.25.E-02
MRH	*DAB2IP*	2.13	1.25.E-02
LCH	*SPAG4*	0.21	1.26.E-02
LCH	*CTLA4*	0.18	1.26.E-02
LCH	*SRSF6*	0.51	1.26.E-02
MRH	*TCHH*	7.61	1.26.E-02
LCH	*IZUMO4*	0.21	1.26.E-02
MRH	*PNMAL1*	6.87	1.27.E-02
MRH	*KRT222*	4.55	1.27.E-02
LCH	*GTF2I*	0.41	1.27.E-02
LCH	*SNORA48*	0.22	1.28.E-02
LCH	*RPS28*	0.23	1.28.E-02
LCH	*OXCT1*	0.35	1.29.E-02
MRH	*WISP2*	9.38	1.30.E-02
LCH	*PM20D2*	0.49	1.30.E-02
MRH	*LINC01119*	8.35	1.31.E-02
MRH	*PLIN1*	7.95	1.32.E-02
MRH	*C3orf80*	5.27	1.32.E-02
LCH	*ZNF711*	0.17	1.32.E-02
MRH	*ABCB5*	7.31	1.32.E-02
LCH	*INSIG1*	0.39	1.32.E-02
LCH	*RPS2*	0.36	1.32.E-02
MRH	*WNT11*	6.74	1.32.E-02
LCH	*SMIM5*	0.25	1.32.E-02
LCH	*PLK1*	0.21	1.32.E-02
LCH	*LIF*	0.20	1.32.E-02
LCH	*RAD51-AS1*	0.23	1.32.E-02
MRH	*TIMP2*	3.05	1.32.E-02
LCH	*HMMR*	0.15	1.33.E-02
MRH	*TTC28*	2.12	1.34.E-02
LCH	*NUGGC*	0.24	1.34.E-02
MRH	*ADCYAP1R1*	6.30	1.34.E-02
MRH	*NUDT18*	2.10	1.35.E-02
LCH	*LARP1B*	0.48	1.35.E-02
LCH	*HMGN1*	0.39	1.35.E-02
MRH	*TUB*	3.80	1.36.E-02
MRH	*PELI3*	2.51	1.36.E-02
MRH	*ITSN1*	2.40	1.36.E-02
MRH	*FXYD5*	2.10	1.36.E-02
LCH	*GFM2*	0.51	1.36.E-02
LCH	*MYC*	0.48	1.36.E-02

MRH	*CHMP6*	1.86	1.37.E-02
MRH	*PLEKHA4*	2.72	1.37.E-02
LCH	*AURKB*	0.22	1.37.E-02
MRH	*MAMDC2*	7.71	1.38.E-02
LCH	*BIRC5*	0.27	1.40.E-02
LCH	*LOC100507195*	0.14	1.40.E-02
LCH	*HIST1H2BO*	0.12	1.40.E-02
LCH	*CCL22*	0.15	1.40.E-02
LCH	*MELK*	0.23	1.41.E-02
LCH	*KLF1*	0.17	1.41.E-02
LCH	*CCDC68*	0.23	1.42.E-02
MRH	*SLC22A18*	2.04	1.43.E-02
LCH	*ZBP1*	0.31	1.44.E-02
LCH	*CLEC4C*	0.12	1.44.E-02
MRH	*CCNO*	6.90	1.44.E-02
LCH	*ANP32C*	0.25	1.44.E-02
LCH	*AMPD1*	0.12	1.44.E-02
MRH	*SMAD3*	1.88	1.44.E-02
MRH	*RAB11FIP3*	1.75	1.45.E-02
LCH	*SH2B2*	0.30	1.47.E-02
LCH	*KIF20A*	0.26	1.47.E-02
LCH	*ZNF229*	0.18	1.48.E-02
MRH	*FAT1*	3.38	1.48.E-02
MRH	*LAMA1*	7.11	1.52.E-02
LCH	*RBM45*	0.50	1.53.E-02
LCH	*CSRNP1*	0.18	1.53.E-02
LCH	*CD52*	0.31	1.54.E-02
LCH	*NFKBIZ*	0.19	1.59.E-02
LCH	*KIF23*	0.19	1.59.E-02
MRH	*COL1A2*	3.61	1.59.E-02
LCH	*RPSAP58*	0.43	1.60.E-02
LCH	*SNORA45A*	0.12	1.61.E-02
MRH	*BHMT2*	4.99	1.64.E-02
MRH	*LOC101929450*	4.24	1.65.E-02
MRH	*LINC00475*	8.64	1.65.E-02
MRH	*DST*	3.03	1.66.E-02
LCH	*FBXW7*	0.56	1.67.E-02
LCH	*TKTL1*	0.12	1.67.E-02
LCH	*RPS16P5*	0.12	1.67.E-02
LCH	*FAM132B*	0.32	1.68.E-02
LCH	*KIR3DX1*	0.12	1.68.E-02
MRH	*MYOC*	8.80	1.68.E-02

LCH	*ARGLU1*	0.45	1.68.E-02
LCH	*GPM6A*	0.13	1.68.E-02
MRH	*TRIM50*	6.48	1.69.E-02
MRH	*LRRC37A6P*	4.39	1.70.E-02
MRH	*LOXL1*	3.31	1.72.E-02
MRH	*PDGFC*	3.14	1.73.E-02
LCH	*NLRP6*	0.18	1.74.E-02
MRH	*PAMR1*	5.25	1.75.E-02
MRH	*ADORA1*	3.74	1.75.E-02
LCH	*TIFA*	0.43	1.76.E-02
LCH	*WASH1*	0.17	1.76.E-02
LCH	*SFTPD*	0.12	1.76.E-02
LCH	*C15orf48*	0.17	1.77.E-02
LCH	*DDX21*	0.36	1.77.E-02
MRH	*LPL*	4.44	1.77.E-02
MRH	*FAM84B*	3.05	1.77.E-02
MRH	*CHPF*	3.95	1.78.E-02
MRH	*APOD*	5.83	1.80.E-02
LCH	*ZNF404*	0.30	1.80.E-02
LCH	*LPPR3*	0.12	1.80.E-02
LCH	*HIST1H2AC*	0.23	1.81.E-02
LCH	*SGOL2*	0.27	1.82.E-02
MRH	*KIAA1462*	2.53	1.82.E-02
LCH	*PPA1*	0.43	1.83.E-02
LCH	*SOCS3*	0.22	1.83.E-02
MRH	*FABP3*	4.91	1.84.E-02
MRH	*PLCD3*	4.09	1.84.E-02
LCH	*LSM12*	0.20	1.84.E-02
LCH	*ACOXL*	0.13	1.84.E-02
LCH	*FLJ44635*	0.35	1.84.E-02
MRH	*CYBRD1*	3.25	1.84.E-02
LCH	*S100A9*	0.20	1.85.E-02
LCH	*KIF14*	0.22	1.85.E-02
LCH	*SOX9*	0.16	1.85.E-02
LCH	*USP38*	0.52	1.85.E-02
LCH	*KIAA1524*	0.29	1.85.E-02
LCH	*HJURP*	0.21	1.85.E-02
MRH	*FRMD7*	8.39	1.85.E-02
MRH	*SGCD*	4.58	1.85.E-02
MRH	*MYZAP*	5.21	1.85.E-02
LCH	*PHLDA1*	0.22	1.85.E-02
LCH	*IL5RA*	0.14	1.85.E-02

MRH	*TGFB2*	3.72	1.86.E-02	
LCH	*LOC221946*	0.13	1.86.E-02	
LCH	*SHCBP1*	0.24	1.86.E-02	
LCH	*CHAC1*	0.19	1.87.E-02	
MRH	*C21orf2*	1.93	1.88.E-02	
MRH	*FLJ41200*	6.15	1.88.E-02	
LCH	*LINC00173*	0.18	1.88.E-02	
MRH	*DPEP3*	6.93	1.88.E-02	
MRH	*HEXA*	2.19	1.89.E-02	
MRH	*MAMDC2-AS1*	7.80	1.90.E-02	
MRH	*CPZ*	3.73	1.90.E-02	
MRH	*ASAP3*	3.01	1.93.E-02	
LCH	*RTN1*	0.29	1.93.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
MRH	*FGF10*	7.07	1.96.E-02	
MRH	*KCNIP3*	2.53	1.96.E-02	
LCH	*NAIP*	0.26	1.96.E-02	
LCH	*DUSP5*	0.23	1.96.E-02	
LCH	*HIST1H1B*	0.15	1.96.E-02	
LCH	*MCL1*	0.34	1.97.E-02	
LCH	*TERF1*	0.52	1.98.E-02	
LCH	*KCNH8*	0.15	1.98.E-02	
LCH	*ICAM3*	0.43	1.99.E-02	
LCH	*RAB39B*	0.32	2.01.E-02	
MRH	*FBXW4*	1.92	2.02.E-02	
MRH	*ITIH5*	5.97	2.03.E-02	
LCH	*LMNB1*	0.29	2.05.E-02	
LCH	*RUNDC3A-AS1*	0.13	2.05.E-02	
LCH	*CNKSR1*	0.18	2.05.E-02	
MRH	*HTRA3*	6.26	2.05.E-02	
MRH	*LRP1*	4.06	2.05.E-02	
LCH	*METTL4*	0.51	2.05.E-02	
LCH	*SNORD33*	0.16	2.05.E-02	
LCH	*SNORD36B*	0.13	2.05.E-02	
LCH	*ACHE*	0.26	2.05.E-02	
MRH	*PXDC1*	2.30	2.05.E-02	
LCH	*MANEA*	0.46	2.05.E-02	
LCH	*FOXC2*	0.17	2.05.E-02	
LCH	*CDH1*	0.13	2.05.E-02	
MRH	*JAM3*	2.61	2.06.E-02	
MRH	*TNKS1BP1*	2.43	2.06.E-02	
LCH	*DSP*	0.15	2.06.E-02	
MRH	*EHD2*	2.31	2.07.E-02	

LCH	*HNRNPC*	0.58	2.07.E-02
MRH	*CMTM4*	2.37	2.08.E-02
MRH	*DZIP1L*	2.37	2.08.E-02
MRH	*ZBTB47*	2.24	2.08.E-02
LCH	*INTS7*	0.47	2.08.E-02
LCH	*LOC100130476*	0.23	2.08.E-02
MRH	*SH3D19*	1.95	2.09.E-02
LCH	*NDC80*	0.31	2.09.E-02
MRH	*ACSM5*	5.30	2.09.E-02
MRH	*RPS6KA2*	2.26	2.09.E-02
MRH	*BCL2L1*	2.00	2.09.E-02
LCH	*ANXA2P3*	0.24	2.10.E-02
MRH	*SCNN1A*	4.16	2.10.E-02
MRH	*LOC100507487*	5.08	2.11.E-02
MRH	*VIT*	5.99	2.11.E-02
LCH	*HIST1H1C*	0.22	2.11.E-02
LCH	*RNU11*	0.14	2.11.E-02
MRH	*CHI3L1*	4.47	2.11.E-02
MRH	*ADAMTS18*	7.15	2.12.E-02
LCH	*GPR18*	0.40	2.13.E-02
MRH	*SERPINF1*	3.09	2.13.E-02
MRH	*MMP2*	5.42	2.13.E-02
LCH	*CDCA3*	0.23	2.13.E-02
LCH	*TCEA1*	0.54	2.14.E-02
MRH	*ASPN*	6.10	2.14.E-02
MRH	*NAT8L*	3.75	2.14.E-02
LCH	*ISG20*	0.30	2.15.E-02
MRH	*SCARB1*	2.63	2.15.E-02
MRH	*KIF13A*	2.54	2.15.E-02
LCH	*UBA6*	0.43	2.16.E-02
LCH	*STIL*	0.25	2.18.E-02
LCH	*GAPT*	0.36	2.19.E-02
LCH	*ALG10*	0.35	2.19.E-02
LCH	*SYTL1*	0.34	2.19.E-02
LCH	*SATB1-AS1*	0.16	2.20.E-02
MRH	*MSC*	3.02	2.20.E-02
LCH	*HIST1H3A*	0.13	2.20.E-02
MRH	*COL6A2*	2.32	2.23.E-02
LCH	*SLFN13*	0.25	2.24.E-02
MRH	*UBE2QL1*	3.42	2.24.E-02
MRH	*PLA2G15*	2.47	2.24.E-02
MRH	*IQCK*	2.36	2.24.E-02

LCH	*DCANP1*	0.25	2.24.E-02
LCH	*MAD2L1*	0.30	2.25.E-02
MRH	*GPRC5B*	2.99	2.27.E-02
LCH	*MACROD2*	0.20	2.27.E-02
MRH	*SLC45A1*	3.69	2.27.E-02
LCH	*TRA2A*	0.56	2.27.E-02
LCH	*TTLL7*	0.20	2.27.E-02
LCH	*XBP1*	0.25	2.30.E-02
LCH	*CDCA5*	0.28	2.30.E-02
LCH	*ALPK2*	0.31	2.33.E-02
MRH	*FKBP9*	2.59	2.34.E-02
LCH	*SCARNA5*	0.13	2.34.E-02
MRH	*XYLT2*	1.73	2.34.E-02
LCH	*SNORD34*	0.16	2.34.E-02
MRH	*ACKR3*	3.23	2.34.E-02
MRH	*CLIC6*	4.37	2.35.E-02
MRH	*SPON2*	3.95	2.35.E-02
LCH	*SNAP25*	0.18	2.35.E-02
MRH	*PLEKHM2*	1.88	2.35.E-02
LCH	*USP18*	0.23	2.35.E-02
MRH	*NTM*	5.72	2.36.E-02
LCH	*PRR11*	0.27	2.36.E-02
LCH	*HCAR2*	0.17	2.36.E-02
MRH	*SYPL2*	3.45	2.37.E-02
LCH	*ZBED2*	0.19	2.37.E-02
LCH	*HLA-DRB5*	0.15	2.37.E-02
LCH	*SBNO2*	0.58	2.37.E-02
MRH	*POSTN*	4.39	2.39.E-02
LCH	*PTTG3P*	0.15	2.39.E-02
LCH	*PSMA6*	0.47	2.39.E-02
LCH	*LDLRAD2*	0.19	2.41.E-02
MRH	*PPL*	6.41	2.42.E-02
LCH	*BCL2L14*	0.15	2.43.E-02
MRH	*IFI27*	3.14	2.43.E-02
LCH	*GNG8*	0.13	2.44.E-02
MRH	*FHL1*	2.24	2.45.E-02
MRH	*IRX6*	5.96	2.46.E-02
LCH	*RNF212*	0.20	2.47.E-02
MRH	*GABRD*	4.28	2.48.E-02
MRH	*MARVELD1*	2.20	2.48.E-02
MRH	*COLEC12*	3.68	2.50.E-02
LCH	*BTK*	0.60	2.51.E-02

LCH	*ANKRD36B*	0.16	2.51.E-02	
LCH	*FUT7*	0.21	2.52.E-02	
MRH	*LRRC37A11P*	7.24	2.52.E-02	
MRH	*KCNK15*	6.52	2.52.E-02	
MRH	*GABRP*	5.48	2.52.E-02	
MRH	*BHLHE22*	4.90	2.52.E-02	
MRH	*MGP*	3.26	2.52.E-02	
MRH	*LBX2-AS1*	2.38	2.52.E-02	
LCH	*EDARADD*	0.52	2.52.E-02	
LCH	*DUSP4*	0.25	2.52.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_B
LCH	*RAD54L*	0.21	2.52.E-02	
LCH	*TEX30*	0.33	2.54.E-02	
LCH	*TMPO*	0.34	2.55.E-02	
LCH	*IFIT3*	0.36	2.60.E-02	
MRH	*DNM1*	3.57	2.61.E-02	
MRH	*LOC101928222*	7.39	2.61.E-02	
MRH	*OSBPL1A*	2.09	2.61.E-02	
MRH	*CUEDC1*	1.98	2.61.E-02	
LCH	*HMBS*	0.57	2.61.E-02	
MRH	*IQSEC3*	4.94	2.62.E-02	
MRH	*HTRA1*	3.69	2.63.E-02	
MRH	*HOXA13*	7.81	2.63.E-02	
MRH	*WWC3*	1.82	2.63.E-02	
LCH	*AKAP5*	0.21	2.63.E-02	
LCH	*ZC3H15*	0.58	2.64.E-02	
LCH	*LRMP*	0.55	2.65.E-02	
MRH	*GPR153*	2.46	2.66.E-02	
LCH	*ANGPT1*	0.22	2.69.E-02	
MRH	*CETP*	5.03	2.70.E-02	
LCH	*CDCA8*	0.27	2.70.E-02	
MRH	*CCDC8*	2.96	2.72.E-02	
LCH	*C1orf112*	0.45	2.72.E-02	
LCH	*CARNS1*	0.36	2.72.E-02	
LCH	*ADGRE1*	0.21	2.72.E-02	
LCH	*CTSG*	0.17	2.72.E-02	
LCH	*RNF138*	0.48	2.73.E-02	
MRH	*CCDC106*	1.95	2.73.E-02	
LCH	*BTLA*	0.19	2.73.E-02	
MRH	*CPXM1*	3.81	2.73.E-02	
LCH	*VNN3*	0.19	2.73.E-02	
MRH	*TLCD2*	2.05	2.73.E-02	
LCH	*LOC101927905*	0.14	2.73.E-02	

LCH	*USP15*	0.55	2.74.E-02
LCH	*EZH2*	0.30	2.74.E-02
LCH	*GCSAM*	0.28	2.74.E-02
LCH	*MKI67*	0.21	2.74.E-02
MRH	*FAXDC2*	2.72	2.74.E-02
LCH	*NTRK3*	0.17	2.74.E-02
LCH	*POLR3G*	0.33	2.76.E-02
LCH	*SMAGP*	0.40	2.76.E-02
MRH	*DDAH2*	2.43	2.78.E-02
MRH	*LMO3*	7.14	2.79.E-02
MRH	*KCNMA1*	3.25	2.79.E-02
LCH	*ATP5S*	0.51	2.79.E-02
MRH	*SLC27A1*	2.44	2.81.E-02
MRH	*SMO*	2.31	2.81.E-02
LCH	*ASF1B*	0.32	2.87.E-02
LCH	*STAP1*	0.29	2.87.E-02
MRH	*LRP5*	2.37	2.87.E-02
MRH	*MARK2P9*	7.29	2.88.E-02
LCH	*RDH14*	0.20	2.88.E-02
LCH	*KCNRG*	0.16	2.88.E-02
MRH	*NOX4*	4.41	2.92.E-02
MRH	*FNDC5*	4.24	2.92.E-02
MRH	*SESTD1*	1.78	2.94.E-02
LCH	*COL9A3*	0.33	2.94.E-02
LCH	*TMEM56*	0.28	2.94.E-02
LCH	*ITGA2*	0.21	2.94.E-02
LCH	*ARG1*	0.14	2.94.E-02
LCH	*ELK2AP*	0.14	2.94.E-02
MRH	*SLC17A7*	6.56	2.95.E-02
LCH	*CCT2*	0.59	2.95.E-02
LCH	*LCP1*	0.41	2.95.E-02
MRH	*TACR2*	3.50	2.95.E-02
MRH	*FABP4*	5.42	2.96.E-02
LCH	*MS4A2*	0.18	2.96.E-02
LCH	*LOC101927438*	0.15	2.96.E-02
MRH	*SCN2B*	5.17	2.97.E-02
LCH	*PAICS*	0.48	2.97.E-02
MRH	*FXYD6*	3.06	2.98.E-02
MRH	*ADAMTSL3*	3.48	3.01.E-02
LCH	*BLZF1*	0.53	3.04.E-02
LCH	*AGBL2*	0.19	3.04.E-02
MRH	*PFN4*	4.45	3.04.E-02

MRH	*C3orf62*	2.14	3.05.E-02
MRH	*TGFBR1*	2.42	3.05.E-02
MRH	*CDC14B*	3.05	3.05.E-02
LCH	*SPAG5*	0.26	3.05.E-02
MRH	*MEOX1*	3.94	3.05.E-02
LCH	*KCTD4*	0.14	3.05.E-02
LCH	*RPRD1A*	0.57	3.07.E-02
LCH	*ABHD13*	0.55	3.07.E-02
MRH	*BNC2*	3.79	3.07.E-02
MRH	*RNF187*	1.77	3.08.E-02
LCH	*DHCR24*	0.48	3.08.E-02
LCH	*TNFRSF18*	0.35	3.08.E-02
LCH	*RAB26*	0.14	3.08.E-02
MRH	*ARHGEF10L*	2.43	3.08.E-02
LCH	*LTB*	0.38	3.08.E-02
LCH	*KIF15*	0.18	3.08.E-02
MRH	*DIP2C*	2.81	3.10.E-02
MRH	*PRKG2*	5.94	3.10.E-02
MRH	*ZBED3-AS1*	3.65	3.11.E-02
LCH	*RFTN1*	0.56	3.12.E-02
MRH	*TENM1*	4.60	3.13.E-02
MRH	*SYNC*	4.35	3.14.E-02
LCH	*RBM38*	0.48	3.14.E-02
MRH	*TMEM129*	1.76	3.16.E-02
LCH	*ODC1*	0.44	3.16.E-02
MRH	*EPYC*	7.37	3.19.E-02
MRH	*HMCN2*	6.07	3.21.E-02
MRH	*TPPP*	4.50	3.21.E-02
LCH	*CDC25A*	0.24	3.22.E-02
LCH	*GIPR*	0.27	3.24.E-02
MRH	*LINC01133*	6.65	3.26.E-02
MRH	*TK2*	1.89	3.26.E-02
LCH	*PROK2*	0.17	3.26.E-02
MRH	*LHX2*	6.17	3.28.E-02
MRH	*ASB13*	1.87	3.28.E-02
LCH	*RASSF5*	0.47	3.28.E-02
LCH	*ITGB2-AS1*	0.24	3.28.E-02
LCH	*SAPCD2*	0.23	3.30.E-02
MRH	*PMP22*	3.17	3.31.E-02
LCH	*SLC9B2*	0.19	3.31.E-02
LCH	*HIST1H3G*	0.14	3.31.E-02
MRH	*C20orf194*	2.12	3.32.E-02

LCH	*LAX1*	0.29	3.35.E-02	
LCH	*FOS*	0.23	3.36.E-02	
MRH	*CCL8*	3.71	3.36.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*TOP1*	0.49	3.36.E-02	
LCH	*PWARSN*	0.30	3.36.E-02	
LCH	*SHC4*	0.17	3.40.E-02	
MRH	*OPN4*	7.04	3.40.E-02	
LCH	*GNAI1*	0.38	3.44.E-02	
LCH	*LOC101927153*	0.14	3.44.E-02	
LCH	*MCTS2P*	0.41	3.46.E-02	
LCH	*STK17A*	0.56	3.46.E-02	
LCH	*NOG*	0.15	3.46.E-02	
MRH	*FGF14-AS2*	4.43	3.47.E-02	
LCH	*DIRAS2*	0.14	3.47.E-02	
MRH	*SFRP2*	5.65	3.47.E-02	
MRH	*LOX*	2.86	3.47.E-02	
LCH	*CTPS1*	0.52	3.47.E-02	
LCH	*PPP1R15B*	0.32	3.47.E-02	
LCH	*HIST1H4H*	0.21	3.47.E-02	
MRH	*CACNB1*	2.65	3.48.E-02	
LCH	*SNORD35B*	0.29	3.48.E-02	
MRH	*OLFML1*	2.68	3.53.E-02	
MRH	*SLC39A7*	2.06	3.53.E-02	
LCH	*MGAM2*	0.14	3.53.E-02	
MRH	*PCDHB14*	3.95	3.53.E-02	
LCH	*MMP12*	0.14	3.54.E-02	
LCH	*RANBP1*	0.51	3.56.E-02	
LCH	*LYPLA2P2*	0.26	3.56.E-02	
MRH	*TMEM255A*	5.71	3.56.E-02	
MRH	*FTH1P3*	4.09	3.56.E-02	
LCH	*HACD2*	0.36	3.56.E-02	
LCH	*DEPDC1*	0.26	3.56.E-02	
LCH	*GTSF1*	0.24	3.56.E-02	
LCH	*CENPE*	0.23	3.56.E-02	
LCH	*SKA3*	0.19	3.56.E-02	
LCH	*CD69*	0.25	3.56.E-02	
MRH	*MYBPH*	5.47	3.57.E-02	
MRH	*ANKRD6*	2.68	3.59.E-02	
LCH	*E2F7*	0.18	3.59.E-02	
MRH	*TMEM43*	1.76	3.60.E-02	
LCH	*NYAP2*	0.14	3.63.E-02	
MRH	*CTSZ*	2.81	3.64.E-02	

MRH	*PLVAP*	1.86	3.64.E-02
LCH	*NLRC4*	0.54	3.64.E-02
LCH	*ZNF660*	0.25	3.64.E-02
LCH	*EBLN2*	0.22	3.64.E-02
LCH	*SNORD94*	0.15	3.64.E-02
MRH	*OGN*	3.81	3.67.E-02
MRH	*PEX5*	1.88	3.67.E-02
MRH	*POLR2E*	2.03	3.68.E-02
LCH	*CXorf21*	0.47	3.68.E-02
LCH	*ATP2A3*	0.44	3.69.E-02
LCH	*P2RY14*	0.24	3.69.E-02
LCH	*RPAP2*	0.55	3.74.E-02
MRH	*BAALC*	4.17	3.74.E-02
LCH	*UBD*	0.45	3.76.E-02
LCH	*TNNT2*	0.16	3.76.E-02
MRH	*DMRT3*	4.47	3.76.E-02
MRH	*CPXM2*	3.44	3.76.E-02
LCH	*AASDH*	0.52	3.76.E-02
LCH	*ENPEP*	0.23	3.79.E-02
MRH	*SERPINE2*	4.07	3.82.E-02
LCH	*POLQ*	0.20	3.82.E-02
MRH	*RAB6B*	2.83	3.82.E-02
LCH	*ZNF714*	0.30	3.84.E-02
MRH	*ZC3H12B*	2.90	3.87.E-02
LCH	*ABCA13*	0.16	3.87.E-02
LCH	*ADGRB1*	0.18	3.88.E-02
MRH	*SEC16B*	2.16	3.88.E-02
LCH	*IL1R2*	0.29	3.91.E-02
MRH	*ADIRF*	3.52	3.91.E-02
LCH	*NUDCD1*	0.52	3.92.E-02
LCH	*PMS1*	0.53	3.93.E-02
LCH	*CLEC6A*	0.16	3.93.E-02
LCH	*CD300A*	0.51	3.94.E-02
MRH	*C1orf127*	2.99	3.94.E-02
LCH	*RAD51*	0.27	3.96.E-02
LCH	*MYO7B*	0.16	3.98.E-02
MRH	*PGPEP1*	2.10	3.99.E-02
LCH	*CXCR2*	0.20	3.99.E-02
LCH	*PRSS57*	0.15	3.99.E-02
LCH	*ZNF215*	0.25	4.01.E-02
LCH	*PLSCR1*	0.48	4.02.E-02
MRH	*ZNF818P*	2.32	4.07.E-02

LCH	*C5orf58*	0.23	4.11.E-02
MRH	*CD81*	1.98	4.14.E-02
LCH	*CKAP2L*	0.26	4.15.E-02
MRH	*ADGRD1*	4.42	4.15.E-02
MRH	*PDGFRL*	5.26	4.16.E-02
MRH	*FBN1*	3.39	4.18.E-02
MRH	*CILP*	6.89	4.19.E-02
LCH	*LDAH*	0.59	4.19.E-02
MRH	*EVC2*	2.20	4.20.E-02
MRH	*CLIP3*	2.05	4.20.E-02
MRH	*ANXA2*	2.27	4.22.E-02
LCH	*LOC101929241*	0.15	4.23.E-02
LCH	*C12orf79*	0.23	4.24.E-02
LCH	*MYL4*	0.26	4.24.E-02
MRH	*THBS2*	3.62	4.26.E-02
LCH	*ATP1A4*	0.15	4.28.E-02
MRH	*LINC00922*	6.87	4.28.E-02
MRH	*DNASE2B*	3.57	4.28.E-02
LCH	*ZNF131*	0.62	4.28.E-02
LCH	*HS3ST3B1*	0.35	4.28.E-02
LCH	*CENPK*	0.33	4.28.E-02
LCH	*KIAA1551*	0.48	4.29.E-02
LCH	*MAP2K6*	0.29	4.29.E-02
MRH	*PAX9*	6.84	4.32.E-02
LCH	*TMA16*	0.56	4.32.E-02
MRH	*NUCB1*	1.98	4.32.E-02
MRH	*C1orf233*	2.02	4.33.E-02
LCH	*NAMPT*	0.30	4.33.E-02
MRH	*PLIN4*	5.55	4.33.E-02
MRH	*PLD3*	3.07	4.33.E-02
MRH	*SULF2*	1.98	4.33.E-02
LCH	*COL27A1*	0.50	4.33.E-02
LCH	*HAL*	0.23	4.33.E-02
LCH	*NFE2*	0.23	4.33.E-02
LCH	*ELOVL3*	0.17	4.33.E-02
MRH	*GPC6*	3.33	4.35.E-02
LCH	*RSAD2*	0.28	4.36.E-02
LCH	*FLRT3*	0.16	4.39.E-02
MRH	*SCN1B*	3.68	4.40.E-02
MRH	*FZD4*	2.20	4.40.E-02
MRH	*EFNA4*	1.97	4.40.E-02
LCH	*TDG*	0.49	4.40.E-02

LCH	*ZFP69B*	0.33	4.40.E-02	
LCH	*CXCL2*	0.19	4.40.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*RBM26*	0.48	4.41.E-02	
LCH	*AP1S3*	0.23	4.41.E-02	
LCH	*MIR4517*	0.15	4.41.E-02	
LCH	*LINC00528*	0.40	4.41.E-02	
MRH	*PCK1*	6.66	4.41.E-02	
LCH	*KCNJ2*	0.45	4.41.E-02	
LCH	*CCDC18*	0.30	4.41.E-02	
LCH	*DPF3*	0.22	4.41.E-02	
LCH	*P2RX2*	0.15	4.41.E-02	
LCH	*PTTG1*	0.34	4.42.E-02	
LCH	*LINC01358*	0.18	4.44.E-02	
LCH	*PAPOLG*	0.58	4.44.E-02	
MRH	*CAPN5*	2.63	4.45.E-02	
LCH	*SCARNA21*	0.17	4.45.E-02	
LCH	*ANKRD26*	0.37	4.45.E-02	
LCH	*MIR17HG*	0.24	4.45.E-02	
LCH	*TNFSF11*	0.19	4.45.E-02	
MRH	*GALNT11*	1.65	4.46.E-02	
LCH	*SRGN*	0.38	4.49.E-02	
LCH	*SNORD35A*	0.27	4.49.E-02	
MRH	*AMOTL1*	2.43	4.51.E-02	
LCH	*C16orf59*	0.28	4.51.E-02	
MRH	*C14orf37*	3.72	4.55.E-02	
LCH	*IL21R-AS1*	0.15	4.56.E-02	
MRH	*EPN1*	1.78	4.57.E-02	
MRH	*JHDM1D-AS1*	2.64	4.59.E-02	
LCH	*FAM64A*	0.29	4.61.E-02	
LCH	*TOMM34*	0.40	4.63.E-02	
LCH	*CPA3*	0.21	4.64.E-02	
MRH	*EPB41L1*	3.17	4.64.E-02	
MRH	*AKR1C1*	4.63	4.65.E-02	
LCH	*NOC3L*	0.40	4.67.E-02	
LCH	*CD274*	0.35	4.68.E-02	
MRH	*ALDH4A1*	1.78	4.70.E-02	
MRH	*CEMP1*	2.42	4.70.E-02	
LCH	*CCSER1*	0.22	4.73.E-02	
MRH	*PHLDB2*	2.91	4.74.E-02	
LCH	*C1orf106*	0.17	4.76.E-02	
LCH	*USP28*	0.56	4.77.E-02	
MRH	*THY1*	3.07	4.78.E-02	

LCH	*SUB1*	0.43	4.78.E-02	
LCH	*CECR6*	0.23	4.78.E-02	
LCH	*MYEOV*	0.25	4.79.E-02	
LCH	*NR4A1*	0.23	4.79.E-02	
LCH	*MAMDC4*	0.34	4.80.E-02	
MRH	*MFAP3L*	3.16	4.82.E-02	
LCH	*SUSD3*	0.38	4.85.E-02	
MRH	*ANGPTL7*	6.62	4.85.E-02	
LCH	*RPS27A*	0.43	4.85.E-02	
LCH	*HUS1B*	0.16	4.87.E-02	
LCH	*ISG15*	0.39	4.91.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*LOC100505715*	0.25	4.91.E-02	
MRH	*SEMA5A*	2.09	4.92.E-02	
LCH	*LOC101927124*	0.16	4.92.E-02	
MRH	*CEBPA-AS1*	2.88	4.95.E-02	
MRH	*KIF13B*	2.31	4.95.E-02	
MRH	*PDGFRB*	2.17	4.95.E-02	
LCH	*CCR3*	0.21	4.96.E-02	
LCH	*SNORD60*	0.16	4.96.E-02	
MRH	*TPPP3*	4.06	4.97.E-02	
MRH	*JPH1*	3.75	4.97.E-02	
LCH	*BRI3BP*	0.41	4.97.E-02	
LCH	*CD1E*	0.20	4.97.E-02	
LCH	*CYP46A1*	0.17	4.98.E-02	
LCH	*PTENP1*	0.46	4.98.E-02	
LCH	*QPCT*	0.32	5.00.E-02	
LCH	*ANP32AP1*	0.46	5.00.E-02	
LCH	*MRPL1*	0.52	5.02.E-02	
MRH	*L3MBTL4*	3.20	5.02.E-02	
LCH	*LCTL*	0.16	5.08.E-02	
MRH	*MLF1*	2.59	5.11.E-02	
LCH	*LOC100129917*	0.25	5.11.E-02	
LCH	*SLC2A3*	0.31	5.14.E-02	
MRH	*EDA*	4.56	5.15.E-02	
MRH	*SIX4*	4.13	5.15.E-02	
MRH	*PBX3*	2.06	5.15.E-02	
MRH	*ZSCAN22*	1.75	5.15.E-02	
LCH	*CKAP2*	0.42	5.15.E-02	
LCH	*KIF18B*	0.23	5.15.E-02	
MRH	*PQLC2L*	6.47	5.16.E-02	
MRH	*NLGN4X*	2.61	5.16.E-02	
LCH	*TK1*	0.29	5.16.E-02	

LCH	*ANXA3*	0.19	5.16.E-02	
MRH	*BCL2L2*	1.93	5.16.E-02	
MRH	*MVK*	1.81	5.16.E-02	
MRH	*TOM1L2*	1.65	5.16.E-02	
LCH	*LUCAT1*	0.27	5.16.E-02	
LCH	*FPR2*	0.21	5.16.E-02	
LCH	*POU5F1P3*	0.26	5.16.E-02	
MRH	*MBD3*	1.64	5.18.E-02	
MRH	*ZDHHC15*	3.38	5.21.E-02	
MRH	*PCDHGA4*	4.03	5.22.E-02	
LCH	*GPR182*	0.16	5.22.E-02	
MRH	*CADPS*	5.62	5.23.E-02	
MRH	*EFEMP1*	3.21	5.23.E-02	
LCH	*ACTR3*	0.56	5.23.E-02	
LCH	*LAD1*	0.20	5.25.E-02	
MRH	*DRAM1*	2.53	5.27.E-02	
MRH	*ZBTB7C*	4.84	5.28.E-02	
LCH	*CCNL1*	0.43	5.28.E-02	
MRH	*ARHGEF37*	3.36	5.31.E-02	
MRH	*ANKRD13B*	2.38	5.31.E-02	
MRH	*SPSB1*	2.37	5.31.E-02	
LCH	*MCEMP1*	0.21	5.31.E-02	
MRH	*TENM3*	2.93	5.33.E-02	
MRH	*EPHX1*	2.38	5.33.E-02	
MRH	*PHLDB1*	2.37	5.33.E-02	
LCH	*HDAC9*	0.29	5.33.E-02	
LCH	*SLC16A1-AS1*	0.27	5.33.E-02	
LCH	*C1QBP*	0.52	5.33.E-02	
LCH	*HDC*	0.20	5.33.E-02	
MRH	*EML1*	2.99	5.34.E-02	
MRH	*FGF16*	6.30	5.34.E-02	
MRH	*FLRT2*	2.41	5.37.E-02	
LCH	*SLFN12*	0.40	5.39.E-02	
MRH	*CBLN2*	6.22	5.42.E-02	
MRH	*FGFR1*	2.55	5.42.E-02	
MRH	*ITGB4*	2.05	5.42.E-02	
LCH	*RASGRP2*	0.38	5.43.E-02	
LCH	*NOXRED1*	0.18	5.44.E-02	
LCH	*IL7R*	0.33	5.44.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A LINDSTEDT_DENDRITIC_CELL_MATURATION_B
LCH	*TUBB1*	0.26	5.44.E-02	
LCH	*C20orf166-AS1*	0.17	5.45.E-02	

MRH	*PLXDC1*	3.70	5.45.E-02
MRH	*SPTBN4*	3.93	5.46.E-02
MRH	*PCDHB16*	3.57	5.46.E-02
LCH	*PLK4*	0.30	5.46.E-02
LCH	*IFITM5*	0.16	5.46.E-02
LCH	*FCRL4*	0.16	5.46.E-02
LCH	*LOC101927178*	0.16	5.48.E-02
MRH	*CCDC89*	4.61	5.50.E-02
LCH	*RAB24*	0.45	5.50.E-02
LCH	*ERC2*	0.16	5.51.E-02
MRH	*RBFOX2*	2.15	5.51.E-02
MRH	*SNTA1*	2.22	5.52.E-02
LCH	*ARHGAP9*	0.49	5.52.E-02
LCH	*NEK8*	0.43	5.53.E-02
LCH	*POGLUT1*	0.57	5.55.E-02
MRH	*LY6H*	5.82	5.60.E-02
MRH	*GALNT13*	5.95	5.60.E-02
LCH	*CCDC42B*	0.16	5.60.E-02
MRH	*LOC400043*	2.70	5.62.E-02
MRH	*FRMD5*	5.13	5.63.E-02
MRH	*SREBF1*	2.31	5.63.E-02
MRH	*ARL8A*	1.72	5.67.E-02
LCH	*LOC102724297*	0.29	5.69.E-02
LCH	*PVT1*	0.35	5.72.E-02
MRH	*ZBTB4*	1.74	5.75.E-02
LCH	*SNORD76*	0.22	5.77.E-02
LCH	*SNORA52*	0.23	5.77.E-02
MRH	*RRBP1*	2.01	5.77.E-02
LCH	*SNORA41*	0.16	5.77.E-02
LCH	*EME2*	0.27	5.78.E-02
MRH	*ADAP1*	2.13	5.80.E-02
LCH	*VRK2*	0.53	5.80.E-02
LCH	*RHOH*	0.40	5.80.E-02
LCH	*IL1A*	0.18	5.80.E-02
MRH	*C6*	5.95	5.80.E-02
MRH	*MGLL*	2.46	5.81.E-02
MRH	*NEBL*	3.39	5.82.E-02
LCH	*RNVU1-19*	0.16	5.82.E-02
MRH	*RDH12*	4.16	5.83.E-02
MRH	*CD151*	2.25	5.84.E-02
LCH	*LOC102724323*	0.28	5.84.E-02
MRH	*KCTD21*	1.77	5.85.E-02

LCH	*PGM2*	0.58	5.85.E-02	
MRH	*IL17D*	4.07	5.85.E-02	
MRH	*GPX1*	2.47	5.85.E-02	
MRH	*SNX21*	2.26	5.85.E-02	
LCH	*NPAS1*	0.20	5.85.E-02	
LCH	*LOC285766*	0.16	5.85.E-02	
MRH	*MSR1*	2.52	5.86.E-02	
MRH	*SMG6*	1.94	5.86.E-02	
LCH	*TRIP13*	0.32	5.88.E-02	
LCH	*HCRTR2*	0.16	5.88.E-02	
LCH	*AGMAT*	0.46	5.88.E-02	
LCH	*LOC400958*	0.17	5.89.E-02	
LCH	*SYCE1L*	0.24	5.89.E-02	
LCH	*C12orf42*	0.22	5.89.E-02	
LCH	*USP45*	0.53	5.89.E-02	
LCH	*TEX14*	0.19	5.99.E-02	
LCH	*RORA-AS1*	0.23	6.01.E-02	
LCH	*PGBD4*	0.43	6.03.E-02	
LCH	*REM2*	0.31	6.03.E-02	
MRH	*ME3*	2.00	6.04.E-02	
MRH	*CENPB*	1.58	6.04.E-02	
LCH	*PUS7L*	0.47	6.04.E-02	
LCH	*MPP7*	0.39	6.04.E-02	
LCH	*LOC729737*	0.35	6.04.E-02	
MRH	*TLR8-AS1*	6.19	6.05.E-02	
MRH	*CHCHD6*	2.74	6.05.E-02	
LCH	*LAT2*	0.57	6.05.E-02	
MRH	*C1QTNF2*	3.71	6.06.E-02	
MRH	*TRAPPC6A*	1.70	6.06.E-02	
MRH	*PTPN21*	2.40	6.06.E-02	
MRH	*SNHG6*	2.02	6.06.E-02	
MRH	*DNAJB2*	1.77	6.06.E-02	
LCH	*SCARF1*	0.45	6.06.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*MEPE*	0.18	6.07.E-02	
MRH	*HDAC11*	2.46	6.08.E-02	
LCH	*SMG1P3*	0.29	6.09.E-02	
MRH	*CTNNA1*	1.59	6.11.E-02	
MRH	*ARMCX4*	2.06	6.12.E-02	
LCH	*LINC00582*	0.18	6.12.E-02	
MRH	*ARHGAP1*	1.69	6.14.E-02	
MRH	*PLAT*	2.55	6.15.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
MRH	*AQP7*	6.09	6.19.E-02	

MRH	*HOTAIR*	5.28	6.19.E-02
MRH	*ARHGEF16*	4.01	6.19.E-02
MRH	*KCTD11*	1.93	6.19.E-02
LCH	*LOC101927730*	0.18	6.19.E-02
LCH	*SNORD110*	0.17	6.19.E-02
MRH	*C3orf18*	2.34	6.19.E-02
LCH	*CGN*	0.17	6.21.E-02
MRH	*SEMA3C*	4.27	6.22.E-02
MRH	*LRRC32*	2.73	6.22.E-02
LCH	*BZW2*	0.56	6.23.E-02
LCH	*SHD*	0.17	6.23.E-02
LCH	*TERT*	0.17	6.23.E-02
LCH	*NUF2*	0.29	6.27.E-02
MRH	*L3MBTL4-AS1*	3.94	6.28.E-02
LCH	*EIF3J*	0.60	6.29.E-02
LCH	*POU4F1*	0.17	6.29.E-02
LCH	*SLC22A16*	0.20	6.30.E-02
MRH	*LOC101929723*	4.69	6.31.E-02
MRH	*NUMBL*	1.95	6.31.E-02
LCH	*PPP4R1L*	0.33	6.32.E-02
MRH	*CXCL14*	4.92	6.33.E-02
MRH	*KCNK2*	5.28	6.34.E-02
LCH	*RBM5-AS1*	0.26	6.34.E-02
MRH	*DHRS9*	3.49	6.37.E-02
LCH	*CLEC4E*	0.27	6.37.E-02
LCH	*NRG1*	0.19	6.37.E-02
LCH	*RNU4ATAC*	0.18	6.38.E-02
MRH	*DIRAS1*	3.46	6.39.E-02
MRH	*LOXL2*	2.38	6.39.E-02
MRH	*ATP6V0A1*	2.17	6.39.E-02
MRH	*LINC00639*	3.28	6.40.E-02
LCH	*RMI1*	0.46	6.41.E-02
MRH	*RARG*	2.88	6.41.E-02
LCH	*AKAP6*	0.24	6.41.E-02
LCH	*DCUN1D1*	0.54	6.44.E-02
LCH	*CXCR1*	0.20	6.45.E-02
MRH	*SLC16A2*	2.33	6.46.E-02
MRH	*SYTL2*	2.17	6.46.E-02
LCH	*P2RX5-TAX1BP3*	0.30	6.46.E-02
LCH	*APOBEC3B*	0.27	6.46.E-02
LCH	*ABHD17A*	0.36	6.47.E-02
LCH	*LINC00664*	0.17	6.48.E-02

LCH	*SRSF10*		0.62	6.48.E-02
MRH	*LAMB1*		2.08	6.50.E-02
LCH	*ARRDC3*		0.46	6.50.E-02
LCH	*GTSE1*		0.28	6.50.E-02
MRH	*TMEM100*		4.19	6.52.E-02
LCH	*LCN12*		0.18	6.52.E-02
LCH	*RELT*		0.54	6.52.E-02
LCH	*APCDD1*		0.32	6.53.E-02
LCH	*MX1*		0.29	6.55.E-02
LCH	*KNTC1*		0.33	6.55.E-02
LCH	*SCRG1*		0.17	6.55.E-02
LCH		*43166*	0.64	6.55.E-02
LCH	*ORC1*		0.25	6.55.E-02
MRH	*GPR176*		2.64	6.56.E-02
MRH	*TACC2*		2.68	6.57.E-02
MRH	*EPB41L2*		2.29	6.57.E-02
LCH	*C17orf96*		0.29	6.58.E-02
LCH	*HIST1H3J*		0.17	6.61.E-02
MRH	*CST2*		5.41	6.63.E-02
MRH	*DCLK1*		2.63	6.63.E-02
MRH	*RTN4R*		3.98	6.63.E-02
MRH	*RAB11FIP5*		2.11	6.63.E-02
LCH	*SPC24*		0.23	6.66.E-02
LCH	*BTG2*		0.38	6.66.E-02
LCH	*MB21D1*		0.53	6.69.E-02
LCH	*DDX5*		0.61	6.70.E-02
LCH	*ZNF726*		0.17	6.70.E-02
LCH	*SPRY4*		0.55	6.70.E-02
LCH	*ALG6*		0.62	6.70.E-02
LCH	*TAL1*		0.41	6.72.E-02
LCH	*NRIP3*		0.31	6.72.E-02
LCH	*IL1RAP*		0.37	6.73.E-02
MRH	*RNF135*		1.99	6.74.E-02
LCH	*ZNF586*		0.42	6.74.E-02
MRH	*KCNJ12*		4.50	6.74.E-02
LCH	*GPR89A*		0.31	6.77.E-02
LCH	*STAG3L5P-PVRIG2P-PILRB*		0.37	6.78.E-02
MRH	*MYH10*		2.27	6.78.E-02
LCH	*RPL41*		0.37	6.78.E-02
LCH	*MLC1*		0.30	6.78.E-02
LCH	*PIF1*		0.29	6.78.E-02

LCH	*EGR1*	0.27	6.78.E-02
MRH	*C15orf40*	1.76	6.80.E-02
LCH	*BORA*	0.39	6.80.E-02
LCH	*SNORD89*	0.41	6.80.E-02
MRH	*LY86-AS1*	4.35	6.83.E-02
LCH	*SNORD45C*	0.17	6.83.E-02
MRH	*UBXN10*	4.17	6.83.E-02
LCH	*STK17B*	0.38	6.83.E-02
MRH	*FAP*	3.96	6.84.E-02
MRH	*RMND5B*	1.67	6.85.E-02
MRH	*BOC*	1.84	6.88.E-02
MRH	*PNMA6A*	5.53	6.88.E-02
MRH	*TMEM37*	3.17	6.89.E-02
MRH	*HSD17B14*	2.77	6.89.E-02
LCH	*MSL1*	0.65	6.89.E-02
LCH	*RNGTT*	0.50	6.89.E-02
LCH	*MX2*	0.41	6.90.E-02
LCH	*PKD1P1*	0.17	6.90.E-02
MRH	*ATP10A*	2.17	6.91.E-02
MRH	*OSBPL5*	1.87	6.92.E-02
LCH	*FAM126B*	0.46	6.92.E-02
MRH	*ADAMTS17*	3.64	6.93.E-02
LCH	*IL2RG*	0.52	6.93.E-02
LCH	*FFAR2*	0.20	6.93.E-02
LCH	*EBLN3*	0.59	6.93.E-02
LCH	*DQX1*	0.21	6.94.E-02
MRH	*SLC46A2*	2.03	6.97.E-02
MRH	*PXDNL*	5.08	6.98.E-02
LCH	*CLSPN*	0.26	6.98.E-02
LCH	*BMP2*	0.31	6.99.E-02
MRH	*HLA-DPB2*	4.25	7.00.E-02
LCH	*NHLRC2*	0.40	7.00.E-02
MRH	*RNASE4*	2.44	7.00.E-02
MRH	*NBPF1*	2.04	7.00.E-02
MRH	*ST3GAL3*	1.70	7.00.E-02
MRH	*PDGFB*	2.10	7.01.E-02
LCH	*SNORD19B*	0.17	7.01.E-02
MRH	*COL5A1*	3.25	7.01.E-02
LCH	*TMEM71*	0.47	7.01.E-02
LCH	*DUSP1*	0.26	7.01.E-02
LCH	*CAMK2N2*	0.17	7.01.E-02
LCH	*SCARNA2*	0.39	7.02.E-02

MRH	*CALCR*	5.03	7.05.E-02
LCH	*HAS2*	0.27	7.05.E-02
LCH	*LINC01531*	0.17	7.05.E-02
MRH	*LOC100506700*	5.87	7.05.E-02
MRH	*TMEM104*	1.79	7.06.E-02
LCH	*ZUFSP*	0.45	7.06.E-02
LCH	*SNORA10*	0.22	7.06.E-02
LCH	*MIR4538*	0.17	7.06.E-02
LCH	*N4BP2*	0.35	7.06.E-02
LCH	*KIFC1*	0.29	7.06.E-02
MRH	*MEOX2*	4.59	7.07.E-02
MRH	*AGPAT4*	2.13	7.09.E-02
MRH	*ZNF704*	2.81	7.10.E-02
LCH	*CCT8*	0.63	7.10.E-02
LCH	*PCDH17*	0.28	7.10.E-02
MRH	*ZDHHC1*	2.76	7.10.E-02
MRH	*CACNA1C*	2.44	7.13.E-02
MRH	*ZNF205*	2.10	7.14.E-02
MRH	*LINC00654*	2.54	7.16.E-02
MRH	*KIF3C*	2.28	7.16.E-02
LCH	*FBXO28*	0.60	7.16.E-02
LCH	*TAF4B*	0.48	7.17.E-02
LCH	*KIF4A*	0.23	7.17.E-02
MRH	*MFGE8*	2.57	7.21.E-02
LCH	*OAS2*	0.36	7.21.E-02
MRH	*PPARG*	2.79	7.22.E-02
LCH	*OTOGL*	0.18	7.26.E-02
LCH	*POLR2M*	0.32	7.27.E-02
LCH	*VAMP1*	0.43	7.28.E-02
MRH	*ZNF703*	2.17	7.29.E-02
MRH	*MAPKAP1*	1.69	7.29.E-02
MRH	*CCDC149*	2.92	7.29.E-02
LCH	*HIST1H3H*	0.23	7.29.E-02
LCH	*SNORD12B*	0.18	7.29.E-02
MRH	*FZD6*	2.07	7.29.E-02
MRH	*ROR1*	3.26	7.34.E-02
LCH	*SNORD5*	0.26	7.35.E-02
MRH	*C2orf15*	4.20	7.37.E-02
MRH	*NAP1L2*	4.97	7.37.E-02
LCH	*SCUBE1*	0.19	7.37.E-02
LCH	*CSF3*	0.21	7.38.E-02
LCH	*PLAC8L1*	0.19	7.38.E-02

LCH	*DENND5B*	0.53	7.38.E-02	
LCH	*NCAM1*	0.21	7.38.E-02	
LCH	*PTPN2*	0.53	7.38.E-02	
LCH	*RPL23A*	0.38	7.39.E-02	
LCH	*PAPOLA*	0.63	7.40.E-02	
LCH	*IL1B*	0.22	7.41.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
MRH	*PDGFD*	3.14	7.41.E-02	
MRH	*WNT2*	5.69	7.41.E-02	
MRH	*IGFBP6*	3.95	7.41.E-02	
MRH	*VSIG4*	2.68	7.41.E-02	
LCH	*SLC35F2*	0.45	7.41.E-02	
MRH	*LOC100130705*	3.12	7.42.E-02	
MRH	*KLC4*	1.71	7.43.E-02	
LCH	*AGPAT9*	0.26	7.45.E-02	
LCH	*GABRE*	0.26	7.50.E-02	
LCH	*EIF2AK2*	0.44	7.50.E-02	
LCH	*RHOF*	0.37	7.51.E-02	
LCH	*NSUN6*	0.51	7.51.E-02	
LCH	*ZNF354B*	0.43	7.51.E-02	
LCH	*LOC101928841*	0.18	7.51.E-02	
MRH	*LLGL1*	1.81	7.52.E-02	
MRH	*RTKN*	2.39	7.53.E-02	
MRH	*NFE2L1*	1.71	7.53.E-02	
MRH	*C9orf69*	1.64	7.53.E-02	
LCH	*CCL17*	0.20	7.53.E-02	
LCH	*RNASE2*	0.24	7.54.E-02	
MRH	*LILRA6*	2.30	7.56.E-02	
MRH	*CSDC2*	5.33	7.57.E-02	
LCH	*IL12B*	0.19	7.57.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*SLC7A11*	0.23	7.59.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*TNFRSF4*	0.38	7.59.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_A
LCH	*SLC39A8*	0.29	7.60.E-02	
MRH	*FAM109B*	1.99	7.61.E-02	
LCH	*CBFA2T3*	0.28	7.65.E-02	
MRH	*TIGD4*	5.16	7.65.E-02	
LCH	*E2F1*	0.37	7.65.E-02	
LCH	*DKK2*	0.22	7.65.E-02	
MRH	*HILS1*	5.57	7.65.E-02	
MRH	*KRT36*	3.83	7.65.E-02	
MRH	*NAP1L3*	3.19	7.65.E-02	
MRH	*CLEC3B*	3.13	7.65.E-02	
MRH	*CD34*	2.27	7.65.E-02	

MRH	*PROS1*	2.25	7.65.E-02
MRH	*SEC22C*	1.54	7.65.E-02
LCH	*MROH1*	0.50	7.65.E-02
LCH	*RELL2*	0.35	7.65.E-02
MRH	*SMKR1*	4.53	7.65.E-02
LCH	*HIST1H3C*	0.18	7.66.E-02
MRH	*IGFL2*	5.60	7.66.E-02
MRH	*MAP4*	1.71	7.66.E-02
MRH	*SPATA18*	3.18	7.66.E-02
MRH	*C11orf68*	2.05	7.66.E-02
MRH	*RAB1B*	1.54	7.66.E-02
LCH	*ZNF692*	0.48	7.66.E-02
MRH	*NPM2*	4.40	7.69.E-02
MRH	*APOE*	3.27	7.69.E-02
LCH	*RNU6-2*	0.19	7.69.E-02
LCH	*NEIL1*	0.29	7.69.E-02
MRH	*TLL1*	3.26	7.70.E-02
LCH	*SRSF7*	0.57	7.70.E-02
MRH	*STMN2*	5.65	7.75.E-02
MRH	*PGM5*	4.30	7.76.E-02
MRH	*DHRS1*	1.81	7.76.E-02
MRH	*CERCAM*	3.25	7.76.E-02
MRH	*CGREF1*	2.93	7.76.E-02
MRH	*NCK1-AS1*	1.96	7.76.E-02
LCH	*NACA2*	0.47	7.82.E-02
MRH	*DFNB59*	2.69	7.85.E-02
MRH	*CHRD*	2.87	7.85.E-02
LCH	*LPAL2*	0.22	7.85.E-02
LCH	*CCNE1*	0.43	7.90.E-02
LCH	*NCAPH*	0.23	7.92.E-02
MRH	*C1orf216*	1.72	7.93.E-02
LCH	*WEE1*	0.44	7.93.E-02
MRH	*SMS*	2.25	7.95.E-02
LCH	*NTNG2*	0.44	7.95.E-02
LCH	*FLRT1*	0.19	7.95.E-02
LCH	*SHANK2*	0.18	7.95.E-02
MRH	*PEG3*	2.54	7.97.E-02
LCH	*C19orf26*	0.31	7.97.E-02
LCH	*HMGB1*	0.56	7.99.E-02
MRH	*TRIM47*	2.21	8.01.E-02
LCH	*HIST1H2BN*	0.24	8.01.E-02
LCH	*MIR631*	0.19	8.05.E-02

MRH	*TMEM200B*	2.59	8.05.E-02
LCH	*YOD1*	0.49	8.06.E-02
MRH	*LINC01096*	5.03	8.06.E-02
MRH	*STARD9*	2.32	8.06.E-02
LCH	*FJX1*	0.40	8.06.E-02
LCH	*HELLS*	0.30	8.06.E-02
LCH	*SNORA9*	0.26	8.06.E-02
MRH	*C22orf46*	2.13	8.07.E-02
LCH	*RAB8B*	0.58	8.09.E-02
MRH	*ADAM12*	3.33	8.10.E-02
LCH	*CAAP1*	0.59	8.10.E-02
MRH	*CRTAP*	2.30	8.12.E-02
MRH	*CISH*	2.18	8.14.E-02
LCH	*MIR3916*	0.33	8.14.E-02
LCH	*KIAA0895L*	0.35	8.14.E-02
LCH	*RTKN2*	0.34	8.14.E-02
MRH	*TPBG*	2.43	8.15.E-02
LCH	*RPS15AP10*	0.22	8.15.E-02
MRH	*TSKU*	2.80	8.16.E-02
LCH	*SKP1P2*	0.41	8.16.E-02
LCH	*HIST1H2AH*	0.18	8.16.E-02
MRH	*ITGB5*	2.50	8.16.E-02
LCH	*PAXBP1*	0.56	8.16.E-02
LCH	*CEP78*	0.46	8.16.E-02
LCH	*DKFZP434I0714*	0.35	8.16.E-02
LCH	*DOK7*	0.23	8.16.E-02
LCH	*RASGRF1*	0.32	8.16.E-02
LCH	*GPR183*	0.23	8.16.E-02
MRH	*LOC283335*	3.00	8.17.E-02
LCH	*SUZ12*	0.52	8.17.E-02
LCH	*ZNF793-AS1*	0.20	8.17.E-02
MRH	*FAM174B*	2.44	8.17.E-02
MRH	*ZNF521*	2.14	8.17.E-02
LCH	*PDSS1*	0.45	8.17.E-02
LCH	*SP140*	0.43	8.17.E-02
MRH	*AXIN2*	2.44	8.20.E-02
MRH	*LTBP4*	2.31	8.20.E-02
LCH	*HBG2*	0.19	8.20.E-02
MRH	*SHISA6*	5.24	8.21.E-02
LCH	*HORMAD1*	0.18	8.23.E-02
LCH	*MIR181A1HG*	0.18	8.24.E-02
MRH	*TTLL1*	1.96	8.29.E-02

MRH	*ITFG3*	1.83	8.32.E-02
LCH	*ARMC12*	0.23	8.32.E-02
LCH	*IL21-AS1*	0.18	8.33.E-02
LCH	*POM121L9P*	0.27	8.35.E-02
LCH	*LACTB2-AS1*	0.18	8.35.E-02
MRH	*RCN3*	2.46	8.35.E-02
LCH	*ST6GAL1*	0.61	8.35.E-02
MRH	*CTSF*	2.91	8.36.E-02
LCH	*TSPAN32*	0.37	8.36.E-02
LCH	*PTEN*	0.66	8.38.E-02
LCH	*BMP3*	0.18	8.38.E-02
MRH	*TTC8*	2.21	8.41.E-02
MRH	*TNFSF14*	1.99	8.43.E-02
MRH	*ANKRD35*	3.13	8.44.E-02
MRH	*RHOBTB2*	1.84	8.44.E-02
LCH	*IGBP1P1*	0.33	8.44.E-02
LCH	*HIST1H3F*	0.18	8.44.E-02
LCH	*DONSON*	0.52	8.44.E-02
LCH	*ATAD5*	0.30	8.44.E-02
LCH	*SHISA8*	0.23	8.44.E-02
LCH	*SNORD59B*	0.19	8.44.E-02
LCH	*KIF25*	0.18	8.44.E-02
LCH	*TCL1B*	0.18	8.44.E-02
LCH	*TPD52*	0.49	8.45.E-02
MRH	*MTCL1*	2.64	8.46.E-02
LCH	*MPHOSPH9*	0.45	8.46.E-02
MRH	*LINC00346*	2.83	8.50.E-02
LCH	*RGS1*	0.26	8.50.E-02
LCH	*TXNDC9*	0.65	8.53.E-02
LCH	*CCNE2*	0.35	8.55.E-02
MRH	*RARRES1*	3.87	8.55.E-02
MRH	*PSMG3-AS1*	2.03	8.57.E-02
LCH	*HMGA1*	0.50	8.57.E-02
LCH	*SERPINA1*	0.49	8.57.E-02
LCH	*GHRLOS*	0.26	8.57.E-02
LCH	*COQ3*	0.48	8.58.E-02
MRH	*FAM43B*	3.67	8.58.E-02
LCH	*FIGNL1*	0.44	8.58.E-02
LCH	*ZNF772*	0.45	8.64.E-02
MRH	*COPZ2*	3.18	8.64.E-02
MRH	*PNMAL2*	2.80	8.67.E-02
MRH	*ORMDL3*	1.55	8.67.E-02

LCH	*RAB3IP*	0.43	8.67.E-02
LCH	*BCL7A*	0.31	8.67.E-02
LCH	*NRXN3*	0.21	8.67.E-02
LCH	*NEURL1*	0.28	8.68.E-02
MRH	*ARHGAP28*	2.71	8.77.E-02
MRH	*GOLIM4*	1.90	8.77.E-02
LCH	*GTF2F2*	0.65	8.80.E-02
LCH	*BFSP2*	0.21	8.80.E-02
MRH	*SPON1*	3.98	8.83.E-02
LCH	*USP16*	0.65	8.89.E-02
MRH	*ADAMTS12*	3.20	8.89.E-02
MRH	*COL11A2*	2.27	8.89.E-02
MRH	*CALHM2*	1.97	8.89.E-02
MRH	*PI4K2A*	1.86	8.89.E-02
LCH	*RPL7L1*	0.56	8.90.E-02
LCH	*RDH5*	0.28	8.90.E-02
MRH	*CYP4V2*	1.85	8.92.E-02
MRH	*PTPRA*	1.54	8.92.E-02
MRH	*LTBP2*	3.29	8.94.E-02
LCH	*PHACTR1*	0.35	8.95.E-02
LCH	*MPP6*	0.30	8.95.E-02
LCH	*GREM1*	0.25	8.96.E-02
MRH	*CFB*	2.62	8.96.E-02
LCH	*CLUHP3*	0.38	8.96.E-02
LCH	*ADRA1A*	0.19	8.98.E-02
LCH	*PTPN22*	0.39	9.02.E-02
LCH	*ZBTB24*	0.56	9.04.E-02
MRH	*PRSS3*	5.40	9.04.E-02
MRH	*MED29*	1.52	9.04.E-02
LCH	*C6orf201*	0.20	9.04.E-02
LCH	*PPP1R13B*	0.53	9.05.E-02
LCH	*KIAA1324*	0.38	9.06.E-02
MRH	*ACVRL1*	1.94	9.09.E-02
LCH	*BRCA1*	0.39	9.09.E-02
LCH	*FAM83F*	0.19	9.09.E-02
LCH	*SNORD27*	0.19	9.10.E-02
LCH	*EME1*	0.27	9.10.E-02
MRH	*CMTM3*	1.68	9.11.E-02
MRH	*FBXO31*	1.62	9.11.E-02
LCH	*UBE4A*	0.59	9.11.E-02
LCH	*C9orf72*	0.56	9.11.E-02
LCH	*MARS2*	0.40	9.11.E-02

LCH	*INSL3*	0.32	9.11.E-02	
LCH	*C19orf35*	0.27	9.11.E-02	
LCH	*USH2A*	0.19	9.11.E-02	
LCH	*BTBD10*	0.65	9.12.E-02	
MRH	*GALNT2*	1.81	9.13.E-02	
LCH	*UCKL1-AS1*	0.26	9.13.E-02	
MRH	*PDE5A*	2.51	9.13.E-02	
LCH	*NOP58*	0.59	9.16.E-02	
LCH	*IL21R*	0.36	9.16.E-02	
LCH	*IFI44L*	0.27	9.16.E-02	
LCH	*P2RY13*	0.54	9.17.E-02	
LCH	*VPS9D1-AS1*	0.32	9.17.E-02	
MRH	*MACROD1*	2.28	9.17.E-02	
LCH	*TNFRSF9*	0.29	9.17.E-02	LINDSTEDT_DENDRITIC_CELL_MATURATION_B
MRH	*TOLLIP*	1.58	9.18.E-02	
LCH	*ESPL1*	0.28	9.18.E-02	
LCH	*TBX1*	0.23	9.18.E-02	
MRH	*LRRC20*	1.97	9.18.E-02	
LCH	*BAMBI*	0.29	9.20.E-02	
LCH	*TTC39B*	0.54	9.20.E-02	
LCH	*HOXB4*	0.52	9.20.E-02	
MRH	*KIAA1549*	2.57	9.24.E-02	
LCH	*TOP3B*	0.52	9.24.E-02	
LCH	*HIST1H2BC*	0.28	9.24.E-02	
LCH	*POLE2*	0.24	9.24.E-02	
MRH	*LINC01311*	3.45	9.25.E-02	
LCH	*ARL5B*	0.38	9.26.E-02	
MRH	*CDX1*	4.40	9.27.E-02	
MRH	*ZDHHC7*	1.71	9.28.E-02	
LCH	*AHI1*	0.57	9.28.E-02	
LCH	*ZNF518B*	0.49	9.28.E-02	
LCH	*GPR31*	0.19	9.28.E-02	
MRH	*LINC01150*	2.91	9.29.E-02	
MRH	*CD28*	2.81	9.30.E-02	
LCH	*ZNF816*	0.49	9.30.E-02	
LCH	*LINGO3*	0.32	9.30.E-02	
LCH	*NME2*	0.41	9.31.E-02	
LCH	*MCTP2*	0.33	9.33.E-02	
MRH	*COL12A1*	3.07	9.34.E-02	
LCH	*SEMA4A*	0.39	9.39.E-02	
LCH	*TICRR*	0.24	9.39.E-02	
MRH	*HRAS*	1.94	9.39.E-02	

LCH	*LIPG*	0.25	9.39.E-02
LCH	*DNAAF1*	0.20	9.43.E-02
LCH	*AURKA*	0.36	9.43.E-02
LCH	*RGS18*	0.40	9.47.E-02
LCH	*SPTSSB*	0.21	9.52.E-02
LCH	*SLC26A4*	0.19	9.52.E-02
MRH	*ZFYVE21*	1.85	9.55.E-02
MRH	*TLDC1*	1.84	9.55.E-02
LCH	*HIST2H2AB*	0.21	9.55.E-02
MRH	*FIBIN*	3.35	9.55.E-02
LCH	*GBA3*	0.19	9.57.E-02
LCH	*KRT15*	0.20	9.59.E-02
LCH	*WNT4*	0.26	9.59.E-02
MRH	*EPHA1*	2.71	9.61.E-02
MRH	*FKBP8*	1.59	9.61.E-02
LCH	*BZW1*	0.57	9.63.E-02
MRH	*MAMSTR*	2.24	9.63.E-02
LCH	*RPS13*	0.48	9.64.E-02
LCH	*KISS1R*	0.20	9.70.E-02
MRH	*PDPN*	3.30	9.70.E-02
MRH	*MOSPD3*	1.97	9.71.E-02
MRH	*ADAMTS7P1*	4.93	9.72.E-02
MRH	*TMEM119*	2.99	9.72.E-02
LCH	*UNC13D*	0.60	9.72.E-02
MRH	*CBR1*	1.93	9.74.E-02
MRH	*ENDOV*	1.78	9.75.E-02
LCH	*SYN3*	0.20	9.75.E-02
MRH	*PRSS23*	2.49	9.77.E-02
MRH	*HSF4*	2.36	9.80.E-02
MRH	*CYB5D2*	2.02	9.82.E-02
MRH	*CLSTN3*	2.30	9.84.E-02
MRH	*JAKMIP2*	3.52	9.88.E-02
LCH	*CD1D*	0.51	9.88.E-02
LCH	*LOC388813*	0.19	9.89.E-02
MRH	*HABP4*	2.22	9.90.E-02
MRH	*PIGQ*	1.51	9.90.E-02
LCH	*TMEM56-RWDD3*	0.19	9.90.E-02
MRH	*ARHGEF10*	1.98	9.91.E-02
MRH	*LRIG1*	2.33	9.91.E-02
MRH	*PALMD*	2.31	9.91.E-02
MRH	*FHOD3*	2.64	9.91.E-02
MRH	*PKI55*	2.36	9.91.E-02

LCH	*PCF11*	0.59	9.91.E-02
LCH	*ASNS*	0.47	9.91.E-02
MRH	*KCNJ5*	4.05	9.92.E-02
LCH	*CXCL3*	0.24	9.95.E-02
MRH	*ETV2*	2.93	9.95.E-02
MRH	*RNF220*	1.48	9.95.E-02

Supplemental Table 6. Treatment schema and dose of JLSG-02 induction A therapy

Drug	Dose	Administration days
Cytarabine	100 mg/m^2/day	Days 1–5, 15–19, and 29–33
Vincristine	0.05 mg/kg/day	Days 1, 15, and 29
Prednisolone	2 mg/kg/day	Days 1–28
	1 mg/kg/day	Days 29–35
	0.5 mg/kg/day	Days 36–42