

## **Supplementary Data**

### **Footprint-free human fetal foreskin derived iPSCs: a tool for modeling hepatogenesis associated gene regulatory networks.**

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### **Supplementary Figure S1: Global gene analysis.**

(A) Heatmap of cytochrome P450 family members. The transcriptome profile of the following samples were compared: mature liver (PHH), fetal liver, Hepatocyte-like cells derived from E-iPSCs (HLC), hepatic endoderm derived from E-iPSCs (HE), definitive endoderm derived from E-iPSCs (DE), E-iPSCs (iPSC\_B1). (B) 100 k-means cluster are listed. The used k-means cluster for figure 4B are marked with asterisk. One asterisk = iPSC k-means cluster, two asterisk = DE k-means cluster, three asterisk = HE k-means cluster, four asterisk = HLC k-means cluster, five asterisk = fetal liver k-means cluster and six asterisk = PHH k-means cluster. (C) Heatmap of ABC transporter-related genes. The transcriptome profile of the following samples were compared: mature liver (PHH), fetal liver, Hepatocyte-like cells derived from E-iPSCs (HLC), hepatic endoderm derived from E-iPSCs (HE), definitive endoderm derived from E-iPSCs (DE), E-iPSCs (iPSC\_B1). (D) Heatmap of bile acid transporter-related genes. The transcriptome profile of the following samples were compared: E-iPSCs (iPSC\_B1), definitive endoderm derived from E-iPSCs (DE), hepatic endoderm derived from E-iPSCs (HE), Hepatocyte-like cells derived from E-iPSCs (HLC). (E) Heatmap of HIPPO pathway-related genes. The transcriptome profile of the following samples were compared: mature liver (PHH), fetal liver, Hepatocyte-like cells derived from E-iPSCs (HLC), hepatic endoderm derived from E-iPSCs (HE), definitive endoderm derived from E-iPSCs (DE), E-iPSCs (iPSC\_B1). A scheme of the HIPPO signaling pathway is shown.

### **Supplementary Figure S2: Liver specification.**

(A) KEGG pathway analysis of HLC-tissue specific genes resulted in the listed pathways. For that a DAVID analysis was done from the exclusively expressed genes in HLCs from the venn diagram in figure 6A (838 genes from Supp Table 6). (B) Pie chart illustrating tissue distribution of genes exclusively expressed in HLCs. The list of exclusively expressed genes in HLCs (from venn analysis figure 5A) was analysed employing the PaGenBase database. PaGenBase is a database for the collection of tissue- and time-specific pattern genes, including specific genes, selective genes, housekeeping genes and repressed genes (Pan et al. 2013; <http://bioinf.xmu.edu.cn/PaGenBase/>).

### **Supplementary Figure S3: Comparison of gene expression of a-priori-known stage-specific markers in multiple pluripotent stem cell lines differentiated into HLCs leading to the central transcription factor network.**

(A) heatmap of the stage specific markers listed in Supplementary Figure S5A from this study (Figure 6B), (B) unpublished data of differentiating ES into HLCs related to the study by Jozefczuk et al.<sup>1</sup> and (C) published data from the study by Jozefczuk et al.<sup>1</sup> differentiating iPSCs into HLCs.

### **Supplementary Figure S4: Gene regulatory networks.**

This figure presents clusters associated with the gene regulatory networks from Figure 4B (transcription factor over-representation analysis via the oPOSSUM data base, Kwon et al. 2012). (A) The network for iPSCs shows the regulatory relations between OCT4 (POU5F1), SOX2, NANOG, KLF4. (B) The network for DE demonstrates the regulatory relations between SP1, INSM1, MZF1, KLF4 and REST. (C) The network for HE represents the regulatory relations between LHX3, MIZF and CTCF. (D) The network for HLC illustrates the regulatory relations between PLAG1, EWSR1-FLI1 and IRF2. (E) The network for fetal liver shows the regulatory relations between TAL1::GATA1, HNF1A, ZFN143, GATA1 and HNF1B. (F) The network for primary human hepatocytes (PHH) represents the regulatory relations between HNF1A, CTCF, ZFX, HNF4A, FOXA2, FOXA1 and CEBPA.

### **Supplementary Figure S5: Scheme for construction of the hepatocyte differentiation transcription factor network.**

(A) A-priori-known markers refer to the stages iPSC/ESC (red), DE (yellow), HE (blue) and HLC (green) in the gene expression data and at least one additional cell line. Transcription factor analysis via oPOSSUM3 delivers transcription factors regulating this gene set. (B) Z-score from oPOSSUM3-analysis is plotted vs. GC content. Myc, HNF1A, HNF4A, SP1, MZF1 and KLF4 are most significant with the highest Z-scores greater than 10. (C) The most significant transcription factors with a Z-score greater than 10 (green) are connected with the genes they regulate (red) from the list (A).

### **Supplementary Tables**

#### **Supplementary Table S1: KeyGenes corresponding to Figure 4E.**

(A) KeyGenes prediction matrix. KeyGenes Identity score of the queried samples Hepatocyte-like-cells (HLCs), fetal liver and primary human hepatocyte (PHH) to the samples from the training set. (B) KeyGenes classifier genes. Genes determined by the KeyGenes tool as classifiers for the tissue types provided in the training set.

#### **Supplementary Table S2: Gene lists of venn diagram Figure 5A.**

Gene names of all expressed genes in hepatocyte-like cells (HLCs), HLCs and fetal liver, fetal liver, fetal liver and primary hepatocytes (PHH), in PHH, PHH and HLCs as well as genes which were expressed in all samples. Gene list relates to venn diagram in Figure 5A.

#### **Supplementary Table S3: Gene list of exclusively expressed genes in HLCs.**

List of gene names related to figure 5B GO cellular components of HLCs exclusively expressed genes (Fisher extract  $p < 0.01$ ). Data set from venn diagram figure 5A genes which were exclusively expressed in HLCs (1806 genes, Supplementary Table S2) were used for this analysis in DAVID.

**Supplementary Table S4: Gene lists of the venn diagram Figure 5C.**

Gene names of all expressed genes in hepatocyte-like cells (HLCs) vs. fetal liver, fetal liver vs. primary hepatocytes (PHH) and HLCs vs. PHH as well as genes expressed in the intersection and in all samples. Gene list relates to venn diagram in Figure 5C.

**Supplementary Table S5: Gene list related to Hippo pathway.**

List of gene names related to figure 5D GO cellular components of Hippo pathway in the intersection of HLCs vs. fetal liver and HLCs vs. PHH (Fisher extract  $p < 0.01$ ). Data set from venn diagram Figure 5C genes which were expressed in HLCs vs. fetal liver and HLCs vs. PHH (1958 genes, Supplementary Table S4) were used for this analysis in DAVID.

**Supplementary Table S6: Gene lists of the venn diagram Figure 6A.**

Gene names of all expressed genes in definitive endoderm (DE), hepatic endoderm (HE) and hepatocyte-like cells (HLCs) as well as genes which were expressed in the intersections and in all samples. Gene list relates to venn diagram in Figure 6A.

**Supplementary Table S7: List of genes used for heatmaps in Supplementary Figure S3 and regulatory network analysis via oPOSSUM data base.**

List of priori-known markers refer to the stages iPSC/ESC (red), DE (yellow), HE (blue) and HLC (green) in the gene expression data and at least one additional cell line.

**Supplementary Table S8: Regulatory network analysis via oPOSSUM data base.**

List of transcription factors (TFs) with their classification, JASPAR ID, target gene hits, transcription factor binding site (TFBS) hits and Z-score. The oPOSSUM database (Kwon et al. 2012) was used. TFs list relates to Figure 6C.

**Supplementary Table S9: Gene lists of a venn diagram.**

Gene names of all expressed genes in hepatocyte-like cells (HLCs) vs. induced pluripotent stem cells (iPSCs), fetal liver vs. iPSCs and PHH vs. iPSCs as well as genes which were expressed in the intersections or all samples generated via venn diagram analysis.

Differences and commonalities between HLCs, fetal liver and PHH are assessed by statistical tests vs. iPSCs and pairwise statistical tests of the three experiments vs. each other. Most genes (4953) are in the intersection set common to all three experiments. Pairwise intersections fetal liver/PHH have 2823 genes, HLCs/PHH 1699 genes and HLCs/fetal liver 988 genes

**Supplementary Table S10: Antibody list.**

List of antibodies used for immunofluorescence-based staining of cells.

### **Supplementary Table S11: Quantitative real-time PCR (qPCR) primer sequences.**

List of primer sequences used for quantitative real-time PCR.

## **Supplemental Methods**

### **Immunofluorescence-based detection of proteins**

The cells were fixed, permeabilized and stained for immunofluorescent imaging as described by Matz and Adjaye<sup>2</sup>. The list of primary and secondary antibodies used is provided in Supplementary Table S9. Nuclei were counter-stained with DAPI (100 ng/ml, Vector Laboratories, Burlingame, CA, USA, [www.vectorlabs.com](http://www.vectorlabs.com)). The fluorophores on the secondary antibodies were visualized using a Zeiss, LSM 510 Meta confocal microscope with a connected camera for microscopy model AxioCam ICc3 and the software Axiovision 4.6.

### **Quantitative Real-Time Polymerase Chain Reaction**

The Quantitative Real-Time Polymerase Chain Reaction (qPCR) was performed in 384-well Optical Reaction Plates (Applied BioSystems, Foster City, CA, <http://www.appliedbiosystems.com>). Reactions were carried out on the ABI PRISM 7900HT Sequence Detection System (Applied BioSystems) as previously described<sup>3</sup>. The amplifications were carried out in triplicates per gene with three wells as negative controls without template. *GAPDH* and  $\beta$ -*ACTIN* were amplified along with the target genes as endogenous control for normalization. The last heating step was performed with a ramp rate of 2% in order to generate a dissociation curve of the qPCR product. The output data generated by the SDS 2 software (Applied BioSystems) were transferred to MS Excel (Microsoft) for analysis. The differential mRNA expression of each gene was normalized against the *GAPDH* mRNA expression in the respective samples and calculated using the comparative Ct (threshold cycle) method ( $\Delta\Delta$ Ct method). Commercial bought fetal liver (Clontech, #636540) and PHH (Clontech, #636531) RNA was used. All primers which were used are listed in Supplementary Table S11.

### **Microarray -Based Gene Expression Analysis**

Quality of experiments at the bead-summary level is controlled by calculation of the Pearson correlation coefficient between all experiments vs. each other. These coefficients are condensed in a table marking value ranges of the correlation coefficients in different colors to enable detection of outliers. Additionally, a dendrogram is generated via the *plotSampleRelation* method from the R/Bioconductor lumi package to enable comparison of similarities between experimental samples and outlier finding by obvious mis-alignments in the dendrogram<sup>3-5</sup>.

Stage specific genes are determined via comparisons of subsequent differentiation stages: DE vs. E-iPSCs, HE vs. DE, HLCs vs. HE, Fetal liver vs. HLCs and PHH vs. fetal liver. Differentially up-

regulated genes in these comparisons are found with the criteria a) Illumina detection p-value  $< 0.05$  in the test case, b) ratio  $> 1.3333$  and c) limma-p-value  $< 0.05$  and limma-q-value  $< 0.05$ . Differentially down-regulated genes in these comparisons are found with the criteria a) Illumina detection p-value  $< 0.05$  in the control case, b) ratio  $< 0.75$  and c) limma-p-value  $< 0.05$  and limma-q-value  $< 0.05$ . The differentially expressed genes are subjected to pathway analysis via Consensus Path DB <sup>6</sup>.

Cytochromes, ABC transporter genes and several other transporter genes were filtered from the microarray experiments of iPSCs, definite endoderm (DE), hepatic endoderm (HE), hepatocyte-like cells (HLCs), fetal liver and primary human. Heat maps of these clusters were generated via the `heatmap2` function from R using Euclidean distance as distance measure.

Genes differentially expressed in HLCs vs. E-iPSCs, fetal liver vs. E-iPSCs and PHH vs. E-iPSCs were compared via a Venn diagram. Differential expression was termed significant if a) limma-p-value  $< 0.05$  and limma-q-value  $< 0.05$ , b) detection-p-value  $< 0.05$  at least in one of both conditions and c) ratio  $< 0.75$  or ratio  $> 1.33$ .

In order to detect differences between the three experiments in more detail an analysis of variance (ANOVA) was employed to filter genes followed by pairwise t-tests. Genes were termed significant if a) anova-p-value  $< 0.05$  and anova-q-value  $< 0.05$ , b) t-test p-value  $< 0.05$  and t-test q-value  $< 0.05$  and c) detection-p-value  $< 0.05$  at least in one of both conditions.

#### *K-means clustering and analysis of differentiation-stage-specific clusters*

Expression profiles of all genes are analyzed via k-means clustering. In order to achieve a sufficient granularity  $k=100$  clusters are conceived. The *kmeans* clustering algorithm from the R/Bioconductor environment is applied for this task. The result of the clustering analysis is an association table of Illumina probes and genes to the 100 clusters. Plots of mean and standard deviation of all genes' expression over all HLC differentiation phases are condensed for all clusters. Heatmaps of these clusters are generated via the `heatmap2` function from R.

Stage-specific clusters containing genes which are prominently expressed in dedicated stages of the differentiation were extracted from the k-means clustering. Five clusters were selected representing stages iPSC (containing POU5F1), definite endoderm (containing SOX17), hepatic endoderm, hepatocyte-like cells, fetal liver (containing AFP) and primary human hepatocyte (containing ALB). The gene sets from these clusters were subjected to transcription factor analysis via oPOSSUM3 <sup>7</sup> single site analysis using default parameters with the exception of restricting the amount of upstream / downstream sequence to 2000/2000 bases. Networks were drawn via the R package *network* scaling transcription factor nodes proportional to the oPOSSUM z-score and using a threshold of  $z > 3$ .

microRNA analysis is based upon TargetScan 6.2 predictions <sup>8</sup>. Genes from stage-specific k-means clusters are analysed for over-representation in gene sets regulated by the same microRNA. P-values are calculated via the hypergeometric test. False-Discovery rate is assessed using q-values <sup>9</sup>. P-values and q-values  $< 0.05$  are marked in red.

### *Tissue type prediction*

In order to check the tissue type of the HLCs the application of a tissue prediction tool was considered. At the time when this manuscript was written the CellNet<sup>10</sup> tool was not able to test data from the Illumina Human HT12 platform. Therefore it was decided to use the tool KeyGenes<sup>11</sup>. Although KeyGenes was developed for Next-Generation-Sequencing data there it provides the possibility to generate own training sets. A training was set up to fit the Illumina Human platform thus avoiding technical bias introduced by differing microarray platforms. Data sets for the Illumina human platform were downloaded from NCBI GEO for tissues brain (GSE29378)<sup>12</sup>, kidney (GSE43974)<sup>13</sup>, lung (GSE63459), intestine (GSE48634), heart (GSE64189) and liver (GSE25744)<sup>14</sup>. These data sets were normalized via quantile normalization from the R/Bioconductor<sup>4</sup> package preprocessCore and transformed to a logarithmic scale (base 2). The training data set was generated from them via the R script provided at the KeyGenes web site (www.keygenes.nl)<sup>12</sup>. The test set was produced by filtering genes from k-means cluster 9 which had a peak at HLC from the quantile normalized log2-transformed Illumina data. HLCs, fetal liver and primary human hepatocytes samples were used for the test set.

### *Analysis of tissues associated with expressed genes*

Association of genes' expression with tissues was retrieved from the PaGenBase database version 1.0<sup>15</sup>. The collection of datasets for specific genes for Homo sapiens/tissue was used for this analysis thus basing it on a combination of microarray and next-generation sequencing data. Genes exclusively expressed (detection p-value<0.05) in HLC cells but not in DE cells and not in HE cells were mapped to PaGenBase tissues.

### *Transcription factor analysis*

The oPOSSUM database<sup>7</sup> was downloaded in June 2014 and Single Site Analysis was performed on this local instance to detect over-represented conserved transcription factor binding sites in a set of progenitor associated genes. This analysis was parameterized to use species "human", 2000 base pairs upstream and downstream each, use only JASPAR Transcription Factor Binding Site (TFBS) profile matrices which belong to the tax group "vertebrates", a minimum relative TFBS position weight matrix (PWM) score of 0.85 and a minimum information content (specificity) of JASPAR TFBS profile matrices of 8.

The network was drawn based on the results of the oPOSSUM analysis using only transcription factors surpassing a predefined for the Z-Score. The Z-Score shows if in the investigated up- and

downstream regions of the set of genes there are more TFBS than in the background. For Supp. Fig. 3 we used a threshold of 3 while for fig. 6 we used a relatively restrictive threshold of 10 to focus on the core regulatory network. For all transcription factors above this threshold we extracted the conserved binding sites from the oPOSSUM analysis output and connected them with the transcription factor itself as edges in the graph. For the drawing and layout of the graph we employed the R package *network* (<http://www.jstatsoft.org/v24/i02/paper> (Accessed February 26, 2015) <sup>16</sup> which was instructed to draw red circles for genes and green circles with sizes corresponding to the Z-scores for the transcription factors.

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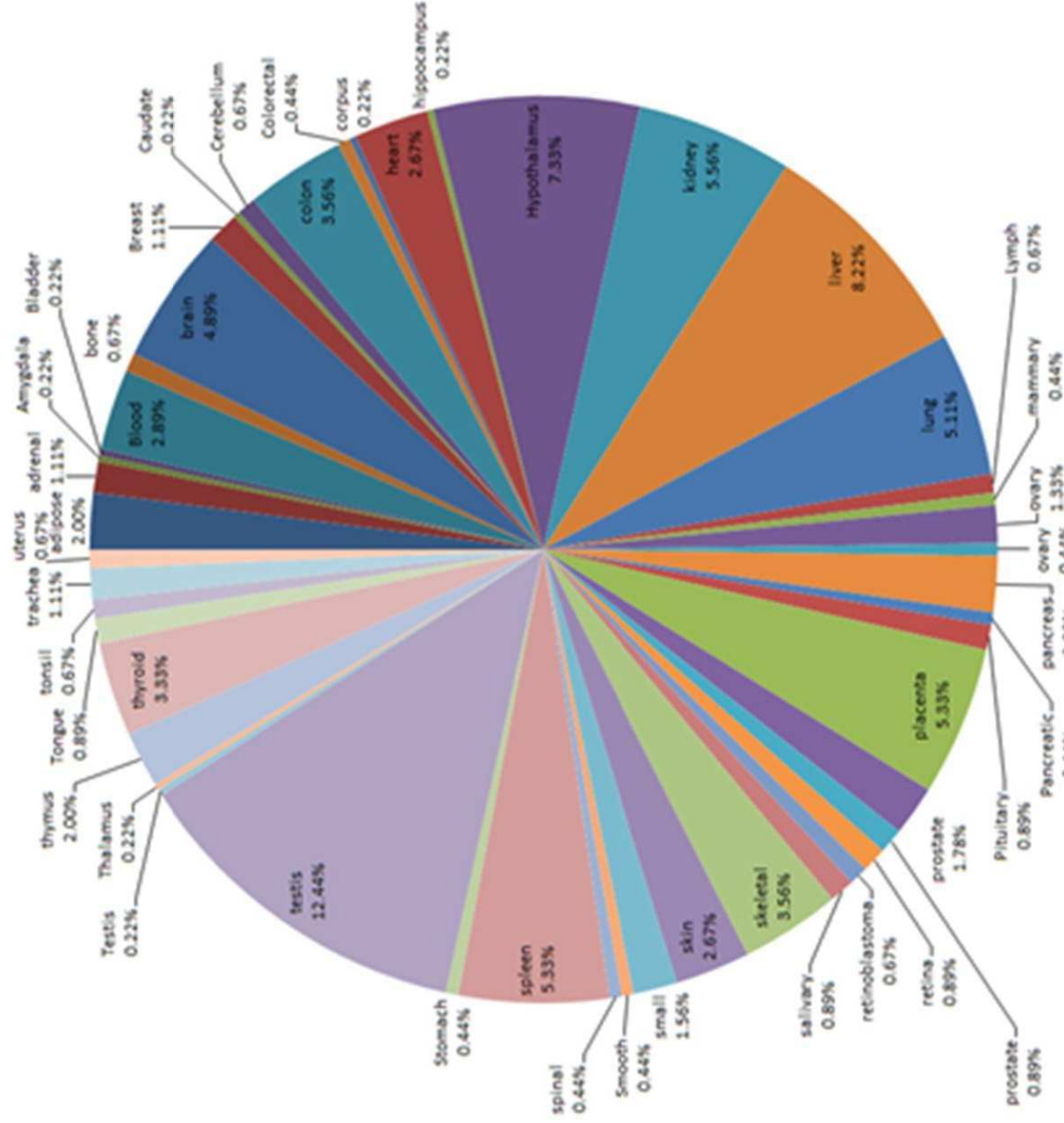


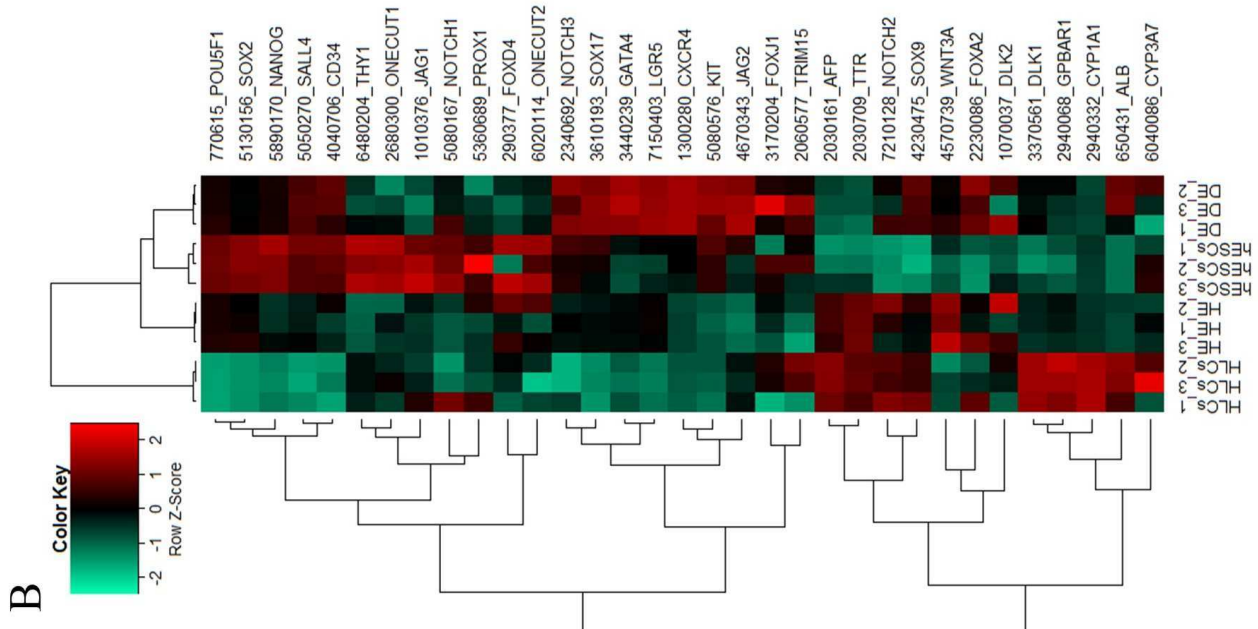
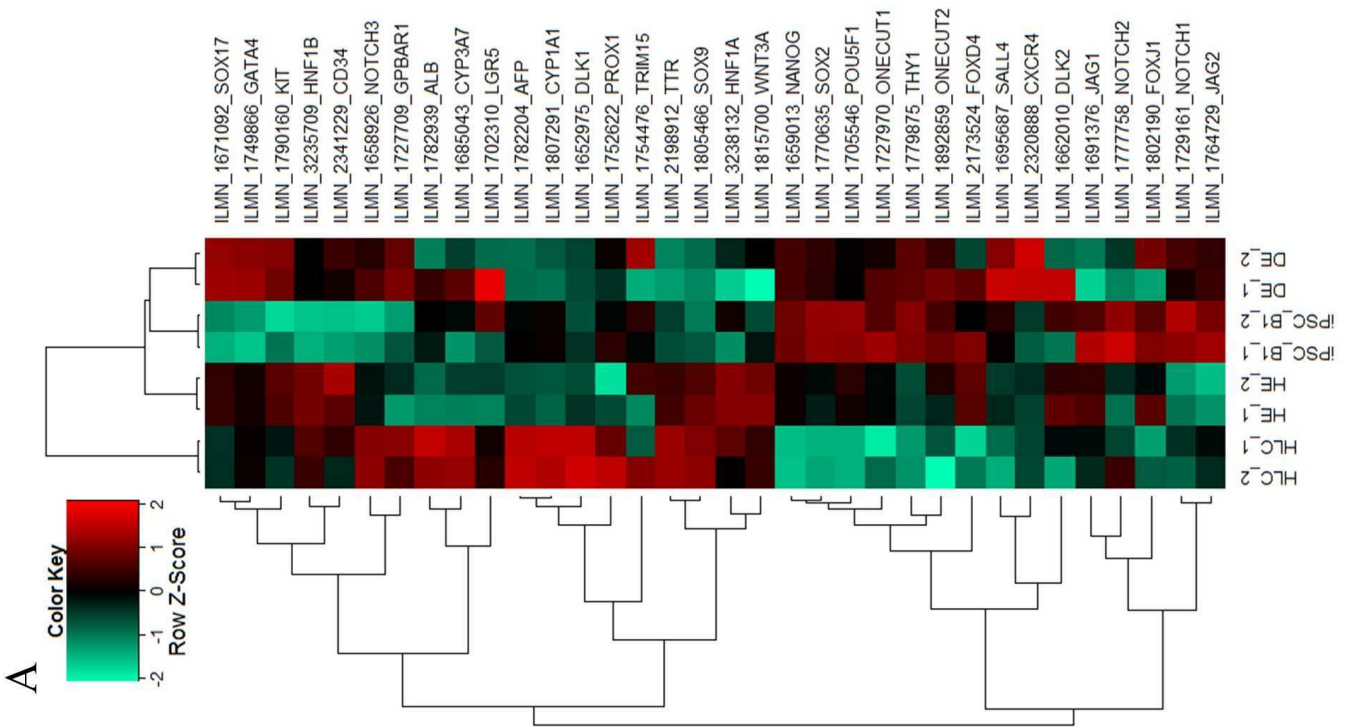
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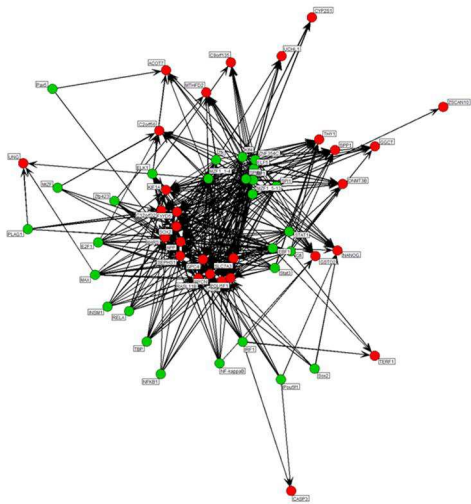
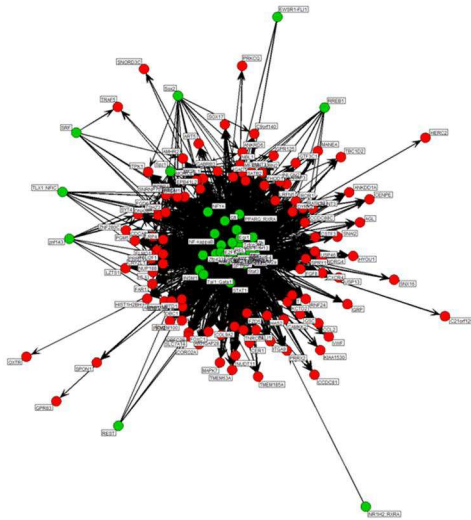
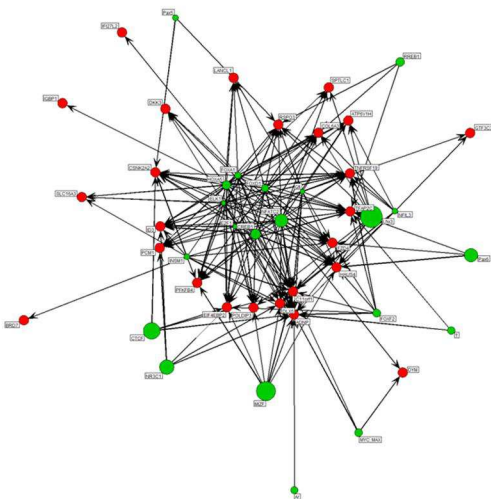
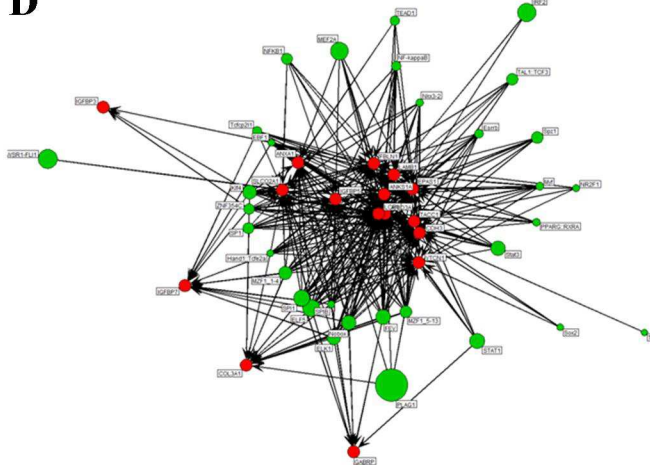
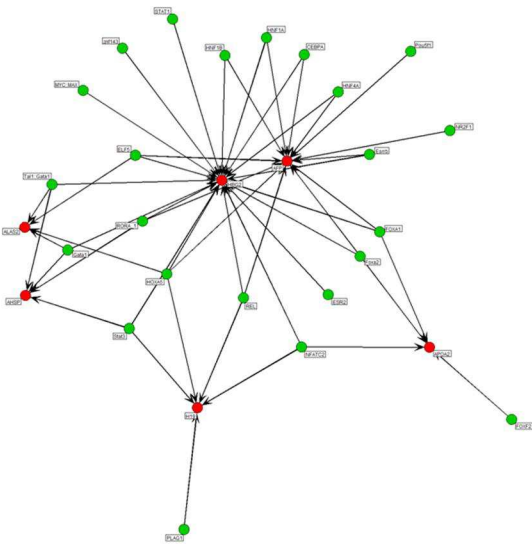
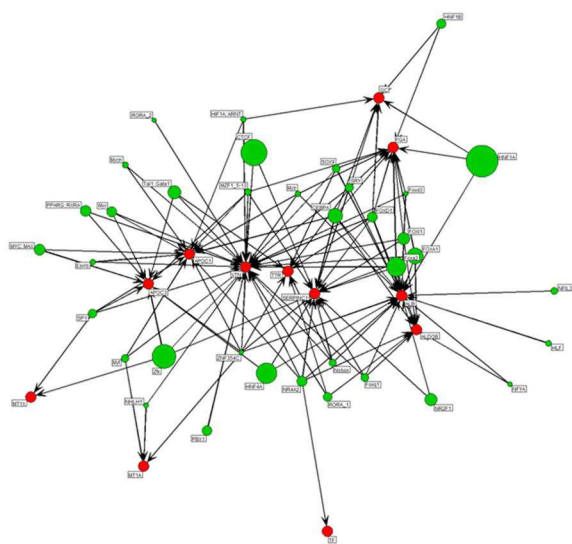


Category	Term	Count	%	PValue
KEGG_PATHWAY	hsa00830:Retinol metabolism	3	8.11	0.006825
KEGG_PATHWAY	hsa00980:Metabolism of xenobiotics by cytochrome P450	3	8.11	0.008375
KEGG_PATHWAY	hsa00982:Drug metabolism	3	8.11	0.008925
KEGG_PATHWAY	hsa00071:Fatty acid metabolism	2	5.41	0.09051
KEGG_PATHWAY	hsa00983:Drug metabolism	2	5.41	0.096986
KEGG_PATHWAY	hsa00350:Tyrosine metabolism	2	5.41	0.099135

**B**





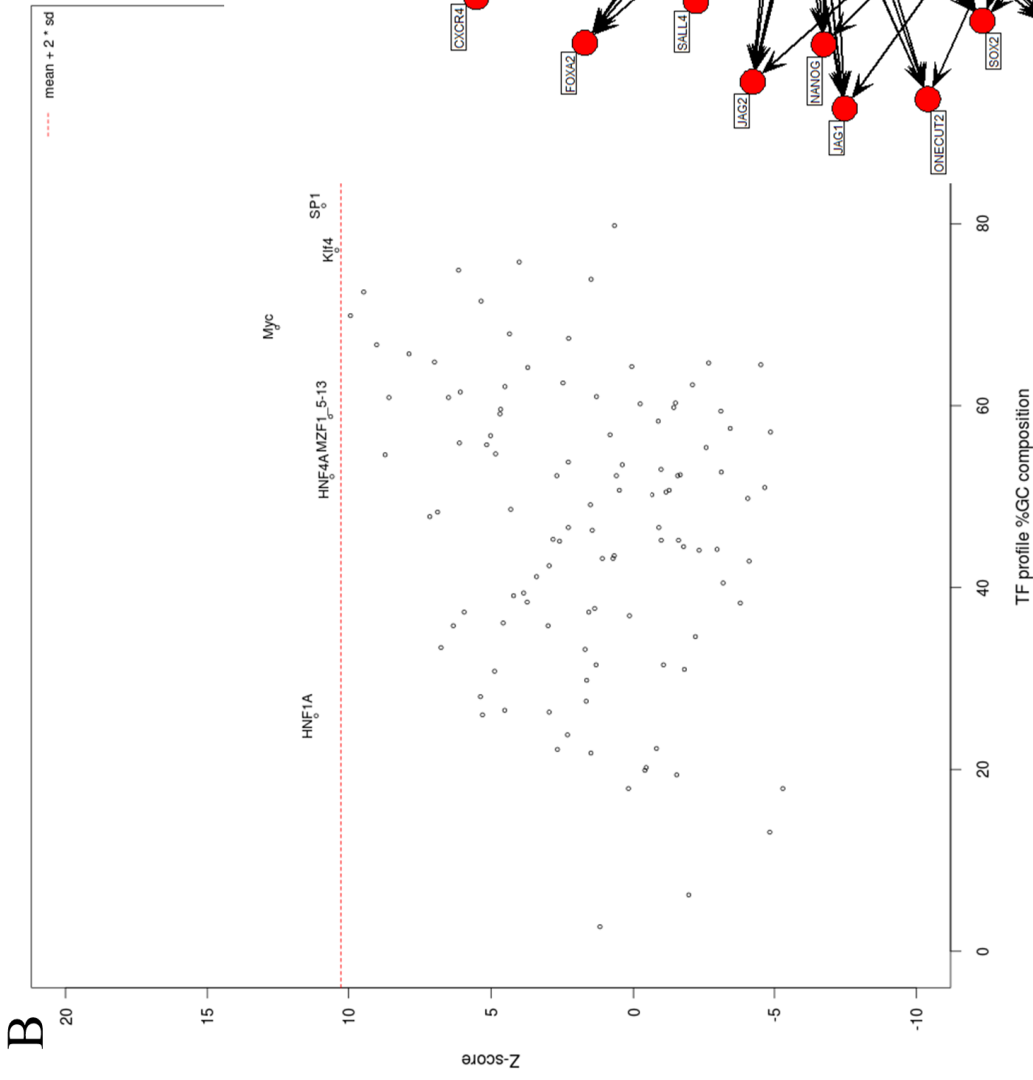
**A****B****C****D****E****F**

**A**

- POU5F1
- SOX2
- NANOG
- HNF1A
- HNF1B
- LGR5
- ONECUT1
- ONECUT2
- ALB
- AFP
- TTR
- SOX17
- SALL4
- GPBAR1
- DLK1
- DLK2
- KIT
- CD34
- THY1
- CYP3A7
- CYP1A1
- TRIM15
- WNT3A
- SOX9
- NOTCH1
- NOTCH2
- NOTCH3
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- JAG2
- FOXD4
- FOXJ1
- PROX1
- CXCR4
- GATA4

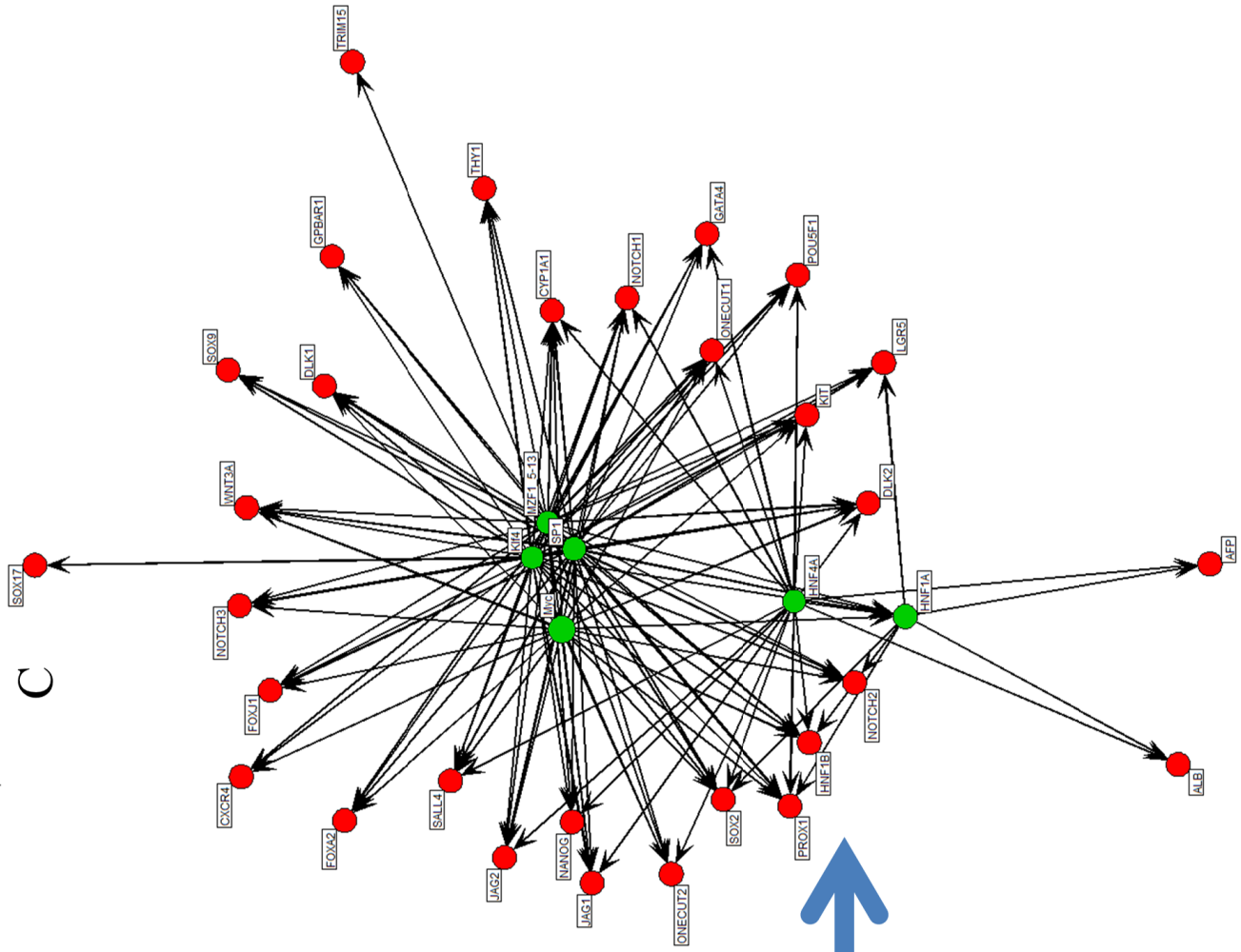
- iPSC/ESC
- DE
- HE
- HLC

Z-score vs. TF profile %GC composition



**B**

**C**



Transcription factor analysis via oPOSSUM3

Supplementary Table S1: KeyGenes corresponding to Figure 4E.

A	HLC_1	HLC_2	fetal_liver_1	fetal_liver_2	PHH_1	PHH_2
brain	0,00872249	0,00356035	0,00095596	0,00077447	0,00128284	0,00129498
heart	0,00202789	0,00126442	0,00045451	0,00091234	0,00203436	0,00299791
intestine	0,00058457	0,00194039	0,00044729	0,00040809	0,00748768	0,00180078
kidney	0,05411781	0,09250339	0,00736333	0,00554801	0,003114	0,00645026
liver	0,93235915	0,89657184	0,98934908	0,99221622	0,98571919	0,98730311
lung	0,00218808	0,00415962	0,00142983	0,00014086	0,00036192	0,00015297

B brain	ENSG0000010	ENSG0000014	ENSG0000016	ENSG00000166963
heart	ENSG00000118194			
intestine	ENSG0000014	ENSG0000018	ENSG00000260027	
kidney	ENSG0000006	ENSG0000013	ENSG0000018	ENSG00000260027
liver	ENSG0000013	ENSG0000014	ENSG00000155066	
lung	ENSG0000006	ENSG00000173391		

Supplementary Table 2: Gene lists of venn diagram Figure 5A.

hlc_expr	fetal_liver_expr	hlc_expr AND fetal_liver_expr	phh_expr	hlc_expr AND phh_expr
A2ML1	ABCC13	ABCA4	A1BG	AASS
A4GALT	ABI3	ABCC10	ABCA10	ABCA2
A4GNT	ABI3BP	ABCC4	ABCG4	ABHD11
AADA4L4	ABLIM2	ABCG2	ABHD1	ABHD7
ABCA11	ACAP1	ACRC	ACBD5	ABL2
ABHD12B	ACPT	ACSL4	ACSM1	ACBD4
ABHD9	ACRBP	ACSS1	ADAMTS15	ACER3
ACBD7	ACSBG1	ACTA1	ADCYAP1R1	ADCY1
ACCN3	ACSL6	ACTG2	ADH1B	AGR2
ACPP	ADAM12	ADAMTS7	AFAR3	AIM1
ACRV1	ADAMTS5	ADAMTS9	AKR7L	AIM1L
ACTC1	ADD2	ADAMTSL1	ALOXE3	AKR1B10
ADAM2	ADRA2C	ADAT2	ALS2CL	AKR1B15
ADAM8	ALOX12	ADCY3	ALS2CR12	ALK
ADAMTS18	AMN	ADCY4	ALX3	ALPI
ADAMTS19	AMPH	ADORA2A	ANKRD29	ALPK2
ADAMTS2	ANAPC7	ADORA2B	AOX1	AMAC1L2
ADAMTS20	ANK1	ADPRH	APLN	AMY2B
ADAMTS3	ANKAR	AEBP1	APOL1	ANKRD1
ADAMTS6	ANKLE1	AFAP1	AQP7	ANKRD20B
AFF2	ANKRD53	AFAP1L2	AQP9	ANXA8
AHDC1	AOAH	AFF3	ARID5A	ANXA8L2
AHNAK2	APCDD1	AGPAT4	ARL14	ARAP2
AKAP2	APOBEC2	AHCYL2	ARP11	ARFGEF2
AKT3	ARFRP1	AHI1	ASIP	ARHGEF16
ALDH1A3	ARHGAP5	AHSP	ASPHD1	ARL4C
ALDH1L2	ARHGDIG	AIM2	ATOH8	ARMC9
ALDH3B2	ARHGFE9	AKAP10	ATP6V0D2	ARRDC1
ALG10	ARL9	ALG10B	BAI1	ASPH
ALKBH8	ARMC2	ALMS1	BDH2	ATHL1
ALMS1P	ARMC4	ALOX15	BOLA2B	ATP13A3
ALPPL2	ARTN	AMHR2	C10orf108	ATP6V0A4
ALS2CR16	ASCL2	ANAPC2	C10orf21	ATP6V1E2
AMBRA1	ATOH7	ANGPT1	C11orf91	B3GNT3
AMH	ATP1B2	ANGPTL2	C12orf34	B4GALNT4
AMN1	AZU1	ANK3	C12orf39	BACH1
ANGPT2	B3GALT2	ANKRD32	C12orf56	BAK1
ANKDD1A	BAI3	ANKRD41	C12orf8	BEX5
ANKRD34A	BCL2L14	ANKRD52	C14orf11	BIK
ANKRD36	BEST1	ANLN	C14orf121	BLOC1S2
ANKS1B	BPI	ANO2	C14orf126	BTN2A2
ANKS3	BSPH1	ANTXR1	C14orf21	C11orf36
ANO9	BST1	AP1GBP1	C17orf67	C12orf49
ANXA8L1	BZRPL1	AP1M2	C19orf36	C12orf5
AP3B2	C10orf105	AP3M2	C1orf200	C13orf31
APCDD1L	C11orf21	AP4M1	C21orf63	C14orf118
APLF	C14orf162	APEG1	C21orf71	C14orf181
APLP1	C15orf34	APLN	C3orf41	C14orf78
AQP10	C16orf30	APOBEC3D	C4B	C15orf48
ARHGAP27	C16orf38	APOLD1	C5orf46	C16orf67



ARHGAP29	C17orf76	AQP1	C6orf122	C17orf108
ARHGAP6	C17orf87	ARHGAP11B	C6orf142	C19orf71
ARL13B	C18orf1	ARHGAP15	C6orf222	C22orf33
ARNT2	C18orf51	ARHGAP18	C6orf27	C2orf15
ARSK	C19orf59	ARHGAP20	C7orf65	C2orf21
ASAM	C19orf67	ARHGAP22	C8orf30B	C3orf33
ASPHD2	C1orf101	ARHGAP25	C8orf46	C3orf52
ASRGL1	C1orf175	ARHGAP28	C8ORFK29	C4A
ATP10B	C1orf186	ARHGAP8	C9	C6orf1
ATP12A	C1orf38	ARHGEF17	CADM3	C6orf141
ATP2C2	C1orf92	ARHGEF3	CALCA	C6orf163
ATP6V1B1	C1QTNF4	ARL17P1	CAMK2B	C6orf204
ATP6V1C2	C20orf132	ARMCX1	CCDC103	C7orf53
ATP6V1G2	C20orf175	ARMCX2	CCDC88B	CAMK2D
ATP8B1	C21orf67	ARMCX4	CCK	CAMTA2
ATRX	C21orf69	ART5	CCL13	CBLC
AURKAPS1	C2CD4C	ASAP1IT1	CCR2	CBX8
B3GALNT2	C2orf3	ASCL5	CD200	CCDC126
B3GALTL	C2orf32	ATG2B	CD300E	CCDC17
B3GNT5	C2orf40	ATP2A3	CD40	CCNO
BAALC	C2orf88	ATP6AP1L	CDC27	CDCP1
BAHCC1	C2orf89	ATP7A	CDC37L1	CDK8
BAI2	C3AR1	ATXN2L	CDH15	CDKN2A
BAPX1	C3orf22	AURKA	CES4	CDKN2C
BATF3	C3orf32	AURKB	CH25H	CEP170
BCAR4	C3orf71	B3GALNT1	CHAD	CFHR3
BCL11B	C4orf37	B3GALT4	CHADL	CHST9
BCMO1	C5AR1	B3GNT8	CHRDL2	CIDEA
BEND4	C5orf20	B3GNTL1	CHST4	CLCF1
BEND6	C6orf184	B4GALT6	CLIP4	CLTCL1
BICD1	C7	BACH2	CLU	CNNM4
BMP5	C8orf77	BAGE5	CLUL1	CNTNAP2
BNC1	C8orf79	BARD1	CNDP1	COL11A2
BNC2	C9orf84	BBS12	COPZ2	CRCT1
BOC	CA1	BCAM	COX16	CSDC2
BRWD3	CACNA1I	BCAT1	CPLX1	CST6
BVES	CALCRL	BCL11A	CSAG3A	CXorf21
C10orf39	CAMP	BCL2	CSAG3B	CYP1A1
C10orf41	CAPN11	BDP1	CSF1	CYP1B1
C10orf73	CARD9	BEND5	CTRB1	CYP26A1
C10orf82	CAV3	BEX4	CXCL13	CYP2D7P1
C11orf47	CBFA2T3	BIRC5	CXCL2	CYP2E1
C11orf70	CBLN4	BLM	CXCL6	DAB2IP
C12orf64	CCDC111	BMP6	CYP1A2	DALRD3
C14orf125	CCDC26	BMP7	CYP27B1	DCAF4L1
C14orf176	CCDC27	BMPER	CYP2A6	DDIT4L
C14orf37	CCDC52	BNIPL	CYP2A7	DDX3Y
C15orf33	CCDC81	BPTF	CYP2B6	DHH
C15orf59	CCDC88A	BRAF	CYP2B7P1	DHRS2
C16orf54	CCL21	BRSK1	CYP2C18	DIRAS3
C16orf55	CCL23	BRUNOL6	CYP2C19	DKFZP564O0523
C16orf74	CCL8	BSN	CYP2C9	DKFZp667M2411
C16orf88	CCR1	BSPRY	CYP3A4	DMRTA1
C17orf47	CCR10	BTK	CYP4F11	DNAJC2
C17orf69	CCR9	BTRC	CYP4F22	DNAJC25-GNG10
C17orf78	CCRL2	BUB1	CYP7A1	DNTTIP2

C17orf82	CD163L1	BUB1B	CYSLTR2	DOCK9
C18orf45	CD180	C10orf128	DAO	DSEL
C19orf21	CD19	C10orf33	DAPK2	DUSP27
C19orf39	CD1A	C10orf51	DDTL	DZIP1L
C19orf69	CD209	C10orf78	DDX20	EDN1
C1orf102	CD300A	C10orf88	DDX25	EEA1
C1orf105	CD300C	C11orf61	DERPC	EEF1A2
C1orf133	CD33	C11orf82	DGCR5	EFCAB7
C1orf161	CD36	C11orf84	DIS3	EFHC1
C1orf170	CD37	C12orf48	DKFZp564N2472	EGLN3
C1orf187	CD38	C12orf60	DKFZp686K1684	EGR2
C1orf189	CD4	C12orf68	DNAJC16	EIF2C4
C1orf190	CD48	C13orf18	DOCK5	EIF5A2
C1orf213	CD53	C13orf3	DOK7	ELK4
C1orf215	CD5L	C13orf34	DSG1	ENAH
C1orf229	CDADC1	C14orf145	DUXA	EPHB6
C1orf61	CEACAM8	C14orf19	DYNC1LI1	ESM1
C1orf64	CETP	C15orf20	DYSFIP1	EXOC8
C1orf81	CFHR4	C15orf21	ECEL1	EYA2
C1orf88	CFP	C15orf27	ECT2L	F2RL1
C1orf96	CHAC2	C15orf28	EDAR	F8A3
C20orf12	CHRNA10	C15orf42	EIF3CL	FAM114A1
C20orf151	CHRNB4	C16orf62	ENTPD8	FAM45B
C20orf75	CISH	C16orf79	EPHA3	FAM46B
C21orf129	CLC	C17orf41	EPHA6	FAM59A
C21orf49	CLDN2	C17orf44	EREG	FAM76A
C21orf81	CLEC10A	C17orf65	ERO1LB	FBLIM1
C2orf54	CLEC12A	C17orf75	ESR1	FBXO16
C2orf67	CLEC1B	C17orf80	F2RL3	FEM1B
C3orf15	CLEC3B	C17orf98	FAM139A	FER1L5
C3orf18	CLEC4D	C18orf2	FAM150B	FGD6
C3orf67	CLEC4G	C18orf26	FAM57B	FGF2
C3orf72	CLEC4M	C18orf54	FAM71E2	FLJ10781
C4orf10	CLIC2	C19orf33	FAM80A	FLJ10996
C4orf16	CMAH	C19orf38	FANCA	FLJ26850
C4orf31	CMPK2	C1orf106	FAS	FLJ35024
C4orf39	CMTM1	C1orf116	FBXO25	FLJ41200
C4orf43	CMTM2	C1orf135	FCAMR	FLJ41484
C4orf49	CMTM5	C1orf152	FGF19	FOSL1
C5orf27	COL14A1	C1orf156	FGF21	FOXP4
C6orf100	COL9A1	C1orf165	FGF6	GABRB3
C6orf132	COLEC10	C1orf21	FGF9	GALR2
C6orf134	CORO1A	C1orf24	FIS	GAN
C6orf148	CPA3	C1orf26	FLJ10661	GARNL3
C6orf168	CR1L	C1orf59	FLJ20397	GATA6
C6orf199	CRB1	C1orf89	FLJ21687	GBAP
C6orf221	CSH1	C1orf95	FLJ35785	GGTL3
C6orf25	CSH2	C1QTNF1	FLJ38379	GHRHR
C6orf52	CSPG4	C1QTNF5	FLJ40330	GMIP
C6orf54	CST7	C20orf117	FLJ42289	GPC1
C6orf81	CTSG	C20orf160	FLJ42709	GPR153
C8orf16	CUGBP2	C20orf194	FLJ44790	GPR64
C9orf126	CX3CR1	C20orf196	FLJ45422	GPRC5A
C9orf135	CXADRP3	C20orf94	FLJ45966	GPRC5B
C9orf164	CXCL17	C21orf122	FOXD2	GRAMD1C
C9orf58	CXCL3	C21orf128	FRY	GREM1

C9orf61	CXCR4	C21orf56	FSIP1	GREM2
C9orf93	CXorf18	C2orf37	FSTL4	GRHL1
CA11	CXorf59	C2orf63	FUNDC2	GRIP2
CA3	CYBB	C3orf62	FUT5	HAPLN4
CABYR	CYLC1	C3orf70	G0S2	HDAC9
CACNA1C	CYSLTR1	C4orf18	GAGE5	HES2
CACNA2D2	CYTH4	C4orf29	GBP3	HHAT
CACNA2D3	CYTL1	C4orf38	GBP7	HIST1H3D
CACNG4	DARC	C5orf23	GCK	HIST1H3E
CADM2	DAZ2	C5orf34	GDA	HIT-40
CALCB	DC36	C5orf39	GEM	HIVEP1
CALCR	DCDC5	C5orf42	GEMIN7	HSPB8
CAPN14	DCX	C5orf53	GFRA1	ICOSLG
CART1	DEFA1	C5orf54	GJB3	IER5L
CASQ2	DEFA1B	C5orf62	GLOD5	IFIT3
CCDC105	DEFA3	C6orf117	GLT1D1	IGF1
CCDC113	DEFA4	C6orf124	GNG12	IL1RL1
CCDC147	DERL3	C6orf167	GPD1	IL20RB
CCDC149	DLEC1	C6orf182	GPR141	INPP4A
CCDC153	DNAJC11	C6orf208	GPR88	IPPK
CCDC33	DNAJC28	C6orf26	GRIA3	IQSEC2
CCDC57	DNASE1L3	C6orf59	GSDM1	IRF6
CCDC64B	DNM3	C7orf13	GSTT2B	ISM1
CCDC9	DNTT	C8orf44	GUCA2B	KATNAL2
CCDC96	DOC2A	C8orf51	GZF1	KCNF1
CCKBR	DOK2	C8orf58	HCG18	KCNN2
CCNA1	DPEP2	C9orf100	HEPACAM	KCTD11
CDGAP	DPEP3	C9orf140	HIST1H3A	KCTD17
CDH10	DPF1	C9orf167	HNF4A	KDM6B
CDH13	DPF3	C9orf62	HRCT1	KIAA0284
CDH17	DPT	C9orf66	HSD11B1	KIAA0672
CDH26	DSCR5	CA14	HSD17B13	KIAA0895L
CDH3	DUSP21	CA8	HSF4	KIAA1383
CDH8	DUSP26	CACNB2	HTR2B	KISS1R
CDKAL1	E2F8	CACNB3	IBSP	KLC4
CDS1	ECE1	CACNG6	IGSF9B	KLF10
CDX1	EEFSEC	CAMK1G	IL12A	KLF5
CDX2	EFCBP1	CAMTA1	IL15	KRT18P19
CDY1B	ELANE	CAPN13	IL15RA	KRT18P26
CECR6	ELN	CASC5	IL1RL2	KRT18P30
CEMP1	ELTD1	CC2D2A	IL23A	KRT18P34
CEND1	EMCN	CCDC121	IL6ST	KRT18P42
CERCAM	EMILIN1	CCDC136	JMJD7	KRT7
CFTR	EPB42	CCDC137	KAAG1	KRT80
CGB	ESCO2	CCDC138	KCND3	LAMB3
CGB7	ESRP2	CCDC146	KCNIP3	LAMC2
CHAC1	F13A1	CCDC15	KIAA0467	LARP6
CHGB	FABP3	CCDC150	KIAA0738	LATS2
CHRM3	FAIM3	CCDC151	KIR2DS3	LDHC
CHRNA3	FAM101B	CCDC152	KLHL15	LMTK2
CIZ1	FAM109B	CCDC3	KLHL25	LOC100128202
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CLCNKA	FAM129C	CCDC66	LGALS9B	LOC100128695
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CLEC18C	FAM26F	CCDC99	LOC100128295	LOC100129138
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COL13A1	FCRL2	GDC20	LOC100131091	LOC100131176
COL15A1	FCRLA	GDC42EP5	LOC100131277	LOC100131447
COL22A1	FDPSL2A	GDC45L	LOC100131390	LOC100131460
COL23A1	FLJ11827	CDC7	LOC100131683	LOC100131727
COL4A6	FLJ23834	CDCA1	LOC100131774	LOC100131895
COL9A2	FLJ25404	CDCA2	LOC100132234	LOC100131972
COL9A3	FLJ30430	CDCA3	LOC100132288	LOC100132205
CORO6	FLJ32255	CDCA5	LOC100132506	LOC100132354
COX11	FLJ36032	CDCA7	LOC100132552	LOC100132494
COX18	FLJ36848	CDCA8	LOC100132655	LOC100132910
CPA4	FLJ39639	CDH11	LOC100132738	LOC100133075
CPAMD8	FLJ41170	CDH5	LOC100132888	LOC100133211
CPLX2	FLJ41603	CDH6	LOC100132913	LOC100133435
CPNE2	FLJ41733	CDK3	LOC100132967	LOC100133438
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CXCR6	GFI1B	CEP55	LOC139735	LOC401433
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CXXC6	GH1	CGA	LOC145837	LOC440160
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DHX57	GNA15	CHST10	LOC338756	LOC642769
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DKFZP434L187	GP9	CHSY3	LOC344382	LOC644094
DKFZp686J0529	GPR101	CHTF18	LOC347487	LOC644144
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DNAJC18	GYPA	CLEC4A	LOC400707	LOC645659
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DUOX2	HIST1H1D	CPZ	LOC642003	LOC650840
DUOXA2	HIST1H2AM	CRHBP	LOC642628	LOC651556
DUSP5P	HIST1H2BO	CRISP2	LOC642656	LOC652094
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DVL1	HIVEP3	CRNKL1	LOC642889	LOC653105
DYNC111	HK3	CRSP2	LOC642916	LOC653110
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ERCC6	IL2RB	DACT3	LOC646372	LONRF2
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ETAA1	IL3RA	DCDC2	LOC646482	LRRC16
EXPH5	IL7R	DCHS1	LOC646561	LRRC16A
EYA1	IL8RB	DCLK1	LOC646743	LRRC23
FALZ	IL8RBP	DCLK3	LOC646813	MAB21L2
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FAM126A	IQCA1	DCUN1D2	LOC646982	MAP7D3
FAM135A	IRAK3	DDX11	LOC647102	MAPK4
FAM181B	ITGA2B	DDX26B	LOC647121	MAPK8IP1
FAM183A	ITGAD	DENND2A	LOC647229	MDS1
FAM21A	ITGB3	DEPDC1	LOC647328	MED13
FAM23B	ITLN1	DEPDC1B	LOC647509	MESDC1
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FAM70A	KCNK17	DHFR	LOC647910	MICALL1
FAM80B	KCNMB1	DIAPH3	LOC647920	MIR604
FAM82B	KCNU1	DIO3	LOC647965	MIR98
FAM83B	KDM2B	DIO3OS	LOC648025	MIRLET7D
FAM90A6P	KIAA0748	DKFZp451M2119	LOC648174	MLLT4
FBXL14	KIAA1644	DKFZp686E2433	LOC648517	MNX1
FBXL16	KIF6	DKFZp686I15217	LOC648691	MSX1
FBXL21	KIR2DS5	DLC1	LOC648749	MUC4
FBXO10	KIR3DL1	DLG3	LOC648874	NBPF11
FBXO36	KIR3DL2	DLG4	LOC648993	NCRNA00173
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FGD4	KRT1	DLL1	LOC649238	NFKBID
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ACSM5	AATK
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ACY3	ABCA1
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ADH6	ABCA8
ADORA3	ABCA9
ADRB2	ABCB10
AGTR1	ABCB4
AGXT	ABCB6
AGXT2	ABCB7
AGXT2L1	ABCB9
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ATF7IP	ABI2
ATP2B2	ABL1
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C16orf50	ACE2
C16orf73	ACER2
C19orf51	ACHE
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C1orf51	ACLY
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GGT3P	AK3
GGTLC2	AK3L1
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THPO	BAG3
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TNXA	BAT3
TOR2A	BAT4
TOX3	BAT5
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TXNL4A	BBS9
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Supplementary Table S3: Gene list of exclusively expressed genes in HLCs.

Term	%	PValue	Genes
GO:0005911~cell-cell junction	1,694	9,18E-05	CLDN18, OCLN, CLDN9, CLDN10, MIP, COL17A1, PVRL1, PPL, WNK4, TGM1, OBSL1, MLLT4, PARD6A, MICALL2, PARD6B, GJB7, MAGI1, LIN7C, MPP7, GJB6, ABCB4, LIN7A, IGSF5, ITGA6, PKP3, DSC1, ABCC2, PDZD3
GO:0043296~apical junction complex	1,028	5,81E-04	MICALL2, PARD6A, PARD6B, CLDN18, CLDN9, OCLN, MAGI1, LIN7C, MPP7, CLDN10, LIN7A, IGSF5, WNK4, PKP3, PPL, DSC1, PDZD3
GO:0030054~cell junction	3,267	5,88E-04	SEPT3, CLDN9, OCLN, GABRB1, FERMT1, SYT6, GABBR2, ZNRF2, WNK4, SV2A, CHRNA3, ANKS1B, MAGI1, MPP7, LIG4, PCLO, IGSF5, RND1, CHRM3, OPHN1, ERC2, IGSF9, CLDN18, CTNND2, CLDN10, MIP, PVRL4, SYNPR, COL17A1, PVRL1, PPL, SYN2, TGM1, OBSL1, MLLT4, GABRP, NPHP1, PARD6A, MICALL2, PARD6B, GJB7, NLGN1, LIN7C, GJB6, HOMER1, ABCB4, LIN7A, PPP1R9A, ITGA6, RAPSN, PKP3, DSC1, ABCC2, PDZD3
GO:0016327~apicolateral plasma membrane	1,028	8,13E-04	MICALL2, PARD6A, PARD6B, CLDN18, CLDN9, OCLN, MAGI1, LIN7C, MPP7, CLDN10, LIN7A, IGSF5, WNK4, PKP3, PPL, DSC1, PDZD3
GO:0005624~membrane fraction	4,537	0,00141	SEPT3, SLC15A1, VAPB, SLC15A2, HIP1R, CYP2S1, PDLIM5, DPP10, HPS1, CNGB1, SLC16A1, SLC23A1, ART5, KCNK9, SLC24A2, SLC1A6, ATP8B1, LMOD1, JPH1, PCDHGA12, STS, CYP1A1, SLC22A7, NROB1, FOLH1, DGAT2, CNTN1, RYR2, ABAT, ERC2, LOC388514, STEAP2, TM4SF4, GCNT3, HSD3B1, OAS3, ARF6, OAS2, ABCA3, MIP, FMO4, IGF1R, SYNPR, PVRL1, FMO1, RASGRP1, BCL2, CYP26B1, TNKS, FUT1, A4GNT, MTMR7, UGT2B28, ACSL5, KLK6, CYP46A1, CYP2C8, LIN7C, MAL, HOMER1, LIN7A, SLC10A1, ABCB4, PPP1R9A, KCNJ8, LASS1, MAP2, ADRA1B, MEP1A, DSC1, DIO1, ABCC2, RDH16, PDZD3, RSC1A1
GO:0070160~occluding junction	0,786	0,00236	MICALL2, PARD6A, PARD6B, CLDN18, CLDN9, OCLN, MAGI1, LIN7C, CLDN10, MPP7, LIN7A, IGSF5, WNK4

GO:0005923~tight junction	0,786	0,00236	MICALL2, PARD6A, PARD6B, CLDN18, CLDN9, OCLN, MAGI1, LIN7C, CLDN10, MPP7, LIN7A, IGSF5, WNK4
GO:0005626~insoluble fraction	4,598	0,00244	SEPT3, SLC15A1, VAPB, SLC15A2, HIP1R, CYP2S1, PDLIM5, DPP10, HPS1, CNGB1, SLC16A1, SLC23A1, ART5, KCNK9, SLC24A2, SLC1A6, ATP8B1, SYNJ2, LMOD1, JPH1, PCDHGA12, STS, CYP1A1, SLC22A7, NROB1, FOLH1, DGAT2, CNTN1, RYR2, ABAT, ERC2, LOC388514, STEAP2, TM4SF4, GCNT3, HSD3B1, OAS3, ARF6, OAS2, ABCA3, MIP, FMO4, IGF1R, SYNPR, PVRL1, FMO1, RASGRP1, BCL2, CYP26B1, TNKS, FUT1, A4GNT, MTMR7, UGT2B28, ACSL5, KLK6, CYP46A1, CYP2C8, LIN7C, MAL, HOMER1, LIN7A, SLC10A1, ABCB4, PPP1R9A, KCNJ8, LASS1, MAP2, ADRA1B, MEP1A, DSC1, DIO1, ABCC2, RDH16, PDZD3, RSC1A1
GO:0000267~cell fraction	5,687	0,00252	CGA, SEPT3, CGB, INSL4, SLC15A1, VAPB, SLC15A2, HIP1R, CYP2S1, PDLIM5, DPP10, HPS1, CGB7, CNGB1, SLC16A1, SLC23A1, ART5, KCNK9, STAC, IAPP, SLC24A2, SLC1A6, ATP8B1, SYNJ2, LMOD1, JPH1, PCDHGA12, STS, CYP1A1, SLC22A7, FBP1, NROB1, FOLH1, DGAT2, CNTN1, RYR2, ABAT, ERC2, LOC388514, STEAP2, CRYBA1, TM4SF4, GCNT3, HSD3B1, OAS3, ARF6, OAS2, TRH, ABCA3, TAC3, LOC653269, IL17C, MIP, FMO4, CALCB, IGF1R, SYNPR, PVRL1, FMO1, RASGRP1, BCL2, CYP26B1, HAAO, SRR, TNKS, FUT1, A4GNT, MTMR7, UGT2B28, ACSL5, KLK6, CYP46A1, CYP2C8, LIN7C, MTL5, MAL, IDO1, HOMER1, LIN7A, ABCB4, SLC10A1, PPP1R9A, KCNJ8, LASS1, MAP2, MEP1A, ADRA1B, DSC1, DIO1, ABCC2, RDH16, PDZD3, LHB, RSC1A1
GO:0034702~ion channel complex	1,512	0,00345	FXVD1, KCNE1L, CLCN2, GABRB1, CACNB2, KCNA5, CNGB1, KCNJ14, KCNJ13, KCNS3, KCNQ4, KCNS1, TTYH2, KCNQ2, CHRNA3, ANO9, GABRP, SCN2B, KCTD1, CACNG1, CLIC3, KCNJ8, CLIC6, RYR2, KCTD14
GO:0042598~vesicular fraction	1,694	0,00441	HSD3B1, CYP2S1, OAS3, OAS2, FMO4, MIP, IGF1R, PVRL1, FMO1, BCL2, CYP26B1, TNKS, JPH1, UGT2B28, ACSL5, KLK6, STS, CYP1A1, CYP46A1, CYP2C8, DGAT2, KCNJ8, LASS1, MAP2, LOC388514, DIO1, STEAP2, RDH16



GO:0005792~microsome	1,633	0,00575	HSD3B1, CYP2S1, OAS3, OAS2, FMO4, MIP, IGF1R, PVRL1, FMO1, BCL2, CYP26B1, TNKS, JPH1, UGT2B28, ACSL5, KLK6, STS, CYP1A1, CYP46A1, CYP2C8, DGAT2, KCNJ8, LASS1, MAP2, LOC388514, DIO1, RDH16
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Supplementary Table S4: Gene lists of the venn diagram Figure 5C.

fetal_vs_phh_anova	hlc_vs_fetal_anova	fetal_vs_phh_anova AND hlc_vs_fetal_anova	hlc_vs_phh_anova	fetal_vs_phh_anova AND hlc_vs_phh_anova	hlc_vs_fetal_anova AND hlc_vs_phh_anova
ADIPOR1	A2M	ABCB10	AASDH	ABAT	AADAC
AEN	AARS	ABHD11	ABCB11	ABCA2	AAK1
ANXA11	ABCB6	ACAP1	ABCC10	ABCB1	ABCA8
ANXA8L2	ABHD8	ACSL4	ABCG8	ABCC11	ABCC6P2
ASAP1IT1	ABI3	ACSS1	ABT1	ABCC2	ABHD12
ATF2	ACAD8	ACTN4	ACAD9	ABCC3	ABHD14A
ATP7A	ACBD3	ADAP2	ACLY	ABHD1	ABHD14B
BCL7C	ADAMTSL4	ADORA1	ACO1	ABLIM1	ACAA1
C16orf59	AEBP2	AFF3	ACSS2	ABLIM3	ACADM
C16orf87	AFF4	AHSP	ACTB	ABTB2	ACAT2
C17orf49	AMDHD1	AKTIP	ACYP1	ACAA2	ACBD7
C1orf144	APOBEC3F	ALAS2	ACYP2	ACACA	ACER3
C1orf25	ARFGAP2	ANK1	ADAMTSL2	ACACB	ACP1
CAND2	ARID5B	ANKRD41	ADARB1	ACAD11	ACPL2
CBR4	ARIH1	ANXA2P3	ADH5	ACADVL	ACPP
CCNF	ARS2	AP2S1	ADHFE1	ACOT4	ACSM3
CKS2	ASCC1	APOA2	ADRA2A	ACOT9	ACTC1
CLDN3	ATE1	APOBEC2	AEBP1	ACSL5	ACTN1
CNO	ATP5H	APOM	AES	ACSM5	ACVR1
COQ6	ATP5J2	APP	AGMAT	ACTR5	ADAM19
COTL1	ATP6V1E1	ARHGAP15	AGPAT6	ACY3	ADAM9
CREBL2	AVP	ARHGAP22	AIDA	ADAM15	ADAMTS1
CSRP2BP	AZIN1	ARHGAP30	AKAP1	ADCY3	ADAMTS19
DC36	B9D1	ARHGAP9	AKAP10	ADCYAP1R1	ADAR
DENND2C	BCOR	ARIH2	AKR1D1	ADH1B	ADH1A
DGKQ	C12orf10	ARL4A	ALOXE3	ADH1C	ADH4
DLEU1	C12orf49	ARL9	ALS2CR4	ADI1	ADIPOR2
DSTYK	C14orf166	ARMCX3	AMD1	ADK	ADORA2B
DYNLT1	C17orf76	ASCL2	ANAPC1	ADPRHL2	AFAP1
E2F3	C17orf96	ASTE1	ANGEL2	ADRA1A	AFAP1L2
E2F8	C5orf15	ATAD1	ANGPTL2	ADRM1	AGBL5
EFCAB4A	C7orf42	ATL3	ANKFY1	ADSL	AGK
ENO1	CCDC120	ATP1B1	ANKRD13A	ADSSL1	AGTPBP1
FAM104A	CD38	ATP1B2	ANKRD16	AFAR3	AHCYL1
FAM164C	CD74	ATP5G1	ANKRD17	AFF1	AHCYL2
FANCI	CEBPD	ATP6V0A1	ANKRD33	AFMID	AHSG
GATA5	CIRH1A	AYP1p1	ANKRD39	AFP	AIF1L
GMPS	CLDN15	BACE2	ANKS4B	AFTPH	AIFM1
HERC1	CNGA1	BANP	AOF2	AGPAT4	AIG1
HLA-G	CNN3	BCAR1	AP1G2	AGPAT9	AIM1L
HMGB1L1	CTDSP1	BEND7	AP3M1	AGXT2L1	AIP
HPS4	CXADR	BEX1	APOE	AGXT2L2	AK2P2
IL18BP	CYGB	BGN	APTX	AHR	AKR1B1
INPP5D	DAZAP1	BIK	ARHGAP1	AKIRIN2	AKT1
IRS1	DENND5A	BLVRA	ARID2	AKR1A1	ALB
JOSD2	DGCR2	BLVRB	ARL16	AKR1B10	ALDH1A3
KCNT2	DLGAP4	BMP2	ARL6IP4	AKR1C2	ALDH3B2

KIAA0831	DRD4	BMP2K	ARMC1	AKR1C3	ALG10
KIF21A	EIF2B2	BNIP3L	ARMC10	AKR1C4	ALG10B
LDOC1L	ELMOD2	BOLA3	ARPC1B	AKR7A3	ALKBH3
LOC100129685	F13B	BPGM	ARPC3	ALAS1	ALX1
LOC100130367	F2RL1	BSN	ARPC5L	ALDH1B1	AMBP
LOC100131261	FAM119B	BTG2	ARSA	ALG14	AMFR
LOC100131381	FAM171A1	BTK	ARSK	ALG1L	AMOT
LOC100132863	FAM50A	BZRPL1	ART5	ALG2	AMY1B
LOC100134291	FIS1	C10orf33	ASCC3	ALG3	AMZ2
LOC100190986	FLJ22795	C10orf35	ATG16L1	ALPL	ANAPC11
LOC143666	FLJ40113	C12orf27	ATG2A	ALS2CL	ANGPTL3
LOC282997	FLJ40504	C12orf45	ATG4B	AMACR	ANK3
LOC387867	FOLR3	C14orf173	ATN1	AMHR2	ANKIB1
LOC642361	FUK	C15orf57	ATP12A	AMY2A	ANKLE2
LOC644879	GADD45GIP1	C19orf22	ATP5C1	AMY2B	ANKRD10
LOC644931	GMFB	C19orf42	ATP5G3	ANAPC5	ANKRD11
LOC650546	GOLGA5	C19orf48	ATP5S	ANKRD35	ANKRD38
LOC730740	GPC3	C19orf62	ATP5SL	ANLN	ANKRD50
LPAR5	GSTA2	C1orf162	ATP6V1B2	ANO1	ANKS1A
LRRC32	HADHB	C1orf59	ATP8B2	ANXA10	ANO10
MAD2L1	HEMGN	C1QC	ATRIP	ANXA2P2	ANO6
MARK3	HK3	C20orf108	AVEN	ANXA4	ANTXR1
MBLAC2	JUNB	C20orf175	B9D2	ANXA6	ANXA1
METAP2	KIAA1545	C20orf27	BAG5	AOX1	ANXA3
MPHOSPH9	KLF2	C22orf25	BANF1	AP2B1	AP1M2
MXD3	LIPA	C2orf32	BAT2L	AP2M1	AP3B2
NAP1L4	LOC100129122	C3orf10	BBS2	AP4E1	APBB1IP
NEFH	LOC100133477	C3orf54	BCL2L12	APCS	APH1A
NOSTRIN	LOC145853	C5orf23	BDNF	APOC4	APOA1
ODC1	LOC283767	C5orf4	BEND6	APOF	APOC1
OIP5	LOC284821	C7orf27	BLZF1	APOL2	APRT
PA2G4	LOC285733	C9orf123	BMPR2	APOL3	AQP12A
PASK	LOC399748	C9orf30	BMX	AQP7P1	AQR
PCBD2	LOC440313	C9orf40	BPHL	AQP7P2	ARCN1
PDXK	LOC644860	CALD1	BRD3	AQP9	ARFGEF1
PGAM5	LOC644934	CBX3	BRD7P2	AR	ARG2
PGBD3	LOC645236	CCDC102A	BRE	ARHGAP12	ARHGAP10
PHLDA2	LOC645979	CCDC26	BSPRY	ARHGEF3	ARHGAP18
PLAC9	LOC648294	CCDC52	BTBD10	ARID1A	ARHGAP21
PLTP	LOC650298	CCL15	BTG1	ARL14	ARHGAP28
PLXNB2	LOC651697	CCL23	BTN3A3	ARL2	ARHGAP29
PNO1	LOC728290	CCNE2	C10orf11	ARL5B	ARHGAP8
PRMT6	LOC728823	CD34	C10orf32	ARL8B	ARHGEF10
ProSAPiP1	LOC729776	CD5L	C10orf88	ARMC5	ARHGEF17
PRTFDC1	LOC730316	CD97	C11orf54	ARMC6	ARHGEF7
RAD21	LOC732425	CDC14B	C12orf30	ARMCX6	ARID3A
RASSF7	LRRN3	CDH5	C12orf62	ARNTL	ARID3B
RBBP4	LRSAM1	CDKN2D	C13orf34	ARP11	ARL5A
RBPJ	MAPKAPK5	CENPM	C14orf105	ARRDC4	ARMC7
RCE1	MARCH2	CENTG2	C14orf133	ARSD	ARPC1A
RFNG	MARCH8	CFD	C14orf143	ASB13	ARPC2
RGL1	MAT2B	CKAP2	C14orf2	ASB7	ARPC5
RHBDF2	MCOLN1	CLEC14A	C15orf63	ASIP	ARPP19
RHOQ	MED8	CLEC1B	C16orf68	ATF3	ARRDC2
RPA3	MFSD1	CLEC4G	C16orf7	ATF4	ASAM
RRP1	MKRN2	CLIC2	C17orf101	ATF6	ASAP2

RUSC2	MRPL1	CNDP2	C17orf53	ATOH8	ASB3
S100A16	MRPL24	CNPY2	C17orf62	ATP1B3	ASNS
SASS6	MRPL37	CNPY4	C17orf79	ATP5A1	ATF7IP2
SLBP	MRPL55	CNRIP1	C17orf80	AURKA	ATIC
SLC1A1	MYO18A	COL9A1	C17orf85	AZGP1	ATP1A1
SLC39A11	NAT12	COLEC11	C17orf89	BAAT	ATP2B1
SLMO1	NBN	COMMD4	C19orf10	BAD	ATP2B4
SNHG5	NME3	COPS3	C19orf2	BAG3	ATP2C1
SP4	NR1H2	CPOX	C19orf50	BAIAP2	ATP5E
SPINK1	NUP88	CRB1	C19orf70	BAIAP2L2	ATP5EP2
SPTY2D1	OSGEP	CRHBP	C1orf106	BBOX1	ATP6AP1
TACC3	PARP4	CSNK1D	C1orf124	BCKDHB	ATP6V0A4
TGFB11	PDE8B	CTGLF1	C1orf165	BCL10	ATP6V0B
TMEM127	PDHB	CTNS	C1orf24	BCL11A	ATP6V1B1
TMEM171	PDS5A	CUL4A	C1orf43	BCL3	ATP6V1H
TNFSF4	PLEKHB2	CX3CR1	C1orf55	BCL7B	ATP9A
TOR1AIP2	PMS2L4	CXCL12	C1orf85	BDH2	ATXN3
TP53I3	POLB	CYBB	C20orf117	BECN1	AXIN2
TPI1	POLR1E	CYBRD1	C20orf177	BEXL1	AZI1
TRIM39	POLR3F	CYP1A1	C20orf29	BHMT	B3GALT4
TRMT5	PPM1B	CYP26A1	C20orf45	BIRC3	B4GALT1
TSPAN18	PPP2CA	CYP3A7	C20orf72	BLOC1S2	B4GALT4
TSPAN5	PRKCDBP	CYTL1	C21orf119	BNIP2	B4GALT6
TTC13	PRR13	DCDC2	C21orf55	BOAT	BAI2
TUBA1A	PRRG1	DCK	C21orf70	BOK	BAIAP2L1
USP14	PSG3	DCN	C22orf27	BST2	BAMBI
VASH1	PTPN1	DKC1	C2orf44	BTBD12	BAPX1
WRNIP1	RBPMS2	DLK1	C2orf69	BTF3	BARD1
ZHX2	RHBDF1	DNAJA3	C2orf82	BTRC	BASP1
ZNF121	RHOG	DNAJA4	C3orf25	BUB1	BAT2
ZNF407	RPS26	DNAJC3	C3orf50	BUB1B	BAT2D1
ZNF451	RPS9	DNASE1L3	C4A	BYSL	BAZ2B
ZNF512	SAC3D1	DOCK10	C4BPB	C10orf116	BBS1
ZSWIM5	SCRIB	DOCK8	C4orf18	C10orf125	BBS4
	SEC14L4	DOLPP1	C5orf21	C10orf140	BBS9
	SERPINA5	DPYSL5	C6orf108	C10orf4	BCAP29
	SERPINF2	DST	C6orf153	C10orf59	BCAR3
	SF4	DUSP9	C6orf192	C10orf68	BCAR4
	SH3RF1	DUT	C6orf221	C11orf17	BCAT1
	SHE	E2F2	C6orf62	C11orf48	BCL9
	SLC25A29	E2F4	C7orf40	C12orf31	BCL9L
	SLC25A42	ECM1	C7orf70	C12orf34	BDH1
	SLC2A9	EFNA1	C8orf38	C12orf44	BFAR
	SLC39A3	EHBP1L1	C8orf40	C12orf56	BICD1
	SLC45A3	EIF1AY	C8orf47	C13orf3	BIN1
	SLC48A1	EIF4E3	C9orf119	C14orf106	BLOC1S1
	SLCO1B3	ELTD1	C9orf135	C14orf147	BMF
	SNX22	EMILIN1	C9orf58	C14orf149	BMP6
	SP2	ENPP2	C9orf93	C14orf167	BMP7
	ST3GAL3	EPB41	CA12	C14orf169	BMPR1A
	STK11	EPB42	CA2	C15orf52	BNC1
	SYS1	EPOR	CABC1	C16orf48	BNC2
	THAP11	ERMAP	CACNG4	C16orf91	BNIPL
	TIAF1	ETV4	CAD	C17orf68	BOC
	TJP3	ETV5	CALCOCO2	C17orf90	BRD7
	TNS1	EZH2	CAND1	C17orf91	BRD8

	TOMM7	FAM117A	CAPN6	C18orf10	BRP44
	TOR2A	FAM124B	CAPRN2	C18orf18	BRP44L
	TPD52L2	FAM188A	CARS2	C18orf8	BRSK1
	TRAM1	FAM46C	CASP6	C19orf12	BRWD1
	TSPAN12	FAM57A	CATSPER2	C19orf24	BTAF1
	TTY14	FAM65C	CCDC107	C19orf36	BTBD2
	UBE2E2	FAM73B	CCDC13	C19orf63	BTBD3
	UCP2	FCER1G	CCDC132	C1GALT1C1	BTG3
	VEZT	FCGBP	CCDC14	C1orf107	BZW2
	WASL	FCRLB	CCDC24	C1orf122	C10orf118
	YIPF1	FECH	CCDC47	C1orf149	C10orf65
	YTHDF1	FERMT3	CCDC49	C1orf168	C11orf51
	ZBED4	FGL2	CCDC8	C1orf212	C11orf59
	ZDHHC6	FGR	CCDC97	C1orf51	C11orf70
	ZNF277	FLII	CCL2	C1orf63	C11orf80
	ZNF524	FLJ20273	CCL3L1	C1R	C12orf11
	ZNRD1	FLJ20489	CCNA1	C1RL	C12orf35
	ZSCAN16	FMO1	CCNG2	C1S	C12orf47
		FOXD4L1	CCNI	C20orf111	C12orf52
		FOXO1	CCPG1	C20orf24	C13orf23
		FOXQ1	CCR7	C20orf46	C14orf102
		FPR3	CCRK	C20orf55	C14orf135
		FYB	CD58	C20orf7	C14orf145
		GAB3	CD83	C21orf91	C14orf4
		GAPVD1	CD99L2	C22orf29	C14orf73
		GART	CDAN1	C2orf18	C14orf78
		GATA1	CDC25C	C2orf47	C15orf41
		GFPT1	CDC40	C4BPA	C17orf58
		GFRA2	CDC42	C4orf32	C17orf63
		GIMAP4	CDC42EP5	C4orf34	C17orf69
		GIMAP6	CDCA2	C5orf13	C17orf71
		GIMAP7	CDH23	C5orf35	C18orf26
		GJA4	CDH6	C5orf46	C18orf54
		GLIPR2	CDX2	C5orf53	C19orf43
		GLRX5	CEACAM1	C6	C1orf105
		GMFG	CENPQ	C6orf141	C1orf152
		GMNN	CEP110	C6orf142	C1orf198
		GMPR	CEP68	C6orf145	C1orf53
		GNG11	CHD8	C6orf160	C1orf57
		GPBAR1	CHN1	C7orf20	C1orf74
		GPC1	CHST14	C7orf44	C1orf88
		GPC5	CLCN3	C7orf50	C1orf9
		GPR116	CLEC16A	C8G	C20orf20
		GPR126	CLIP4	C9orf150	C20orf43
		GPR137B	CLK2	C9orf3	C20orf75
		GPR34	CLUAP1	C9orf82	C21orf2
		GPR44	CLYBL	C9orf89	C21orf66
		GPT2	CMC1	CABLES1	C2orf15
		GRAP	CMTM6	CACNA1H	C2orf28
		GSN	CNKSR3	CALCA	C3orf19
		GSTA4	CNOT1	CAMK2B	C3orf59
		GSTM2	CNTN4	CAPN5	C4orf14
		GYPA	CNTNAP1	CASC4	C4orf31
		GYPB	COL22A1	CASP7	C4orf41
		GYPC	COL6A2	CASZ1	C5
		GYPE	COMMD5	CAV1	C5orf33

		HAL	COPB1	CAV2	C5orf42
		HBA1	COX15	CBLC	C5orf51
		HBA2	COX7A2	CBLL1	C5orf54
		HBB	CRABP1	CBR3	C6orf117
		HBBP1	CRADD	CBS	C6orf204
		HBG1	CRCP	CBX4	C6orf225
		HBG2	CREB1	CBX5	C7orf23
		HBM	CREBBP	CCDC106	C7orf68
		HBQ1	CRKL	CCDC21	C8A
		HBZ	CROP	CCDC3	C8orf4
		HCLS1	CRTAP	CCDC50	C8orf42
		HDDC3	CRY2	CCDC88B	C8orf55
		HDHD2	CRYZ	CCDC94	C8orf58
		HEBP2	CS	CCL16	C9orf140
		HEYL	CSNK1G1	CCL20	C9orf167
		HIST1H2BH	CSNK2A1	CCNB1	CA3
		HLA-DMB	CSNK2A1P	CCNB2	CA4
		HLA-DPA1	CSTF3	CCNE1	CA5A
		HLA-DRA	CTDSP2	CCNL1	CA5B
		HLA-DRB6	CTDSPL	CCNYL1	CAB39L
		HMBS	CTNNAL1	CD40	CABYR
		HOXA5	CTNND2	CD47	CACHD1
		HOXA6	CTSF	CD59	CACNA2D3
		HPRT1	CTSH	CD68	CACNB3
		HSD11B2	CTSS	CDA	CADM1
		HSPC159	CTSZ	CDC2L6	CALB2
		HTRA2	CWF19L2	CDC42EP2	CALCR
		ICAM4	CX3CL1	CDC5L	CALU
		IDS	CXCL10	CDC7	CAMK1D
		IFNGR1	CXorf57	CDCA4	CAMK2D
		IFT122	CYP21A2	CDCA5	CAMK2G
		IKZF1	CYP2A6	CDK9	CAMK2N1
		IL11RA	CYP3A43	CDKN1B	CAMLG
		IL1RAPL1	CYR61	CDKN2B	CAMSAP1L1
		INF2	CYTH1	CDR2	CANT1
		INS-IGF2	CYTH2	CDV3	CAPNS1
		ITLN1	D2HGDH	CECR5	CARD10
		JAZF1	DAAM1	CEP192	CARM1
		KCNH2	DAZAP2	CES1	CART1
		KCNK6	DCAKD	CES2	CASC3
		KCTD3	DCTD	CES4	CASP1
		KEL	DDHD2	CES8	CASP9
		KIAA1598	DDRGK1	CETN3	CASQ2
		KIAA1737	DDX1	CFHR3	CAT
		KIF13B	DDX12	CFHR5	CBFA2T2
		KIF6	DDX17	CFL2	CBL
		KLF5	DDX21	CHAD	CBLB
		KLHDC8B	DEF8	CHCHD10	CBX1
		KLHL3	DENND4C	CHDH	CBX2
		KLRB1	DENR	CHMP1B	CCBE1
		KRT1	DEPDC6	CHMP2A	CCDC101
		KRT13	DGCR6	CHMP4B	CCDC123
		LAGE3	DGKA	CHMP4C	CCDC136
		LAMA4	DGUOK	CHST9	CCDC151
		LAT	DHODH	CHURC1	CCDC153
		LDB2	DHRS1	CIDEC	CCDC45

		LECT2	DHRS3	CITED4	CCDC56
		LEPR	DHRS4L2	CLCF1	CCDC6
		LILRB2	DHX37	CLDN23	CCDC84
		LILRB5	DIO3	CLMN	CCDC86
		LINGO1	DIRAS3	CLP1	CCKBR
		LIPC	DLG3	CMBL	CCNB1IP1
		LMNB1	DNAH14	CNBP	CCND2
		LMO2	DNAJB1	CNDP1	CCNG1
		LOC100129902	DNAJC14	CNPY3	CCNJL
		LOC100130556	DNAJC18	COL27A1	CCNK
		LOC100130624	DNAJC27	COL3A1	CCS
		LOC100130746	DNAL1	COPZ2	CD163
		LOC100131164	DNMT3L	COQ5	CD24
		LOC100132499	DOHH	COX411	CD320
		LOC100133545	DOPEY1	COX5A	CD9
		LOC100133609	DPAGT1	CP	CD99
		LOC100133678	DPH2	CPN2	CDC14A
		LOC100134424	DPH3	CPSF3	CDC42SE1
		LOC147727	DPY30	CREB5	CDH1
		LOC200030	DPYSL2	CRELD2	CDH10
		LOC387686	DSCR6	CRIP1	CDH24
		LOC388654	DSE	CRIP2	CDH3
		LOC391132	DSN1	CRP	CDK5RAP3
		LOC391769	DUS4L	CRY1	CDK7
		LOC392288	DUXA	CRYAA	CDKN1C
		LOC439949	DUXAP3	CRYM	CDO1
		LOC440570	DVL2	CSDA	CDR2L
		LOC440731	ECHDC3	CST3	CDS1
		LOC441018	ECM2	CSTF2	CDYL
		LOC441081	EEF1B2	CTBS	CELSR2
		LOC641768	EFNB3	CTH	CENPJ
		LOC642073	EGLN2	CTSO	CENTG3
		LOC642113	EGR1	CUTC	CEP55
		LOC642469	EI24	CUX2	CEPT1
		LOC643008	EIF2AK2	CWF19L1	CERCAM
		LOC643431	EIF2S2	CXCL6	CGA
		LOC644852	EIF3E	CYB561D2	CGB1
		LOC644928	EIF3H	CYLD	CHCHD2
		LOC645284	EIF4B	CYP1A2	CHCHD7
		LOC646791	EIF4E2	CYP2A7	CHCHD9
		LOC647579	EIF6	CYP2B6	CHD4
		LOC648399	ELAVL3	CYP2C18	CHES1
		LOC649396	ELOVL4	CYP2C19	CHFR
		LOC651309	ENPP1	CYP2C8	CHM
		LOC651816	EPHA8	CYP2C9	CHMP5
		LOC653907	EPHB3	CYP2D6	CHST12
		LOC729687	EPHX2	CYP2D7P1	CHST13
		LOC729870	EPRS	CYP2E1	CHST15
		LOC730525	EPS15	CYP2U1	CHST3
		LOC731049	ERBB3	CYP3A4	CHSY1
		LOC732165	ERCC2	CYP4F11	CIB2
		LOC732316	ERO1LB	CYP4F2	CISD1
		LOC732419	ESD	CYP4F22	CKAP4
		LRMP	ETFA	CYP8B1	CKB
		LRPAP1	ETNK2	CYTA	CKMT1A
		LRRRC17	EVC	CYYR1	CLCNA

		LST1	EXOC1	DAB2	CLDN1
		LXN	EXOC5	DAK	CLDN10
		LY96	EXOSC10	DAO	CLDN18
		LYL1	EXOSC5	DAXX	CLDN6
		LYVE1	EXOSC7	DBNDD1	CLEC2D
		MAGEA12	EXTL2	DBR1	CLIP3
		MAP3K8	F10	DCPS	CLN8
		MAP7	FABP5L2	DCTN6	CMTM4
		MARCH3	FADD	DCUN1D3	CMTM8
		MARCO	FAF1	DCXR	CNIH4
		MAST3	FAHD1	DDIT3	CNN2
		MED16	FAHD2B	DDT	COBLL1
		MEP1A	FAM108B1	DDTL	COG5
		MFNG	FAM110A	DDX19B	COG6
		MGC13057	FAM127C	DDX28	COL11A1
		MGST3	FAM162A	DEFB1	COL12A1
		MINPP1	FAM173A	DEGS1	COL4A2
		MIR1976	FAM173B	DEPDC1B	COL4A5
		MPP1	FAM176B	DEPDC7	COL4A6
		MPP5	FAM183A	DERL1	COL5A1
		MRPS7	FAM195A	DERL2	COL6A1
		MS4A6A	FAM20A	DET1	COL6A3
		MS4A7	FAM20B	DEXI	COL7A1
		MTFR1	FAM36A	DGCR5	COLEC12
		MUC6	FAM64A	DHRS2	COMMD1
		MUSTN1	FAM69A	DHRS9	COPA
		MXI1	FAM86A	DHTKD1	COPG
		MYB	FAM8A1	DHX58	CORO2A
		MYL4	FAM96B	DIAPH3	COX10
		MYT1	FANCB	DIDO1	COX7B
		MZF1	FAR1	DKFZp779M0652	CPD
		NAPEPLD	FAR2	DMRTA1	CPE
		NBPF14	FBXL15	DNAH1	CPNE3
		NCKAP1L	FBXO3	DNAJB4	CPS1
		NCOA7	FBXO45	DNAJC25	CPSF2
		NDUFA2	FDX1	DNPEP	CPXM2
		NFE2	FERMT1	DNTTIP2	CPZ
		NKD2	FGL1	DOCK7	CRABP2
		NMNAT3	FHOD3	DONSON	CREB3L3
		NOS3	FIP1L1	DPM1	CRH
		NP	FKBP4	DPP7	CRIM1
		NPL	FLJ10081	DSCC1	CRISPLD1
		NR2F1	FLJ10357	DUS2L	CRISPLD2
		NUDT14	FLJ10374	DUSP1	CRMP1
		OAT	FLJ10661	DUSP10	CRSP2
		OLFM1	FLJ10916	DUSP16	CRYZL1
		OSBP	FLJ11783	DUSP22	CSDE1
		OSBP2	FLJ13305	DYM	CSF2RA
		P2RY13	FLJ20699	DYNLL2	CSNK1G3
		P4HA2	FLJ22531	DYNLT3	CSNK2A2
		PAFAH1B3	FLJ38717	E2F7	CSRNP2
		PAK2	FLJ41484	EAPP	CSRP1
		PANK2	FLJ44124	EBNA1BP2	CST1
		PANX2	FLJ45244	ECGF1	CST4
		PCNT	FLJ46309	ECHDC1	CST6
		PECAM1	FLRT3	ECHS1	CTHRC1



		PERP	FMO4	ECT2	CTNNA1
		PIGQ	FNBP1	ECT2L	CTPS2
		PIN1	FOLH1	EEPD1	CTSB
		PKP4	FOLH1B	EFEMP2	CTSL1
		PLAC8	FOXH1	EFHD1	CTSL2
		PLCB2	FRAG1	EGFR	CUL4B
		PLEK	FRAP1	EGLN1	CXCL16
		PLOD3	FRAT1	EIF2B5	CXCR7
		PNMA3	FREM1	EIF2S1	CXorf45
		POLE3	FSIP1	EIF5	CXXC5
		POLS	FST	ELAC1	CYB5D1
		PPAPDC2	FTHL11	ELK4	CYB5R2
		PPM1F	FTHL2	ELL	CYBASC3
		PPOX	FYN	ELL3	CYC1
		PPP2R2B	GALC	ELOVL5	CYCS
		PPP3CC	GALNT10	ELOVL6	CYFIP1
		PPP4R1	GALNT3	ENDOG	CYP11A1
		PRDX2	GATA4	ENPP7	CYP1B1
		PRO0628	GATM	ENTPD5	CYP27A1
		PRR14	GATS	ENTPD8	CYP2S1
		PRR15L	GBE1	EPB41L2	CYP4X1
		PRR5	GCK	EPB41L4B	D4S234E
		PRRG4	GCKR	EPB41L5	DACT1
		PRSS8	GCN1L1	EPHA2	DAD1L
		PSD	GDE1	EPS8	DAG1
		PTMA	GDI1	ERAP2	DBNDD2
		PTPN11	GDI2	ERCC6L	DCAF10
		PTS	GDPD1	ERGIC1	DCBLD2
		PYGB	GGT2	ERLIN2	DCP1B
		RAB3IL1	GGTLC1	ERN1	DCTN2
		RABGEF1	GHITM	ERO1L	DDAH1
		RAC2	GINS4	ESM1	DDAH2
		RAD23A	GIT1	ESPNL	DDEF2
		RAD51C	GJC1	ESRRA	DDIT4
		RAMP2	GK	ESRRAP2	DDIT4L
		RAPGEF5	GK5	ETNK1	DDR1
		RAPH1	GLE1	ETS2	DDX39
		RASGRP2	GLG1	EXOSC6	DDX42
		RASIP1	GLRX2	F8A1	DDX47
		RBM47	GLS2	FAAH	DDX50
		RBP1	GLT8D2	FADS2	DEAF1
		RBP2	GMEB1	FAHD2A	DENND2D
		RBX1	GMPR2	FAIM	DENND4A
		RCCD1	GNAS	FAM100A	DERA
		RELN	GNB5	FAM102A	DFFA
		RETN	GOLT1A	FAM105B	DFNA5
		RFESD	GON4L	FAM107B	DFNB59
		RFX1	GPATCH4	FAM134B	DHX30
		RGS10	GPR141	FAM13A	DHX40
		RGS18	GPR146	FAM160B1	DHX57
		RHAG	GPX3	FAM174A	DIABLO
		RHCE	GRHPR	FAM178A	DIO2
		RNF123	GRINA	FAM35A	DIP2B
		RNF145	GRIP2	FAM86B1	DIRAS2
		RNF213	GRN	FAM91A1	DIRC2
		RNPEP	GSG2	FAM96A	DKFZP58611420

		RP5-1022P6.2	GTF3C5	FANCA	DKFZp761P0423
		RPIA	GTSE1	FANCD2	DKK1
		RPL14	H2AFY2	FANCG	DKK3
		RPL36A	HAUS4	FAS	DLD
		RPS26L	HCCS	FASTKD5	DLG2
		RPUSD3	HCFC1R1	FBL	DLG5
		RRAGC	HCG2P7	FBLN2	DLK2
		RSPH3	HDAC7A	FBLN7	DLX3
		RUNDC3A	HDHD1A	FBXL3	DLX5
		S100A10	HEATR5B	FBXL6	DMGDH
		S100A12	HEBP1	FBXO25	DMKN
		S100A8	HERC4	FBXO31	DMTF1
		SAMSN1	HIAT1	FBXO46	DNAH2
		SAPS2	HIF1AN	FBXO6	DNAJB12
		SCGB3A1	HINFP	FBXW4	DNAJB6
		SDPR	HINT1	FCAMR	DNAJC10
		SELL	HIST1H2BD	FEM1B	DNAJC13
		SELM	HIST2H2AA4	FEM1C	DNAL4
		SERPINA13	HIST2H2AC	FGF2	DNMT3B
		SERPINB9	HIST2H2BE	FGGY	DOCK1
		SERPINI1	HKR1	FHDC1	DOCK11
		SETD8	HLA-C	FICD	DPEP1
		SGIP1	HMGA1	FIS	DPM3
		SH2D3C	HMGB3	FKBP5	DPP8
		SH2D4A	HNRNPD	FLJ10986	DPPA3
		SHANK3	HNRNPF	FLJ12078	DPPA4
		SHD	HNRNPR	FLJ20581	DPY19L1
		SLA2	HNRPH3	FLJ20674	DPY19L4
		SLC13A5	HOXB8	FLJ38482	DPYS
		SLC17A2	HRG	FLJ42289	DPYSL3
		SLC1A4	HS6ST2	FLVCR2	DRG2
		SLC22A25	HSPA1A	FMO3	DSC2
		SLC22A4	HSPBL2	FNDC4	DSG2
		SLC25A37	HTR2B	FOSB	DTX3
		SLC25A39	HUWE1	FOSL1	DULLARD
		SLC26A3	IFI30	FOSL2	DUOX1
		SLC2A10	IHH	FOXA2	DYNC1I1
		SLC40A1	IL13RA1	FOXD2	DYNC1I2
		SLC5A11	IL17RB	FOXP1	DYNC1LI2
		SLC6A9	IL17RC	FRYL	DYRK3
		SLC9A9	IL18R1	FSTL3	ECD
		SMC2	IL8	FTH1	EDARADD
		SMC4	IMP4	FTSJD2	EDC3
		SMOX	INHA	FVT1	EDG4
		SNAP25	INO80C	G0S2	EDN1
		SNCA	IPW	GABPB2	EDNRB
		SNHG3-RCC1	IQCC	GADD45A	EEF1A1
		SNORD36C	IRAK1	GADD45B	EFEMP1
		SNRPF	IRF2BP2	GAK	EFNB2
		SNRPN	IRF5	GALK2	EFS
		SOBP	ISM1	GAS8	EIF2B4
		SOX18	ITCH	GBP1	EIF4A2
		SOX6	ITFG1	GBP3	EIF4A3
		SPI1	ITFG3	GBP7	EIF4G3
		SPP1	ITGB1BP1	GCC1	EIF4H
		SPTA1	ITSN1	GCLM	ELAVL1

		SRRD	JDP2	GDF15	ELMOD1
		ST6GALNAC4	JTB	GEM	EME1
		STAB2	KCNJ16	GFOD2	EMID2
		STAT5B	KCNJ8	GFRA1	ENAH
		STRADB	KCNS1	GGNBP2	ENC1
		SUMF2	KIAA0363	GHR	ENO2
		SYNGR1	KIAA0556	GJB2	ENPEP
		TAL1	KIAA0907	GJB3	ENSA
		TBC1D10A	KIAA1191	GLIPR1	ENTPD4
		TCF20	KIAA1267	GLOD5	EPAS1
		TCF21	KIAA1285	GLT25D1	EPCAM
		TCTEX1D1	KIAA1328	GLYATL1	EPHA1
		TESC	KIAA1632	GMPPB	EPHA4
		TFDP1	KIDINS220	GNE	EPM2AIP1
		TFDP2	KIF22	GNMT	EPN3
		TFRC	KIF2A	GOLSYN	EPST11
		TGM2	KLF15	GPD1	ERC1
		TMCO6	KLF8	GPT	ERCC1
		TMED4	KLHL2	GPX2	ERCC5
		TMED9	KRCC1	GPX4	ESPN
		TMEM14B	KRT17	GRB14	ESRRG
		TMEM14D	KRTCAP2	GRIA3	ETFB
		TMEM167B	LACTB	GRPEL1	EVL
		TMEM170B	LAMA3	GSTM4	EWSR1
		TMEM173	LANCL2	GSTP1	EXD2
		TMEM2	LASS2	GSTT2	EXOC2
		TMEM43	LASS5	GSTT2B	EXOC7
		TMPRSS9	LBR	GTPBP4	EXPH5
		TNFAIP8L3	LCLAT1	H2AFX	EXTL3
		TRAF4	LCMT2	H3F3B	EYA1
		TRIM10	LCOR	HACE1	EZR
		TRIM8	LDHD	HAO2	F12
		TSPAN32	LGALS3BP	HAS3	F2
		TSPAN7	LGI2	HBEGF	F3
		TTC25	LIME1	HBP1	FAM100B
		TTY11	LIN9	HCG4	FAM108C1
		TUBB1	LMNA	HCP5	FAM114A2
		TUBB4Q	LOC100127988	HDAC1	FAM116B
		TXNDC16	LOC100128326	HECTD1	FAM118A
		UBAC1	LOC100128477	HECTD3	FAM119A
		UBXN6	LOC100128510	HEPACAM	FAM120A
		UGCG	LOC100128688	HERC2	FAM120B
		UNC84A	LOC100128731	HEXIM1	FAM123A
		UROS	LOC100129580	HGD	FAM127B
		VCAM1	LOC100129742	HIBADH	FAM129B
		VNN2	LOC100130229	HIC2	FAM149A
		VWA1	LOC100130557	HIGD1A	FAM156A
		VWF	LOC100130633	HIP1R	FAM156B
		WAS	LOC100130905	HIST1H2AC	FAM158A
		WDR40A	LOC100131096	HIST1H2BC	FAM164A
		WNK4	LOC100131541	HIST1H3D	FAM172A
		XK	LOC100131810	HK1	FAM181B
		XLKD1	LOC100131835	HLA-A	FAM184A
		XPO7	LOC100131866	HLA-B	FAM189B
		YBX1	LOC100131940	HLA-E	FAM195B
		YOD1	LOC100132323	HLA-F	FAM44B

		YPEL2	LOC100132510	HLF	FAM46B
		YPEL4	LOC100132717	HLTF	FAM48A
		ZADH2	LOC100133077	HLX	FAM49A
		ZBTB17	LOC100133578	HM13	FAM60A
		ZDHHC23	LOC100133972	HMOX1	FAM62B
		ZEB2	LOC100134266	HNF4A	FAM65A
		ZFAND3	LOC134997	HNRNPH2	FAM65B
		ZMAT2	LOC148430	HNRPUL1	FAM80B
		ZNF35	LOC149448	HNRPUL2	FAM83B
		ZNF443	LOC152195	HOMER2	FAM84B
		ZNF696	LOC201175	HPCAL1	FAM89A
		ZNF697	LOC202227	HPGD	FANCE
		ZWINT	LOC203547	HPS6	FARP1
			LOC255326	HPSE	FAT1
			LOC283953	HSD11B1	FAT3
			LOC285016	HSD17B12	FBLIM1
			LOC285359	HSD17B13	FBLN1
			LOC285900	HSD17B6	FBLN5
			LOC286002	HSD3B7	FBN2
			LOC341315	HSPB1	FBN3
			LOC341457	HSPC111	FBXL10
			LOC387723	HTATIP2	FBXL14
			LOC387841	HY1	FBXL2
			LOC388076	ID2	FBXL21
			LOC388524	IFFO2	FBXO2
			LOC388681	IFI27	FBXO21
			LOC389072	IFI44	FBXO4
			LOC390956	IFIH1	FBXW8
			LOC391833	IFIT2	FER1L3
			LOC392221	IFIT3	FGA
			LOC399900	IFNAR2	FGD1
			LOC400389	IFT52	FGD6
			LOC400464	IGDCC4	FGF11
			LOC401357	IGF1	FGG
			LOC401588	IGFBP1	FH
			LOC439953	IGFBP2	FHL2
			LOC440396	IGSF8	FHL3
			LOC440585	IK	FIG4
			LOC440589	IKZF5	FILIP1
			LOC440748	IL15	FIT1
			LOC440991	IL15RA	FKBP14
			LOC441114	IL1R2	FKBP2
			LOC442609	IL1RL1	FLJ10996
			LOC641765	IL1RN	FLJ12684
			LOC641825	IL28RA	FLJ14712
			LOC641844	IL32	FLJ16779
			LOC642282	IL5RA	FLJ22184
			LOC642299	IL6R	FLJ30428
			LOC643031	IMMP2L	FLJ31568
			LOC643300	INHBE	FLJ42957
			LOC643433	INSIG1	FLJ44342
			LOC643438	INTS12	FLNA
			LOC644033	INTS9	FLNB
			LOC644101	IPO11	FLNC
			LOC644919	IRF1	FLRT2
			LOC644990	IRF7	FMNL2

			LOC645001	IRS2	FMO5
			LOC645430	ITGA9	FMOD
			LOC645452	ITGB4BP	FN1
			LOC645693	ITGB7	FNBP1L
			LOC645897	ITPKC	FNDC3B
			LOC645963	JAK1	FNTA
			LOC646272	JAM2	FOLR1
			LOC646282	JMJD6	FRAS1
			LOC646845	JMJD7	FRAT2
			LOC647009	JMY	FREM2
			LOC647081	JOSD1	FRMD6
			LOC647150	JUB	FRS3
			LOC647276	JUN	FRZB
			LOC647718	JUND	FSTL1
			LOC648024	KCNIP3	FTHL16
			LOC649169	KCNK5	FTHL7
			LOC649447	KIAA0232	FTL
			LOC649503	KIAA0406	FUCA1
			LOC649639	KIAA0427	FUCA2
			LOC649859	KIAA0564	FUT4
			LOC649873	KIAA0586	FXR1
			LOC650128	KIAA0892	FZD2
			LOC650157	KIAA1543	FZD3
			LOC650737	KIAA1671	FZD4
			LOC651198	KIAA1875	FZD6
			LOC651202	KIF11	FZD7
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			LOC651987	KIF3B	GAB2
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			LOC653752	KLHL29	GAR1
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			MED28	LOC147710	GTF3C3
			MED31	LOC152217	GTPBP3
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			MEGF9	LOC197350	GUCY1A3
			MESP1	LOC221710	GUCY2C
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			MGC70857	LOC389672	HELZ
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			MTPN	LOC644914	HOXB5
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			NLGN4Y	LOC653458	IGSF5
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			NR2C2	LOC728034	INPP1
			NR3C2	LOC728098	INTS2

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			NRM	LOC728139	INVS
			NSDHL	LOC728160	IPO8
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			NT5DC2	LOC728811	IRX4
			NTF4	LOC728855	ISCU
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			NUBP1	LOC729666	ISM2
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			OPRL1	LOC730820	ITGB5
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			PAK4	LRG1	KCNMB4
			PAK6	LRP5L	KCTD12
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			PCMTD1	MAK16	KHDRBS1
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			PDGFRL	MAPRE3	KIAA1217
			PDS5B	MARCH5	KIAA1324L
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			PDZK1IP1	MBOAT2	KIAA1549
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			PHF5A	MGRN1	KLHL24
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			PIGP	MIR1978	KMO
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			PINX1	MLXIPL	KRT18P26
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			PON3	MUTYH	LCP1
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			PPAN	MYL12A	LEMD2
			PPAT	MYL6	LEPREL1
			PPHLN1	MYLK	LEPREL2
			PPIAL4A	MYO1B	LEPROTL1
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			PPM1H	MYRIP	LHFP
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			PTPDC1	NFYC	LOC100129958
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			SNORA70B	R3HDM1	LTA4H
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			SRRM1	RASSF4	MAP2
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			SSH1	RBP7	MAP2K3
			SSH2	RCC2	MAP3K1
			SSTR2	RCL1	MAP3K6
			SSX4	RDH14	MAP3K7
			STAT1	RDH16	MAP4K4
			STAT4	RELA	MAPK4
			STAT6	RELB	MAPK7
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			STK4	REXO1	MAPKBP1
			STUB1	RFC3	MAPRE1
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			TBCD	RPA1	MEST
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			TCEB3	RPF1	METRNL
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			TLR1	S100PBP	MIR21
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			TMED5	SC4MOL	MMD
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			TMEM147	SCP2	MMP9
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			TRIB3	SFRS5	MT1F
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			USP30	SLC31A2	NAV1
			USP33	SLC35C1	NAV2
			USP39	SLC35D1	NCK2
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			TFG	OTUB1
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			THRSP	OVOL2
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			TIFA	P4HA1
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			TIMP3	PAH
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			TK2	PALMD
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			TMEM107	PAPOLA
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				TRPM8	PELI3
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				UMPS	PLD3
				UNC84B	PLD5
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				URG4	PLEKHA9
				USP2	PLEKHG3
				USP24	PLSCR4
				USP34	PLXDC2
				USP38	PMP22
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				UST	PNMA6A
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				VEGFA	POLE
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ACHE
ACMSD
ACOT12
ACOT7
ACOX2
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ACSM2A
ACSM2B
ACVR2A
ACY1
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ADD3
ADM
ADNP
ADRB2
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AGT
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AGXT
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AK1
AK2
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AKIRIN1
AKR1B15
ALAD
ALCAM
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ALDH2

ALDH3A2
ALDH4A1
ALDH7A1
ALDH8A1
ALDH9A1
ALDOA
ALDOB
AMMECR1
ANG
ANGPT1
ANGPTL4
ANKRA2
ANKRD1
ANKRD57
ANP32B
ANXA2
AP1S1
AP2A1
AP3B1
AP3D1
APOB
APOC2
APOC3
APOH
APPBP2
AQP11
ARAP3
ARG1
ARHGAP17
ARHGAP23
ARHGAP24
ARHGDIA
ARHGEF16
ARHGEF5
ARID4A
ARL4C
ARMCX2
ART4
ASB1
ASB8
ASB9
ASF1B
ASGR1
ASGR2
ASH2L
ASL
ASPM
ATF5
ATF6B
ATG4A
ATG7
ATM
ATP2B2
ATP5J
ATP6V0D1
ATP6V0E1

ATP6V0E2
ATP6V1A
ATP6V1E2
ATPAF1
ATRN
ATXN2
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AVPI1
AXL
AXUD1
B2M
B3GALNT1
BAT3
BBX
BCHE
BCKDHA
BCL2L2
BEND5
BEX2
BHLHB2
BHMT2
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BMP4
BOLA2
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C8orf33
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C9orf103
C9orf21
C9orf45
C9orf78
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CAP1
CAPRIN1
CARD8
CARS
CASP2
CASP4
CAST
CBR1
CCBL1
CCDC28B
CCDC34
CCDC53
CCDC77
CCL14
CCNA2
CCND1
CCND3
CCNDBP1
CCRN4L
CCT8
CD14
CD151
CD1D
CD248
CD81
CD93
CDC2

CDC20
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CDC25A
CDC42EP1
CDC45L
CDCA3
CDK10
CDK2
CDK6
CDKN1A
CDKN3
CDRT4
CDT1
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CECR1
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CENPE
CENPF
CENPV
CEP135
CEP152
CERK
CFB
CFH
CFHR1
CFHR2
CFI
CGN
CHAF1B
CHD7
CHD9
CHIC2
CHN2
CHPT1
CHST7
CIB1
CIDEB
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CKAP5
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CLDN7
CLDND1
CLIP1
CLNS1A
CLSTN1
CMAS
CMIP
CMPK1
CMTM3
CMTM7
CNIH
CNOT6
CNOT8
CNTNAP2
COBRA1
COL1A2

COL4A1
COL4A3BP
COL5A2
COMT
COPG2
COPS7B
COQ9
COX5B
COX7C
CP110
CPB2
CPN1
CPSF4
CPVL
CRB3
CREB3L2
CRK
CRLF3
CSE1L
CSF1R
CSF3R
CSNK1E
CSRP2
CTAGE6
CTSE
CXCL14
CYB561
CYB5A
CYBA
CYCSL1
CYP2J2
CYP39A1
CYP3A5
CYP4A11
CYP4F12
CYP4F3
CYP4V2
CYTSB
DACT3
DBI
DCAF7
DCP2
DDA1
DDB1
DDC
DDX11
DDX23
DDX54
DECR1
DECR2
DEDD2
DENND2A
DHDDS
DHRS4
DHX32
DICER1

DIO1
DLGAP5
DMAP1
DMC1
DNAJC12
DNASE1
DNASE2
DNMT1
DOK4
DPF2
DPM2
DPYD
DSP
DSTN
DUS3L
DUSP14
DUSP23
DUSP28
DUSP6
DVL3
DYNC1H1
DYNLL1
EARS2
EBP
EBPL
ECH1
ECHDC2
EEF1A2
EEF1D
EGFLAM
EHD4
EHHADH
EIF2AK1
EIF3D
EIF3L
EIF4A1
EIF5A
ELF3
ELL2
ELOVL1
ELOVL2
ELP2
EMILIN2
EML1
ENPP5
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EPB41L3
EPHB6
ERI1
ERICH1
ERP29
ERRFI1
ESAM
ETFDH
ETS1
EVC2

EXO1
EYA2
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F7
F9
FAAH2
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FADS1
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FAM117B
FAM125B
FAM129A
FAM160B2
FAM176A
FAM177A1
FAM39DP
FAM46A
FAM82A2
FASTKD1
FBXL20
FBXO11
FBXO18
FBXO32
FBXO38
FBXO5
FBXW5
FEN1
FES
FEZ1
FEZ2
FGD5
FGFR3
FKBP1A
FLJ14213
FLJ21986
FOXA1
FOXA3
FOXJ2
FOXM1
FSCN1
FTCD
FTHL12
FTHL8
FXYD1
FXYD2
G6PC
GAL3ST1
GALK1
GAMT
GAS1
GBA3
GBAS
GBGT1

GBP2
GCA
GCH1
GCHFR
GCLC
GCNT2
GGA3
GGCX
GHDC
GIN3
GLYAT
GLYCTK
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GOT1
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GPR175
GPR177
GPR37
GPR56
GPRASP2
GPRC5C
GPX1
GSDMD
GSR
GSTA1
GSTA5
GSTK1
GSTT1
GTF2E2
GTF2IRD2B
GTF3C2
GUSB
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H2AFY
H3F3A
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HACL1
HADH
HADH2
HAGH
HAO1
HCFC1
HCN4
HDAC2
HDDC2
HEG1
HERC5
HES4
HEXB
HFE2
HGFAC
HGS
HIST1H4C
HIST2H2AA3

HIST2H2AB
HJURP
HLA-H
HMGB2
HMGXB4
HMMR
HNRNPAB
HOXB2
HP
HPD
HPN
HPR
HPS1
HPX
HRASLS3
HRSP12
HSD17B10
HSD17B11
HSZFP36
HTRA1
HTT
HULC
HYOU1
IAH1
IARS2
ICAM2
ID3
IER3
IFI35
IFI6
IFITM1
IFITM2
IFITM3
IFRD1
IFRD2
IFT88
IGF2BP2
IGF2BP3
IGFBP7
IGSF1
IKBKG
IL20RB
IMPDH2
INTS4
IP6K1
IQCK
IRAK2
IRF8
IRX3
ISCA1
ISG20
ISOC2
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ITIH2
ITIH4
ITM2A

ITM2C
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ITPRIPL2
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JARID2
JMJD8
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KANK4
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KCTD14
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KEAP1
KHK
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KIAA0319L
KIAA0355
KIAA0528
KIAA0922
KIAA1026
KIAA1712
KIAA1797
KIAA1881
KIAA2013
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KIF20B
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KIFC1
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KNG1
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KYNU
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LAMC2
LANCL1
LARP6
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LCMT1
LEAP-2
LGALS2
LIN37



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LRRC28
LRRFIP2
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LUZP1
LYSMD4
MACF1
MAD1L1
MAD2L1BP
MAGED1
MAGED2
MALL
MALT1
MAP2K1
MAP2K5
MAPBPIP
MAPKAP1
MARCKSL1
MARVELD3
MASP1
MASP2
MBNL2
MCM10
MCM2
MCM4
MCM6
MCM7
MDC1
MDK
MED23

MED24
MED25
METTL1
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METTL7B
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MGC57346
MGEA5
MICALL2
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MID2
MIDN
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MOBKL2C
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MPV17
MPV17L2
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MRPL17
MRPL20
MRPL23
MRPL36
MRPL40
MRPS27
MSRA
MSX1
MT1H
MTHFD2
MTHFS
MTL5
MTO1
MUC1
MYADM
MYC
MYH10
MYH9
MYO6
MYO9A
MYPOP
NAAA
NARF
NAT15
NCALD
NCAPD2
NDC80
NDRG2
NDUFAF1
NDUFAF3
NEDD9
NELF
NEO1
NFE2L1
NFIB

NFIL3
NGEF
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NINJ2
NIP7
NIPBL
NIPSNAP1
NMRAL1
NODAL
NONO
NOP16
NOP2
NR0B2
NR1H3
NR1I3
NR2F2
NRP1
NSL1
NT5DC3
NT5E
NT5M
NTHL1
NTN1
NUAK2
NUCB1
NUCKS1
NUDT15
NUP160
NUP205
NUP43
NUP93
NUPR1
NUSAP1
NUTF2
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OBFC2A
OCRL
ODF2
OR9A4
ORAOV1
ORC2L
ORC3L
OSBPL1A
OSBPL9
OSCP1
OXCT2
OXER1
OXSR1
P2RY2
P4HB
P4HTM
P76
P8
PABPC1
PABPC4

PACSIN2
PALM
PAMR1
PAPSS1
PAQR8
PAQR9
PARL
PARP9
PARVA
PAWR
PBLD
PCBD1
PCBP2
PCDH24
PCGF5
PCK2
PCNA
PCYT2
PDE12
PDE9A
PDGFRB
PDIA3P
PDXDC1
PDZD8
PEBP1
PEG10
PEPD
PEX11G
PEX16
PFAS
PFKP
PHF21A
PHIP
PHKB
PHLDA1
PIK3R2
PIM2
PINK1
PIP5K2A
PJA1
PKMYT1
PKP2
PLA2G12B
PLAA
PLAG1
PLCXD1
PLD1
PLD6
PLEKHF1
PLEKHG4
PLGLB1
PMVK
POGK
POLR2L
POLR3A
POLR3C

POLR3GL
POLR3H
PON1
PON2
PPDPF
PPIC
PPIH
PPP1R16A
PPP1R1A
PPP2R2A
PPP2R3C
QBP1
PRAP1
PRC1
PRDX5
PRIC285
PRICKLE2
PRKAB1
PRKAG2
PRKX
PROC
PROS1
PRR4
PSCD2
PSMB10
PSMB7
PSMD12
PSRC1
PTBP2
PTGES2
PTGFRN
PTH1R
PTK2
PTOV1
PTPRF
PTPRH
PTPRM
PTRF
PTTG1
PTTG3P
PVRL2
PWWP2B
PXMP2
QARS
QDPR
QPRT
RAB11FIP1
RAB11FIP5
RAB13
RAB23
RAB27A
RAB2B
RAB31
RAB32
RAB9A
RABGGTB

RABL2B
RACGAP1
RAP1GAP
RAPGEF2
RARA
RASSF1
RAVER2
RBKS
RBM12B
RBM4
RBP4
RBPMS
RCAN1
RCOR3
RDH5
REEP6
REPS2
RETSAT
RFWD3
RGN
RGS12
RHBDD1
RHOC
RHOT1
RHOU
RIC8A
RIPK2
RIPK4
RIPK5
RMI1
RNASE4
RND3
RNF126
RNF135
RNF144
RNF144A
RNF150
RNF185
RNMTL1
RNPC3
ROBO3
ROMO1
RPL15
RPL23
RPL36AL
RPL41
RPP21
RPP38
RPRC1
RPS2
RPS26P11
RPS4X
RPS6KB2
RRAS2
RREB1
RRP15

RSPO3
RTKN
RTN4
RTP2
RYK
SAA4
SACM1L
SALL2
SAMD9
SAMM50
SAT1
SCAND1
SCARA3
SCCPDH
SCG5
SCYL1
SDC4
SDHB
SDSL
SEC24C
SELENBP1
SEMA4F
SEMA6B
SEPN1
SEPT11
SEPT2
SEPX1
SERF2
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SERPINA4
SERPINA6
SERPINB1
SESN1
SFRS4
SGCE
SH3BP4
SHRM
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SIK3
SIPA1
SKA1
SKA2
SKP2
SLC11A2
SLC15A3
SLC15A4
SLC16A4
SLC16A9
SLC20A1
SLC25A15
SLC25A43
SLC27A2
SLC2A1



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SLC39A8
SLC3A2
SLC43A3
SLC44A1
SLC44A2
SLC7A5
SLC7A7
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SMARCB1
SMARCC1
SMC3
SMURF1
SNAP29
SNHG6
SNRNP35
SNRPD2
SNUPN
SNX27
SOD1
SON
SORBS2
SORD
SOX4
SOX9
SPARC
SPC24
SPIN4
SPINT2
SPRY1
SPRY2
SPRYD3
SQRDL
SS18
SSR4
ST7
STBD1
STC2
STK3
STK40
STMN3
STOM
STRADA
STT3A
STX3
SUCLG1
SUMO3
SUPT16H
SUSD1
SWAP70
SYNJ1
SYTL4
TACC1

TACC2
TACSTD1
TBC1D9B
TBPL1
TDO2
TEK
TERF2IP
TFB2M
TFPI
TGIF1
TH1L
THSD4
TIMP2
TJP1
TJP2
TM4SF1
TM4SF18
TM4SF4
TM4SF5
TMEM140
TMEM166
TMEM176A
TMEM176B
TMEM181
TMEM189-UBE2V1
TMEM194A
TMEM216
TMEM217
TMEM49
TMEM51
TMEM59
TMEM86B
TMOD1
TMPRSS2
TMPRSS6
TNFAIP3
TNFRSF10B
TNFRSF12A
TNFRSF14
TNFRSF21
TNS3
TOM1L2
TOP2B
TP53AP1
TPM2
TPMT
TPR
TPST2
TRAF3IP2
TRAF6
TRIM15
TRIM26
TRIM33
TRIOBP
TRIP6
TRO

TSC22D2
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TSPO
TSPYL1
TSPYL3
TSPYL5
TSSC4
TTC3
TUBA1C
TUBD1
TUBG1
TXN
TXNDC12
TXNRD1
TYSND1
U2AF1
UAP1L1
UBAP2L
UBE2C
UBE2D4
UBE2T
UBL4A
UCHL5IP
UGP2
UGT2B4
UGT2B7
UHRF1
ULK4
UNG
UPB1
UPP1
UQCC
UQCRQ
UROD
USE1
USMG5
USP15
USP21
VAMP5
VBP1
VCL
VDAC3
VIPR1
VLDLR
VNN3
VOPP1
VPS37A
VPS8
VRK1
VSNL1
WBP11
WDR1
WDR20
WDR23
WDR51A
WNT5A



Supplementary Table S5: Gene list related to Hippo pathway.

Term	%	PValue	Genes
GO:0005667~transcription factor complex	20,51	1,63E-06	SMAD7, TEAD4, SMAD4, SMAD3, LEF1, TEAD2, TEAD3, YAP1
GO:0044451~nucleoplasm part	23,08	1,24E-04	SMAD7, TEAD4, SMAD4, SMAD3, LEF1, TEAD2, TEAD3, YAP1, PPP1CC
GO:0045177~apical part of cell	15,38	1,35E-04	PRKCZ, INADL, PRKCI, CDH1, FZD3, FZD6
GO:0005911~cell-cell junction	15,38	1,79E-04	PRKCZ, INADL, SMAD7, AMOT, CDH1, PARD6G
GO:0016327~apicolateral plasma membrane	12,82	1,85E-04	PRKCZ, INADL, AMOT, PARD6G, FZD6
GO:0044459~plasma membrane part	41,03	4,91E-04	PRKCZ, INADL, SMAD7, TGFBR2, PRKCI, CDH1, FZD3, ITGB2, FZD2, CTNNA1, FZD6, FRMD6, AMOT, PARD6G, DLG2, BMPR1A
GO:0030054~cell junction	20,51	5,17E-04	PRKCZ, INADL, SMAD7, AMOT, CDH1, PARD6G, CTNNA1, DLG2
GO:0005923~tight junction	10,26	0,0011	PRKCZ, INADL, AMOT, PARD6G
GO:0070160~occluding junction	10,26	0,0011	PRKCZ, INADL, AMOT, PARD6G
GO:0005654~nucleoplasm	23,08	0,0027	SMAD7, TEAD4, SMAD4, SMAD3, LEF1, TEAD2, TEAD3, YAP1, PPP1CC
GO:0043296~apical junction complex	10,26	0,0027	PRKCZ, INADL, AMOT, PARD6G
GO:0015629~actin cytoskeleton	12,82	0,0067	PRKCZ, AMOT, CDH1, CTNNA1, LLGL1
GO:0005856~cytoskeleton	25,64	0,0124	PRKCZ, PPP2R1A, YWHAZ, FRMD6, AMOT, CDH1, CTNNA1, DLG2, LATS2, LLGL1
GO:0016342~catenin complex	5,13	0,0140	SMAD7, CDH1
GO:0031012~extracellular matrix	12,82	0,0156	WNT4, WNT5B, WNT11, BMP7, WNT6
GO:0005886~plasma membrane	46,15	0,0188	PRKCZ, INADL, SMAD7, TGFBR2, PRKCI, SMAD3, CDH1, ITGB2, FZD3, FZD2, CTNNA1, FZD7, FZD6, FRMD6, AMOT, PARD6G, DLG2, BMPR1A
GO:0044448~cell cortex part	7,69	0,0228	PRKCZ, PRKCI, LLGL1
GO:0043235~receptor complex	7,69	0,0421	TGFBR2, SMAD3, ITGB2
GO:0031981~nuclear lumen	23,08	0,0451	SMAD7, TEAD4, SMAD4, SMAD3, LEF1, TEAD2, TEAD3, YAP1, PPP1CC
GO:0005578~proteinaceous extracellular matrix	10,26	0,0605	WNT4, WNT5B, WNT11, WNT6
GO:0045121~membrane raft	7,69	0,0611	PRKCZ, TGFBR2, BMPR1A
GO:0005938~cell cortex	7,69	0,0634	PRKCZ, PRKCI, LLGL1
GO:0005912~adherens junction	7,69	0,0704	SMAD7, CDH1, CTNNA1
GO:0070161~anchoring junction	7,69	0,0842	SMAD7, CDH1, CTNNA1
GO:0005913~cell-cell adherens junction	5,13	0,0941	SMAD7, CDH1

Supplementary Table S6: Gene lists of the venn diagram Figure 6A.

he_expr	hlc_expr	he_expr AND hlc_expr	de_expr	he_expr AND de_expr	hlc_expr AND de_expr	he_expr AND hlc_expr AND de_expr
ABCC6P2	A4GNT	A1CF	ABCG4	ABCC1	AADAACL4	A2LD1
ADAM12	AADAC	ABCC2	ABI3	ACCN2	ABAT	A2ML1
ADC	ABCA5	ACADL	ACADSB	ADAM23	ABCA11	A4GALT
ADPRHL1	ABCA8	ACCN3	ACAP1	ADAMTSL3	ABCA2	AAAS
AMBN	ABCA9	ADAT2	ACPT	ADD2	ABCA4	AACS
APBB2	ABCB4	ADRA1B	ACSBG1	ADRB2	ABCC6	AACSL
ARFIP2	ABCC6P1	AFAP1L1	ACSM4	AGR3	ABCC9	AADAACL1
ARL6	ACRV1	AFF2	ACTN3	AMPH	ABCD1	AADAT
BCL2A1	ACSL5	AGT	ACVRL1	ANAPC7	ABCG2	AAGAB
BOLL	ACSS1	AKR1B10	ADAMTS8	ANK2	ACE2	AAK1
C10orf112	ADAMTS2	AKR1B15	ADRA2C	AOAH	ACTG2	AAMP
C11orf65	ADAMTS20	ALDH1L1	AGER	APBB1	ADAM2	AARS
C13orf33	ADAMTSL1	ALDH3B2	AGXT2L1	APCDD1	ADAM8	AARS2
C14orf165	ADCY4	ALG10	ALDOB	ARRB2	ADAMTS7	AARSD1
C19orf57	ADH1A	ALG2	ANK1	ASB9	ADAMTSL5	AASDH
C1orf103	ADRA1A	AMAC1L2	ANKRD19	ASCL2	AFF3	AASDHPPT
C1orf182	AFM	AMDHD1	ANKRD55	ASPHD1	AGPAT9	AASS
C2	AGMAT	AMY2A	ANKRD58	ATOH7	AKAP2	AATF
C21orf34	AGPAT3	ANKRD43	ANO4	ATP1B2	ALDH1A2	AATK
C3orf57	AHSG	ANXA4	ANO7	ATP6V0D2	ALPPL2	ABCA1
C4orf36	AIFM2	ANXA8	AOX1	B3GAT1	ALS2CR16	ABCA3
C4orf47	ALMS1P	ANXA8L1	ARHGEF4	B3GNT4	AMH	ABCA7
C5orf38	ALOX15	ANXA9	ARNTL2	BARX1	ANAPC2	ABCB10
C5orf43	ALOX5AP	APOB	ARTN	BCAS3	ANGPT2	ABCB6
C7orf46	ALPI	APOC3	ARVCF	BCL10	ANKRD23	ABCB7
C7orf51	AMY2B	APOL2	ATOH8	BCL6B	ANKRD36	ABCB9
C8orf79	ANKS4B	AQP3	ATP1A2	BEST4	ANKRD41	ABCC10
CACNA1S	ANP32E	ARHGAP18	ATP2B3	BFSP1	ANO1	ABCC3
CALCA	ANXA8L2	ARHGAP8	ATP8B3	BOLA2B	APCDD1L	ABCC4
CASC1	APLF	ARNTL	B3GALT5	BSPH1	APOBEC3B	ABCC5
CBLN1	AQP1	ARRDC4	BAI1	BTBD11	APOF	ABCD3
CD69	AQP10	ASCL5	BAZ2A	BZW1	AQP7P1	ABCE1
CDYL2	ARAP2	ATP10B	BDKRB2	C12orf28	AQP7P2	ABCF1
CHRD12	ARHGAP20	ATP2A3	BHLHE22	C12orf34	ARHGAP11B	ABCF2
CLGN	ARHGAP29	ATP2C2	BRDT	C12orf56	ARVP6125	ABCF3
COL21A1	ARHGAP30	ATP6V1C2	BREA2	C14orf101	ASAP1IT1	ABCG1
CPSF4L	ARHGAP6	ATP7A	BTBD9	C14orf11	ATF6B	ABHD10
CR2	ARPM1	ATP8B1	C10orf85	C14orf115	ATG2B	ABHD11
CRYBB2	ARRDC1	AURKAPS1	C10orf96	C14orf65	ATP13A3	ABHD12
CUZD1	ART4	BACH1	C12orf36	C15orf34	ATP8B4	ABHD12B
CXorf18	ASGR2	BCAM	C12orf73	C16orf45	ATRX	ABHD14A
CXorf48	BAI2	BEND6	C14orf121	C17orf93	B3GNT3	ABHD15
CXorf56	BCAR4	C10orf10	C14orf21	C19orf4	B3GNT5	ABHD2
DAZ2	BCMO1	C10orf65	C14orf72	C1orf51	BAALC	ABHD3

DAZ4	BNC1	C10orf73	C16orf11	C20orf54	BATF3	ABHD4
DHODH	BRUNOL6	C11orf36	C16orf69	C21orf63	BCAN	ABHD5
DKFZp547K05	C10orf128	C11orf52	C17orf67	C2CD4C	BDP1	ABHD6
DKFZP564J10	C10orf41	C11orf71	C17orf76	C3orf54	BOC	ABHD7
DLX6	C10orf54	C17orf75	C19orf51	C3orf71	BRD4	ABHD8
DLX6AS	C12orf27	C18orf19	C1orf222	C5orf45	BTK	ABHD9
DNAI1	C13orf31	C18orf2	C1orf94	C6orf126	BTN3A2	ABI1
DNTT	C15orf48	C19orf69	C1QL1	C8orf13	C10orf39	ABI2
DYNC1L1	C16orf54	C1orf105	C1QL4	C9orf125	C14orf176	ABL1
EBF3	C16orf55	C1orf161	C1QTNF4	C9orf129	C15orf59	ABL2
EDIL3	C17orf74	C1orf177	C20orf112	C9orf24	C17orf108	ABLIM1
EEFSEC	C17orf82	C1orf189	C20orf62	CA12	C19orf66	ABR
EMR4	C19orf21	C1orf213	C2CD4B	CADPS	C19orf71	ABT1
EN2	C1orf170	C1orf64	C2orf48	CAMK1	C1orf95	ABTB1
EPS8L2	C1orf188	C20orf151	C2orf78	CAMK1D	C1QA	ABTB2
EPS8L3	C1orf210	C2orf67	C2orf80	CAMKV	C1QTNF5	ACAA1
EREG	C1orf215	C3orf60	C3orf32	CAPN9	C21orf128	ACAA2
ERVK6	C1orf229	C4orf16	C3orf35	CCDC4	C4orf38	ACACA
EXOG	C1orf81	C4orf19	C3orf51	CCDC88A	C4orf39	ACACB
FA2H	C1QTNF1	C4orf32	C4orf11	CCL26	C6orf204	ACAD10
FAM153A	C21orf119	C6orf100	C5orf20	CD2	C6orf25	ACAD11
FAM155B	C21orf49	C8orf47	C7orf57	CD200	C6orf81	ACAD8
FAM178B	C2orf54	C8orf51	C8orf15	CD3EAP	C8orf16	ACAD9
FAM187B	C3orf15	C9orf164	C8orf30B	CD7	C8orf44	ACADM
FAM46D	C3orf36	C9orf66	C8orf34	CDA	C9orf3	ACADS
FAM47E	C3orf62	CACNG1	C8orf77	CDH20	CA8	ACADVL
FANK1	C3orf70	CASQ2	C8orf80	CDK5R2	CACNA2D3	ACAP2
FBXO25	C5orf23	CBX8	C8ORFK29	CER1	CALCR	ACAT1
FGFBP1	C5orf27	CCBP2	CA10	CHGA	CAMK1G	ACAT2
FGFR1	C6orf199	CCDC126	CA5BP	CHRN4	CAPN14	ACBD3
FLJ22447	C6orf208	CCDC57	CACNA1D	CHST4	CCDC147	ACBD4
FLJ23865	C6orf221	CCDC68	CACNA1I	CHST6	CCDC17	ACBD6
FLJ36032	C7orf53	CD163	CADM3	CHST8	CCDC35	ACBD7
FLJ36848	C8orf4	CDK8	CAMK2B	CLEC4D	CCNJ	ACCS
FLJ37512	C9orf62	CEACAM21	CAMKK1	CNIH3	CDH26	ACD
FLJ40330	CA3	CECR4	CAPN10	COL9A1	CDKN2B	ACER2
FLJ44450	CACNG4	CFB	CAPN11	COX11P	CDKN2C	ACER3
FLJ90036	CADM2	CFC1B	CBY3	CPNE4	CEACAM1	ACHE
FOXJ1	CAMTA2	CFH	CCDC141	CPT1C	CGA	ACIN1
FXYD4	CAPN3	CFHR3	CCDC19	CSAG1	CGB1	ACLY
G0S2	CASP4	CHGB	CCDC36	CTSF	CHST1	ACN9
GAGE12H	CCDC146	CHTF8	CCDC74A	CUX2	CKMT2	ACO1
GAS2	CCDC149	CIDEB	CCDC81	DBF4	CLSTN2	ACO2
GCNT6	CCDC153	CIDECF	CCL8	DCX	CNR1	ACOT1
GDAP1L1	CCDC33	CLDN9	CD163L1	DDX25	COL20A1	ACOT11
GDEP	CCDC96	CPEB4	CD164L2	DDX6	CORO6	ACOT2
GNAT1	CCR7	CPN1	CD3G	DEPDC7	CPPED1	ACOT4
GPR112	CD247	CRH	CD48	DGCR5	CRIM1	ACOT7
GPR150	CD302	CROCCL1	CD70	DNAJC11	CRLF1	ACOT8
GSDM1	CD84	CRYBA1	CDC14C	DNAJC12	CROCCL2	ACOT9

GTF2H2	CDGAP	CSGALNACT1	CDH12	DOCK5	CRYBA2	ACOX1
GTSF1	CDH17	CSNK1A1L	CDH4	DOK1	CSDC2	ACOX2
HCG18	CDH5	CTSE	CECR2	DPY19L3	CSF3R	ACOX3
HCK	CDH8	CTSO	CELP	DUSP26	CTAGE5	ACP1
HGD	CDKN2A	CXorf21	CHADL	DZIP1	CTGLF1	ACP2
HGSNAT	CDNF	CYP46A1	CHRNA10	ECAT8	CXCL1	ACP6
HIST1H2AM	CDY1B	DALRD3	CHST11	EDA	CYP2D7P1	ACPL2
HIST1H3G	CEACAM6	DDC	CIT	EFCBP1	DDX26B	ACPP
HIST1H4I	CEND1	DHFR	CLUL1	FABP5L3	DEFB1	ACRC
HIST2H2BF	CEP170	DIRAS2	CMTM1	FAM124A	DEFB116	ACSF2
HYALP1	CGB	DIRAS3	CNN1	FAM133A	DEFB123	ACSL1
ICA1L	CGB5	DMRT2	CNNM1	FAM167A	DENND3	ACSL3
ICF45	CGB7	DMXL2	CNTNAP3	FAM179A	DKFZP434L18	ACSL4
IFI44	CGB8	DNAJB4	CNTNAP3B	FAM59B	DKFZp686E24	ACSM3
IL15RA	CHRD	DNAJC22	COL27A1	FAM80A	DNHL1	ACSS2
INSRR	CHRNA2	DNAJC25-GNCG	COL29A1	FANCF	DPY19L2P2	ACSS3
IRF2	CHRNE	DOK5	COL6A6	FAT4	DQX1	ACTA1
ISL2	CIDEA	DOK6	COL8A1	FCN3	DST	ACTA2
JARID1C	CIDEC	DPEP1	CORO1A	FGF12	DZIP3	ACTB
JMJD7	CILP	DPYS	CORO2B	FGF19	EBI3	ACTC1
KCNH2	CLDN18	DUSP27	COX7A1	FLJ10324	ECM1	ACTG1
KERA	CLEC18C	DUSP9	CRYGD	FLJ25404	EGF	ACTL6A
KIAA0692	CLEC1A	DUX4	CSF2	FLJ40125	ELOVL2	ACTN1
KIAA1324	CLEC2B	EDA2R	CSMD2	FLJ44379	EMX1	ACTN4
KIAA1345	CLEC2L	EGFL6	CSPG4	FOXD4	ERP44	ACTR10
KILLIN	CLIC3	EHHADH	CST2	FOXI2	ETV2	ACTR1A
KLHL14	CNNM2	EIF4E1B	CUGBP2	FPR1	EVI1	ACTR1B
KLRC1	CNTN4	ELF5	CXCL11	FRAT1	EZH1	ACTR2
LCE1B	COL15A1	ELMOD1	CXCL6	FRMD5	FAM101A	ACTR3
LNP1	COLEC11	ELP2P	CXCR1	FZD9	FAM183A	ACTR3B
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LOC10012815	CPAMD8	EPN3	CYP2A13	GAP43	FAM91A1	ACTR8
LOC10012820	CPLX2	EPO	CYSLTR2	GDPD4	FBLN7	ACTRT1
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LOC10012852	CREB3L3	ETHE1	DDX20	GGT2	FLCN	ACVR2A
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LOC10012905	CRYAB	F7	DHRS9	GLI2	FLJ10246	ACYP1
LOC10012911	CSF1R	FALZ	DIRAS1	GLIPR1L1	FLJ11292	ACYP2
LOC10012926	CSN1S1	FAM151A	DIS3	GLT25D2	FLJ21986	ADA
LOC10012943	CST6	FAM176A	DISC1	GNA14	FLJ23152	ADAL
LOC10012944	CUBN	FAM188B	DISP2	GPR101	FLJ26850	ADAM10
LOC10013008	CXCR6	FAM76A	DKFZp761E19	GPR146	FLJ35258	ADAM15
LOC10013018	CYP19A1	FARP2	DKK4	GPR182	FLJ37078	ADAM17
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LOC10013050	CYP26B1	FBXL3	DNAJC16	GPR83	FLJ45513	ADAM9
LOC10013065	CYP3A7	FBXO4	DNM1	GRIA3	FOSB	ADAMTS1
LOC10013099	CYP4V2	FCRLB	DNM3	GRM4	FOXF1	ADAMTS18



LOC10013125	DCAF4L1	FGB	DOC2A	GRM8	FOXL2	ADAMTS19
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LOC10013148	DCLK2	FIGN	DPF1	HDAC5	GAS2L1	ADAMTS6
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LOC10013170	DEFA6	FLJ33630	DYRK3	HIST1H1D	GGT7	ADAMTSL2
LOC10013174	DHH	FLJ35429	EBF2	HIST1H1E	GHRHR	ADAMTSL4
LOC10013196	DHRS4L1	FLJ37644	EBI2	HIST1H4J	GLCCI1	ADAP2
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LOC10013198	DKFZp686J05	FMO1	ECSCR	HMGB3L1	GOLGA8E	ADAT1
LOC10013228	DKFZp779L18	FN1	ELAVL3	HMP19	GP6	ADAT3
LOC10013236	DLC1	FOLH1	ELAVL4	HOXD3	GPBAR1	ADCK1
LOC10013255	DLG1	FOXE3	ESRRB	HR	GPD2	ADCK2
LOC10013264	DLX1	FOXI3	F8	HRC	GPR124	ADCK4
LOC10013273	DMPK	FTCD	FAM101B	HSPC047	GRAMD2	ADCK5
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LOC10013417	EFCAB3	GOLGA7B	FAM78B	KIAA1086	HIST1H2BE	ADK
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LOC10013471	ELOVL7	GRAMD1C	FBXL19	KLKB1	HSN2	ADO
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LOC149351	ETAA1	GSTA5	FGF17	LHX6	IL1RAP	ADPRHL2
LOC150223	EXD3	GTF2IRD2P	FGF8	LOC10012837	IL6	ADRA2A
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LOC196993	F8A3	HAAO	FLJ20581	LOC10012907	ITGA1	ADRBK1
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LOC284276	FAM22D	HEXIM1	FLJ23754	LOC10012960	KCNK7	ADSL
LOC284293	FAM23B	HEYL	FLJ27365	LOC10013017	KIAA0226	ADSS
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LOC360030	FER1L5	HIST1H4H	FLJ39632	LOC10013093	KIAA1875	AEN
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LOC389458	FLJ13197	HMGCS2	FLJ40473	LOC10013122	KLC3	AFAP1
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LOC390712	FLJ22639	HOXA2	FLJ45445	LOC10013147	KRT18P34	AFF1
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LOC393076	FLJ35776	HS6ST1	FMN2	LOC10013173	LCAT	AFG3L1
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LOC440330	FLJ44313	ID4	FRMPD4	LOC10013293	LOC10012792	AGA
LOC440577	FLJ45983	IGF1	FSHR	LOC10013303	LOC10012835	AGAP3
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LOC643731	GJB6	KLF3	GNAZ	LOC374491	LOC10013041	AGXT2L2
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SFXN3	ARHGAP22
SHOX2	ARHGAP23
SHROOM1	ARHGAP24
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SLC22A1	ARHGAP27
SLC4A3	ARHGAP28
SLC6A16	ARHGAP4
SLC9A9	ARHGAP9
SMC1A	ARHGDI A
SNAP25	ARHGDI B
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SNORA71A	ARHGEF10L
SNORA72	ARHGEF11
SNORA77	ARHGEF12
SNORA80	ARHGEF16
SNORD11	ARHGEF17
SNORD123	ARHGEF18
SNORD69	ARHGEF19
SNORD87	ARHGEF2
SNORD99	ARHGEF3
SOCS7	ARHGEF5
SPANXA2	ARHGEF5L
SPANXB1	ARHGEF6
SPARCL1	ARHGEF7



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LY6G6C	SOSTDC1	MIRLET7I
LYG1	SPAG4	MLKL
LYPD5	SPRN	MMP16
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MAPKBP1	SRRM5	MRAS
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MDM2	SYK	MT3
MED12L	SYNPO2	MYLC2PL
METTL2B	TAAR8	MYO1G
MFSD9	TAC1	MYRIP
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MGC35440	TBC1D8B	MYST4
MGC52498	TCF21	MYT1
MGLL	TCP10L	NCRNA00113
MIA	TEX11	NCRNA00162
MICALL2	TFAP2B	NECAB1
MIP	TFCP2L1	NFASC
MIR1247	THAP3	NFIA
MIR128-2	THAP8	NFIC
MIR1915	THBS1	NGFR
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MIR30C2	THSD3	NKAIN1
MIR326	TIGD6	NKX2-5
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MIR532	TM4SF18	NMUR2
MIR574	TM6SF2	NOS1AP
MIR577	TMCC3	NOS2
MIR642	TMEM105	NPM2
MIR708	TMEM191C	NPPA
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MPP7	TMEM68	NRP2
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MSLN	TMPRSS13	OR52N2
MT4	TMTC2	OR5AP2
MTSS1L	TNFSF12-TNFS	OR5K4
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MXRA8	TRIM62	PACRG
MYBPC3	TRPV6	PADI3

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SRPX2	ARID3B
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VIPR2	ARMCX3
VPS13B	ARMCX4
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OPHN1	XKRX	PRDM6
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OR7E91P	ZDHHC15	PTAFR
OSM	ZDHHC20	PTGDS
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ZRSR2
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ZSCAN12L1
ZSCAN16
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ZSCAN21
ZSCAN29
ZSCAN5A
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ZSWIM5
ZSWIM6
ZSWIM7
ZUFSP
ZW10
ZWILCH
ZWINT
ZXDC
ZYG11B
ZYX
ZZEF1
ZZZ3

Supplementary Table S7: List of genes used for heatmaps in Supplementary Figure S3 and regulatory network analysis via oPOSSUM data base.

POU5F1	iPSC/ESC
SOX2	DE
NANOG	HE
HNF1A	HLC
HNF1B	
LGR5	
ONECUT1	
ONECUT2	
ALB	
AFP	
TTR	
SOX17	
SALL4	
GPBAR1	
DLK1	
DLK2	
KIT	
CD34	
THY1	
CYP3A7	
CYP1A1	
TRIM15	
WNT3A	
SOX9	
NOTCH1	
NOTCH2	
NOTCH3	
JAG1	
JAG2	
FOXD4	
FOXJ1	
PROX1	
CXCR4	
GATA4	

Supplementary Table S8: Regulatory network analysis via oPOSSUM data base.

TF	JASPAR ID	Class	Target gene hits	Target TFBS hits	Z-score	Fisher score	p_fisher
Myc	MA0147.1	Zipper-Type	20	47	12,538	10,045	4,3402E-05
HNF1A	MA0046.1	Helix-Turn-Helix	8	12	11,142	6,095	0,00225411
SP1	MA0079.2	Zinc-coordinating	26	166	10,879	8,689	0,00016843
MZF1_5-13	MA0057.1	Zinc-coordinating	28	144	10,634	11,781	7,6485E-06
HNF4A	MA0114.1	Zinc-coordinating	18	25	10,585	13,199	1,8525E-06
Klf4	MA0039.2	Zinc-coordinating	28	176	10,414	9,748	5,8411E-05
Mycn	MA0104.2	Zipper-Type	21	45	9,937	10,917	1,8147E-05
MZF1_1-4	MA0056.1	Zinc-coordinating	28	341	9,472	5,875	0,00280879
INSM1	MA0155.1	Zinc-coordinating	19	38	9,017	9,948	4,7823E-05
ESR2	MA0258.1	Zinc-coordinating	6	7	8,72	4,996	0,00676495
Tcfcp2l1	MA0145.1	Other	24	58	8,586	11,598	9,1844E-06
HIF1A::ARNT	MA0259.1	Zipper-Type	24	79	7,882	9,734	5,9235E-05
NR2F1	MA0017.1	Zinc-coordinating	9	11	7,151	5,998	0,00248371
EBF1	MA0154.1	Zipper-Type	21	67	6,987	6,61	0,00134683
Ddit3::Cebpa	MA0019.1	Zipper-Type	10	19	6,879	4,026	0,01784557
FOXF2	MA0030.1	Winged Helix-Turn-Helix	5	13	6,758	1,371	0,25385298
Myf	MA0055.1	Zipper-Type	15	46	6,493	2,883	0,05596661
CEBPA	MA0102.2	Zipper-Type	18	82	6,326	3,134	0,04354328
Zfx	MA0146.1	Zinc-coordinating	25	62	6,141	12,815	2,7197E-06
REL	MA0101.1	Ig-fold	18	51	6,11	4,805	0,0081887
ZNF354C	MA0130.1	Zinc-coordinating	32	305	6,079	11,03	1,6208E-05
Gata1	MA0035.2	Zinc-coordinating	27	104	5,945	10,923	1,8039E-05
Evi1	MA0029.1	Zinc-coordinating	5	5	5,373	4,562	0,01044116
Arnt::Ahr	MA0006.1	Zipper-Type	26	111	5,35	8,846	0,00014396
Nobox	MA0125.1	Helix-Turn-Helix	20	106	5,301	4,043	0,01754476
ZEB1	MA0103.1	Zinc-coordinating	28	253	5,154	5,227	0,00536961
RELA	MA0107.1	Ig-fold	14	25	5,017	5,551	0,00388357
Pou5f1	MA0142.1	Helix-Turn-Helix	7	9	4,877	4,269	0,01399577
PPARG::RXRA	MA0065.2	Zinc-coordinating	11	19	4,841	3,983	0,01862967

Myb	MA0100.1	Helix-Turn-Helix	27	93	4,688	10,595	2,5041E-05
REST	MA0138.2	Zinc-coordinating	1	1	4,664	1,653	0,19147462
Sox2	MA0143.1	Other Alpha-Helix	6	7	4,575	4,042	0,01756231
NFIL3	MA0025.1	Zipper-Type	12	24	4,522	4,82	0,00806679
NF-kappaB	MA0061.1	Ig-fold	15	33	4,513	4,554	0,01052502
Zfp423	MA0116.1	Zinc-coordinating	11	18	4,352	4,124	0,01617967
NFE2L2	MA0150.1	Zipper-Type	9	15	4,308	3,352	0,03501426
Gfi	MA0038.1	Zinc-coordinating	20	90	4,209	3,539	0,02904235
NFKB1	MA0105.1	Ig-fold	9	13	4,01	4,455	0,01162032
HLF	MA0043.1	Zipper-Type	10	16	3,855	4,192	0,01511602
Sox17	MA0078.1	Other Alpha-Helix	25	89	3,733	8,542	0,0001951
Arnt	MA0004.1	Zipper-Type	16	29	3,712	6,66	0,00128115
IRF2	MA0051.1	Winged Helix-Turn-Helix	2	2	3,403	2,04	0,13002871
SOX9	MA0077.1	Other Alpha-Helix	20	56	2,997	6,505	0,00149594
RORA_1	MA0071.1	Zinc-coordinating	12	26	2,962	2,836	0,05865984
FOX11	MA0042.1	Winged Helix-Turn-Helix	20	63	2,961	6,583	0,00138369
TAL1::TCF3	MA0091.1	Zipper-Type	10	20	2,823	2,522	0,08029885
NFYA	MA0060.1	Other Alpha-Helix	9	18	2,692	1,966	0,1400158
HNF1B	MA0153.1	Helix-Turn-Helix	8	10	2,669	4,384	0,01247536
Tal1::Gata1	MA0140.1	Zipper-Type	8	15	2,596	2,057	0,12783691
E2F1	MA0024.1	Winged Helix-Turn-Helix	17	31	2,475	6,452	0,00157736
SRY	MA0084.1	Other Alpha-Helix	24	125	2,317	6,405	0,00165327
Spz1	MA0111.1	Other	15	19	2,287	7,699	0,00045328
SPIB	MA0081.1	Winged Helix-Turn-Helix	28	230	2,286	5,703	0,00333594
NHLH1	MA0048.1	Zipper-Type	11	16	2,276	4,195	0,01507074
FOXA1	MA0148.1	Winged Helix-Turn-Helix	19	78	1,7	3,562	0,028382
FOXD1	MA0031.1	Winged Helix-Turn-Helix	22	78	1,661	6,626	0,00132545
FOXO3	MA0157.1	Winged Helix-Turn-Helix	20	86	1,643	4,021	0,01793502
Nr2e3	MA0164.1	Zinc-coordinating	8	17	1,57	1,783	0,16813299
NR4A2	MA0160.1	Zinc-coordinating	24	77	1,512	6,893	0,00101486
Nkx2-5	MA0063.1	Helix-Turn-Helix	26	232	1,494	5,331	0,00483923
Egr1	MA0162.1	Zinc-coordinating	14	23	1,489	4,95	0,00708341
Nkx3-2	MA0122.1	Helix-Turn-Helix	28	117	1,447	9,562	7,0352E-05

TBP	MA0108.2	Beta-sheet	15	42	1,362	3,121	0,04411303
Foxa2	MA0047.2	Winged Helix-Turn-Helix	16	53	1,313	3,064	0,04670052
MIZF	MA0131.1	Zinc-coordinating	4	5	1,298	1,819	0,16218786
Prrx2	MA0075.1	Helix-Turn-Helix	25	146	1,176	7,031	0,00088405
Pax6	MA0069.1	Helix-Turn-Helix	2	2	1,093	1,531	0,21631924
ELK1	MA0028.1	Winged Helix-Turn-Helix	23	79	0,821	5,141	0,00585183
NR3C1	MA0113.1	Zinc-coordinating	4	4	0,717	2,18	0,11304153
SPI1	MA0080.2	Winged Helix-Turn-Helix	26	122	0,676	6,098	0,00224736
PLAG1	MA0163.1	Zinc-coordinating	4	4	0,666	2,147	0,11683413
CREB1	MA0018.2	Zipper-Type	15	27	0,6	3,876	0,02073359
TEAD1	MA0090.1	Helix-Turn-Helix	7	11	0,497	1,844	0,15818343
RXR::RAR_DR1	MA0159.1	Zinc-coordinating	2	2	0,393	1,314	0,26874293
NKX3-1	MA0124.1	Helix-Turn-Helix	19	78	0,176	4,268	0,01400977
RORA_2	MA0072.1	Zinc-coordinating	6	6	0,141	2,875	0,05641614
USF1	MA0093.1	Zipper-Type	18	30	0,059	6,359	0,0017311
MYC::MAX	MA0059.1	Zipper-Type	6	6	-0,237	2,546	0,07839462
Sox5	MA0087.1	Other Alpha-Helix	21	80	-0,403	5,7	0,00334597
Foxq1	MA0040.1	Winged Helix-Turn-Helix	12	24	-0,444	3,571	0,02812771
RUNX1	MA0002.2	Ig-fold	25	69	-0,677	8,801	0,00015058
Foxd3	MA0041.1	Winged Helix-Turn-Helix	18	54	-0,843	5,052	0,00639653
ELK4	MA0076.1	Winged Helix-Turn-Helix	9	13	-0,907	1,993	0,13628595
SRF	MA0083.1	Other Alpha-Helix	1	1	-0,928	0,683	0,50509942
znf143	MA0088.1	Zinc-coordinating	2	2	-1,005	1,013	0,36312796
T	MA0009.1	Beta-Hairpin-Ribbon	2	2	-1,01	0,985	0,37343923
HOXA5	MA0158.1	Helix-Turn-Helix	27	232	-1,09	5,2	0,00551656
Stat3	MA0144.1	Ig-fold	15	28	-1,18	3,413	0,03294223
Hand1::Tcf2	MA0092.1	Zipper-Type	25	62	-1,291	9,575	6,9443E-05
TLX1::NFIC	MA0119.1	Helix-Turn-Helix::Other	1	1	-1,453	0,587	0,55599276
TP53	MA0106.1	Zinc-coordinating	0	0	-1,512	0	1
Pdx1	MA0132.1	Helix-Turn-Helix	25	152	-1,555	6,374	0,00170532
PPARG	MA0066.1	Zinc-coordinating	0	0	-1,589	0	1
STAT1	MA0137.2	Ig-fold	7	12	-1,619	1,163	0,31254713
Esrrb	MA0141.1	Zinc-coordinating	17	29	-1,681	4,935	0,00719046

NR1H2::RXRA	MA0115.1	Zinc-coordinating	0	0	-1,797	0	1
PBX1	MA0070.1	Helix-Turn-Helix	4	6	-1,826	0,949	0,38712796
ARID3A	MA0151.1	Helix-Turn-Helix	24	175	-1,979	4,683	0,00925122
RREB1	MA0073.1	Zinc-coordinating	2	2	-2,111	0,867	0,42021029
NFATC2	MA0152.1	Ig-fold	25	107	-2,213	6,561	0,00141447
Pax4	MA0068.1	Helix-Turn-Helix	0	0	-2,345	0	1
EWSR1-FLI1	MA0149.1	Winged Helix-Turn-Helix	0	0	-2,592	0	1
GABPA	MA0062.2	Winged Helix-Turn-Helix	17	27	-2,682	4,453	0,01164358
FEV	MA0156.1	Winged Helix-Turn-Helix	22	90	-2,977	3,047	0,04750121
ESR1	MA0112.2	Zinc-coordinating	0	0	-3,111	0	1
RXRA::VDR	MA0074.1	Zinc-coordinating	0	0	-3,126	0	1
AP1	MA0099.2	Zipper-Type	24	119	-3,19	3,965	0,01896804
Pax5	MA0014.1	Helix-Turn-Helix	1	1	-3,44	0,367	0,69280965
IRF1	MA0050.1	Winged Helix-Turn-Helix	6	10	-3,795	0,821	0,43999144
Ar	MA0007.1	Zinc-coordinating	0	0	-4,058	0	1
ELF5	MA0136.1	Winged Helix-Turn-Helix	24	128	-4,107	3,331	0,03575733
CTCF	MA0139.1	Zinc-coordinating	3	3	-4,519	0,625	0,53526143
YY1	MA0095.1	Zinc-coordinating	28	167	-4,655	6,467	0,00155388
Lhx3	MA0135.1	Helix-Turn-Helix	8	9	-4,832	2,43	0,08803683
MAX	MA0058.1	Zipper-Type	11	14	-4,86	2,027	0,13173012
MEF2A	MA0052.1	Other Alpha-Helix	7	11	-5,293	0,937	0,39180148



Supplementary Table S9: Gene lists of a venn diagram.

		hlc_vs_ipsc AND		fetal_liver_ vs_ipsc AND		hlc_vs_ipsc AND fetal_liver_ vs_ipsc AND
hlc_vs_ipsc	fetal_liver_ vs_ipsc	hlc_vs_ipsc AND fetal_liver_ vs_ipsc	phh_vs_ipsc	hlc_vs_ipsc AND phh_vs_ipsc	phh_vs_ipsc AND fetal_liver_ vs_ipsc	phh_vs_ipsc AND fetal_liver_ vs_ipsc AND
AAK1	ABCC1	AACSL	A1BG	A2LD1	A2M	A1CF
ABCA4	ABCC13	ABCE1	A4GALT	AAAS	A2ML1	AADAC
ABCG4	ABHD11	ABCG2	AARS2	AACS	AAA1	AADAACL1
ACER3	ABI3BP	ABLIM1	AATK	AADAT	ABAT	AAMP
ACSBG1	ACO2	ACLY	ABCA10	AARSD1	ABCA1	AARS
ACTA2	ACPT	ACOT8	ABCA11	ABCA2	ABCA6	AASDH
ADAMTS18	ACSL6	ACP6	ABCB7	ABCC10	ABCA9	AASS
ADAMTS20	ACSS1	ACPP	ABCB9	ABCF3	ABCB1	ABCA3
ADAMTS6	ACVRL1	ACTR3B	ABCC9	ABHD12	ABCB10	ABCA5
ADAMTSL5	ADAM12	ADAMTS8	ABHD2	ABHD4	ABCB11	ABCA7
ADARB1	ADCY1	ADCK4	ABI1	ABHD8	ABCB4	ABCA8
ADH5	ADCY4	ADD1	ACAA2	ACAD8	ABCB6	ABCC3
ADPGK	ADCY7	ADIPOR1	ACACA	ACAP1	ABCC11	ABCC5
AFAP1L1	ADRA2C	ADIPOR2	ACBD4	ACAP2	ABCC2	ABCD1
AFF2	AFF3	ADNP2	ACD	ACBD3	ABCC4	ABCF2
AGFG1	AFF4	ADRM1	ACSM1	ACOT11	ABCC6	ABCG1
AHDC1	ALAS2	AGA	ACTR2	ACP1	ABCC6P1	ABHD1
AHI1	ALDH16A1	AGPAT1	ACTR8	ACPL2	ABCC6P2	ABHD12B
AHSA1	ALG11	AHCYL1	ADAM15	ACRBP	ABCD3	ABHD15
AIM2	ALKBH4	AIM1L	ADAMTS2	ACTG2	ABCG5	ABHD7
AK2P2	ALMS1	AKIRIN2	ADAMTS7	ACTN4	ABCG8	ABHD9
AKAP2	AMN	ALDH7A1	ADAT1	ACTR1B	ABHD14A	ABI2
ALDH3B2	ANAPC2	ALG1L	ADAT3	ACYP1	ABHD14B	ABI3
ALG10	ANKAR	ALOX12	ADCY9	ADAL	ABHD3	ABL1
ALK	ANKLE1	AMHR2	ADCYAP1R1	ADAMTSL4	ABHD5	ABTB2
ALKBH2	ANKRD41	ANKRD10	ADH1B	ADAT2	ABHD6	ACAA1
ALOX15	ANO8	ANKRD13D	ADORA2A	ADCK5	ABLIM3	ACACB
AMBRA1	ANXA5	ANKRD16	ADPRH	ADK	ABR	ACADL
AMH	AP3D1	ANKRD20B	ADPRHL2	ADORA1	ABT1	ACADM
ANAPC7	APEX2	ANKRD38	ADRA2A	ADRA1A	ABTB1	ACADS
ANGPT2	APOBEC2	ANKRD9	ADRA2B	AGAP8	ACAD11	ACADVL
ANKHD1-EIF4I	ARFRP1	AP1S1	AES	AGL	ACAD9	ACAT1
ANKLE2	ARHGAP15	AP3S1	AFAR3	AGPAT5	ACADSB	ACBD6
ANKMY2	ARHGAP30	APPBP2	AFF1	AGPAT6	ACAT2	ACBD7
ANKRD13A	ARHGEF2	AQP1	AGGF1	AGRN	ACCS	ACE2
ANKRD26	ARHGEF5L	ARFGAP1	AGPAT3	AHCY	ACER2	ACIN1
ANKRD36	ARIH1	ARID4B	AGPS	AHR	ACHE	ACN9
ANKRD54	ARL9	ARL15	AGXT2L2	AHSA2	ACMSD	ACOT2
ANKRD6	ARRDC3	ARL3	AIDA	AKAP7	ACO1	ACOT7
ANKZF1	ASCL2	ARMCX3	AIP	AKR1A1	ACOT1	ACOT9
ANO6	ASTE1	ASAP1IT1	AIRE	AKR1B10	ACOT12	ACOX1
ANP32A	ATF2	ASCL5	AK3	AKR1B15	ACOT4	ACOX2
API5	ATP10A	ATF4	AKAP1	AKT1	ACSL4	ACOX3

APLP2	ATP5H	ATF7IP2	AKAP10	AKT1S1	ACSM2A	ACOXL
APOBEC3B	ATP6V1G1	ATG2B	AKAP11	ALAS1	ACSM2B	ACP2
APOLD1	ATP7A	ATG4B	AKAP8	ALDH3A2	ACSM5	ACP5
APRT	ATP8B4	ATG4D	AKR7A2	ALG1	ACTC1	ACSF2
AQP10	AXIN1	ATG9A	AKR7L	ALG13	ACTN1	ACSL1
ARD1A	AZU1	ATL3	ALG2	ALG3	ACTR1A	ACSL3
ARF5	B3GALT2	ATP13A2	ALG5	AMD1	ACTR3	ACSL5
ARHGAP1	BAG4	ATP2A2	ALOX5	AMOT	ACTR6	ACSM3
ARHGAP18	BAZ1B	ATP5G1	ALOXE3	ANAPC11	ACTRT1	ACSS2
ARHGAP20	BBC3	ATP6V0A1	ALPI	ANGPTL2	ACVR1	ACTA1
ARHGAP21	BCAT2	ATP6V1F	ALPK1	ANKRD17	ACVR1B	ACTB
ARHGAP27	BCL2L14	ATP9B	ALPP	ANKRD23	ACY1	ACTG1
ARHGAP29	BCL6B	ATXN1	ALS2	ANKRD37	ACY3	ACTL6A
ARHGEF11	BICD2	ATXN2L	ALS2CL	ANKRD44	ACYP2	ACTR5
ARHGEF18	BIK	ATXN7L2	ALS2CR14	ANKRD57	ADAM17	ACVR2A
ARMC8	BPI	AVEN	AMAC1L3	ANXA11	ADAMTSL2	ACVR2B
ARPC3	BRMS1L	BAGE5	AMY2B	ANXA2P3	ADAMTSL3	ADA
ARSJ	BST1	BAP1	ANAPC13	ANXA8	ADAR	ADAM10
ASB6	BTBD1	BCAR3	ANAPC4	ANXA8L2	ADD2	ADAM19
ATAD2B	BZRPL1	BCAS2	ANAPC5	AP1G1	ADD3	ADAM22
ATP10B	C10orf114	BCL2	ANGEL2	AP1G2	ADH1C	ADAM23
ATP13A3	C10orf12	BCL7C	ANKRD19	AP1S2	ADH4	ADAM9
ATP5C1	C10orf128	BCLAF1	ANKRD27	AP3B1	ADH6	ADAMTS1
ATP5S	C10orf57	BEGAIN	ANKRD29	APH1A	ADI1	ADAMTS19
ATP6AP1	C11orf21	BGN	ANKRD30B	APITD1	ADM	ADAMTS9
ATP6AP1L	C11orf49	BLOC1S2	ANKRD32	APOBEC3D	ADNP	ADAMTSL1
ATP6V1B2	C11orf71	BNIP1	ANKRD39	APOBEC3G	ADORA3	ADAP2
ATP6V1C2	C12orf41	BPGM	ANKRD40	APOL2	AFAP1	ADCK1
ATP6V1D	C13orf7	BRE	ANKRD49	AR	AGFG2	ADCY3
ATXN1L	C14orf159	BRI3BP	ANLN	ARF1	AGK	ADCY6
ATXN7L3	C16orf30	BRUNOL6	ANP32E	ARF4	AGMAT	ADCY8
AUH	C16orf38	BTG2	ANXA7	ARHGAP17	AGTR1	ADH1A
AURKC	C16orf57	BTK	AOAH	ARHGAP19	AGXT	ADHFE1
B3GALT4	C16orf88	BYSL	AP2M1	ARHGAP25	AGXT2	ADM2
B3GAT3	C17orf44	C10orf2	AP3S2	ARHGAP4	AHCYL2	ADO
B3GNT1	C17orf87	C10orf76	AP4B1	ARHGEF6	AHNAK2	ADORA2B
B3GNT5	C18orf1	C12orf66	APBA2BP	ARIH2	AHSG	ADRA1B
BAHCC1	C18orf2	C14orf100	APBB3	ARL1	AHSP	ADRB2
BAI2	C18orf45	C14orf126	APEG1	ARL4C	AIF1	ADSL
BANF1	C18orf51	C14orf138	APOL1	ARL4D	AIFM1	ADSS
BAX	C19orf22	C14orf169	APOOL	ARL6IP5	AIFM2	ADSSL1
BBS1	C19orf30	C14orf45	AQP7	ARMCX6	AK1	AEBP1
BBS12	C19orf33	C15orf28	AQP9	ARNTL	AK2	AEBP2
BCAR4	C19orf42	C16orf5	ARFGAP3	ARPC5L	AKR1C4	AEN
BCL2L2	C19orf59	C16orf87	ARHGAP11B	ARRB1	AKR1E2	AFAP1L2
BCMO1	C19orf67	C17orf101	ARHG DIA	ARRDC1	AKR7A3	AFM
BET1	C1orf131	C17orf76	ARHGEF10L	ARSB	AKT3	AFMID
BLCAP	C1orf175	C18orf21	ARID1A	ASF1A	ALCAM	AFP
BMF	C1orf186	C1orf116	ARID5A	ASH2L	ALDH18A1	AFTPH
BMP5	C1orf25	C1orf152	ARL13B	ASTN1	ALDH2	AGAP3

BMP6	C1orf31	C1orf43	ARL14	ATG16L1	ALDH3B1	AGBL5
BNC1	C1orf69	C20orf7	ARL17P1	ATG3	ALDH8A1	AGPAT2
BOC	C1orf92	C21orf59	ARL8B	ATL1	ALDOB	AGPAT4
BRCA1	C1QTNF5	C21orf91	ARMC1	ATP1A1	ALG9	AGPAT9
BRD4	C20orf12	C22orf29	ARMC5	ATP1B1	ALKBH7	AGT
BRF1	C20orf132	C2orf32	ARMET	ATP2B1	ALOX5AP	AGTPBP1
BTAF1	C20orf175	C3orf52	ARP11	ATP6V0E1	ALX1	AGTRAP
BUB3	C21orf124	C3orf70	ART1	ATPAF1	AMBP	AGXT2L1
C10orf118	C22orf28	C5orf23	ARVCF	AURKB	AMDHD2	AHNAK
C10orf41	C2orf24	C5orf25	ASB13	B9D1	AMICA1	AIF1L
C10orf61	C2orf42	C5orf30	ASIP	BACH2	AMN1	AIG1
C10orf73	C2orf64	C5orf53	ASNA1	BAD	AMT	AIMP2
C11orf10	C2orf88	C6orf134	ATG10	BAG3	AMY1A	AJAP1
C11orf46	C3AR1	C6orf72	ATG7	BANP	AMY1B	AK3L1
C11orf57	C3orf32	C6orf85	ATM	BAT2	AMY1C	AKAP12
C11orf59	C3orf58	C7orf63	ATMIN	BAT3	ANGPTL3	AKAP13
C11orf68	C5AR1	C7orf68	ATOH8	BAZ2B	ANGPTL6	AKIRIN1
C11orf75	C5orf20	C8orf33	ATP13A1	BCL3	ANK1	AKNA
C12orf52	C5orf24	C8orf38	ATP2C2	BCL7B	ANKHD1	AKR1B1
C13orf25	C5orf27	C8orf44	ATP5A1	BCL9L	ANKRA2	AKR1C2
C13orf27	C5orf45	C9orf123	ATP6AP2	BET1L	ANKRD11	AKR1C3
C14orf124	C6orf1	C9orf127	ATP6V0A2	BEX2	ANKRD13C	AKR1D1
C14orf2	C6orf182	C9orf43	ATP6V1A	BEX4	ANKRD36B	AKTIP
C14orf72	C6orf184	C9orf6	ATP8B2	BFSP1	ANKRD46	ALAD
C15orf38	C6orf81	C9orf82	ATPBD3	BHLHB2	ANKS3	ALB
C15orf39	C7	C9orf91	ATRIP	BIRC3	ANP32B	ALDH1A1
C16orf55	C7orf36	CA8	ATXN2	BIRC5	ANXA10	ALDH1A2
C16orf61	C9orf16	CAB39L	AURKA	BLZF1	ANXA13	ALDH1A3
C16orf80	C9orf30	CABLES1	AVPR2	BMP2	ANXA4	ALDH1B1
C17orf28	C9orf66	CALCA	B4GALT3	BNIPL	ANXA9	ALDH1L1
C17orf39	C9orf9	CALD1	BAHD1	BOLA2	AOF2	ALDH1L2
C17orf62	CA1	CAMK1G	BATF3	BPNT1	AP1M2	ALDH4A1
C17orf85	CADPS	CAMK2D	BCKDHA	BRD8	AP2A2	ALDH5A1
C19orf39	CALCRL	CAP2	BCL7A	BRPF3	AP3B2	ALDH6A1
C19orf47	CAMP	CAV1	BCYRN1	BTBD3	AP3M1	ALDH9A1
C19orf60	CAMSAP1	CBS	BDH2	BTBD7	APBB2	ALDOA
C1orf102	CAP1	CBX3	BECN1	BTG3	APCDD1L	ALDOC
C1orf105	CARD9	CCDC128	BEND5	BUB1	APCS	ALG10B
C1orf128	CASC5	CCDC146	BEXL1	BZW1	APLNR	ALG14
C1orf172	CBFA2T3	CCDC3	BIN3	C10orf104	APLP1	ALG6
C1orf21	CBLN4	CCDC55	BIRC6	C10orf26	APOA5	ALG8
C1orf213	CCDC147	CCDC86	BLM	C11orf35	APOC2	ALKBH1
C1orf229	CCDC26	CCK	BMS1	C11orf51	APOC4	ALKBH3
C1orf56	CCDC52	CCL2	BMS1P5	C12orf10	APOF	ALKBH5
C1orf9	CCL21	CCNDBP1	BNIP2	C12orf48	APOH	ALKBH8
C1orf93	CCL23	CCNYL1	BPHL	C12orf76	APOL3	ALOX12B
C1QTNF1	CCL8	CCRN4L	BRD1	C14orf135	APTX	ALOX15B
C20orf151	CCNO	CD1D	BRI3	C14orf153	AQP12A	ALPK2
C20orf194	CCR1	CD247	BRI3P1	C14orf167	AQP7P1	ALPL
C20orf43	CCR6	CD7	BRMS1	C14orf79	AQP7P2	ALPPL2

C21orf129	CCRL2	CD97	BSG	C14orf82	AQR	ALS2CR4
C21orf30	CD163L1	CDC14B	BSPRY	C15orf44	ARC	AMACR
C21orf71	CD1A	CDC2L6	BTN2A2	C15orf63	ARF3	AMDHD1
C21orf81	CD209	CDH15	BTN3A2	C16orf67	ARFGAP2	AMFR
C22orf9	CD276	CDH5	C10orf108	C16orf72	ARFIP1	AMMECR1
C2orf30	CD300A	CDK8	C10orf119	C16orf79	ARG1	AMPH
C2orf47	CD300C	CEBPG	C10orf137	C16orf91	ARGLU1	AMY2A
C3orf15	CD33	CECR5	C10orf21	C17orf41	ARHGAP11A	AMZ2
C3orf50	CD37	CEP250	C10orf39	C17orf42	ARHGAP23	ANAPC1
C4orf16	CD38	CETN2	C10orf4	C17orf45	ARHGAP8	ANAPC10
C4orf31	CD4	CGA	C10orf72	C17orf49	ARHGEF10	ANG
C4orf48	CD48	CH25H	C11orf24	C17orf79	ARHGEF16	ANGPT1
C4orf49	CD52	CHMP2B	C11orf31	C17orf89	ARHGEF4	ANGPTL4
C5orf15	CD53	CHORDC1	C11orf48	C18orf10	ARID2	ANK2
C5orf51	CD5L	CHST9	C11orf67	C18orf22	ARID3B	ANK3
C6orf136	CD81	CHSY3	C11orf74	C18orf55	ARID4A	ANKDD1A
C6orf203	CD84	CKLF	C11orf91	C18orf56	ARL2BP	ANKFY1
C6orf208	CDADC1	CLEC14A	C12orf28	C19orf20	ARL5A	ANKIB1
C6orf221	CDC26	CLIC3	C12orf29	C19orf28	ARL5B	ANKMY1
C7orf11	CDC42SE2	CLK4	C12orf34	C19orf62	ARL6IP4	ANKRD1
C7orf25	CDKN2D	CNIH	C12orf39	C19orf71	ARMC9	ANKRD12
C8orf40	CEACAM8	CNN3	C12orf64	C1orf109	ARMCX1	ANKRD20A1
C8orf76	CECR4	CNNM4	C12orf73	C1orf198	ARNT	ANKRD24
C9orf164	CENTG2	CNPY3	C13orf1	C1orf54	ARPC1A	ANKRD33
C9orf41	CEP170	CNTLN	C13orf18	C1orf59	ARPC2	ANKRD35
CA3	CERK	COBL	C14orf106	C1orf77	ARPP19	ANKRD43
CA5B	CES3	COL16A1	C14orf147	C20orf117	ARRDC2	ANKRD50
CACNG4	CETP	COL2A1	C14orf174	C20orf160	ARRDC4	ANKS1A
CAMK1D	CFHR4	COX15	C14orf19	C20orf24	ARS2	ANKS4B
CANX	CFP	CPE	C14orf85	C20orf27	ARSK	ANO1
CAPN14	CHML	CRAMP1L	C14orf93	C20orf4	ARV1	ANO10
CAPN6	CHRNA10	CRB1	C15orf21	C20orf94	AS3MT	ANO2
CAPS	CHRNB1	CREB3L2	C15orf48	C21orf33	ASB1	ANO4
CASP9	CINP	CRIPAK	C16orf33	C22orf27	ASCC1	ANP32C
CASQ2	CISH	CRYBB2	C16orf45	C22orf30	ASCC2	ANPEP
CBFA2T2	CLC	CSF3R	C16orf53	C2CD4B	ASF1B	ANTXR1
CBFB	CLDN2	CSMD2	C16orf63	C2orf40	ASH1L	ANTXR2
CBWD5	CLDND2	CTNNA2	C17orf37	C2orf60	ASL	ANXA1
CCAR1	CLEC10A	CTSE	C17orf67	C2orf63	ASPA	ANXA2
CCBL1	CLEC12A	CUTC	C17orf75	C2orf69	ASPG	ANXA2P1
CCDC105	CLEC1B	CXorf26	C17orf88	C3orf34	ASPH	ANXA3
CCDC111	CLEC3B	CYP11A1	C17orf90	C4orf29	ASPM	ANXA6
CCDC132	CLEC4G	CYP19A1	C17orf97	C4orf34	ASPSCR1	AOX1
CCDC134	CLEC4M	CYP1B1	C17orf98	C5orf21	ASXL2	AP1B1
CCDC35	CLIC2	CYP4Z2P	C18orf18	C5orf35	ATAD2	AP1M1
CCDC6	CLOCK	CYR61	C18orf19	C5orf54	ATCAY	AP2A1
CCDC71	CLTB	CYTH2	C18orf32	C6orf106	ATF1	AP2B1
CCDC85B	CLTCL1	DAAM1	C18orf8	C6orf145	ATF6B	AP3M2
CCDC96	CMAH	DACH1	C19orf10	C6orf162	ATF7IP	AP4E1
CCDC97	CMPK2	DAG1	C19orf24	C6orf47	ATG12	APAF1

CCNG2	CMTM2	DAGLB	C19orf29	C9orf23	ATP2B2	APBB1IP
CCNH	CMTM5	DBR1	C19orf36	C9orf25	ATP4A	APEX1
CCNT2	CNIH3	DCAF10	C19orf38	C9orf45	ATP5D	APH1B
CCR7	CNOT2	DCDC2	C19orf61	C9orf5	ATP5G3	APIP
CCT6B	CNPY2	DDX23	C19orf63	C9orf86	ATP5J	APOA1
CD55	CNPY4	DENND5A	C1GALT1C1	CA9	ATP5SL	APOA2
CD63	CNR1	DENND5B	C1orf107	CABC1	ATP6V0A4	APOA4
CDC14A	CNTFR	DGKD	C1orf123	CACNA1C	ATP6V0E2	APOB
CDGAP	COG4	DHODH	C1orf124	CACYBP	ATPAF2	APOBEC3F
CDH24	COL14A1	DHX30	C1orf144	CADM4	ATPIF1	APOC1
CDH8	COLEC10	DIO3	C1orf149	CADPS2	ATXN3	APOC3
CDK3	COMMD1	DIO3OS	C1orf151	CALCR	AURKAPS1	APOE
CDK5R1	COMMD4	DIRC2	C1orf165	CALHM3	AVPI1	APOM
CDKN2AIP	COPS2	DIXDC1	C1orf166	CAND1	AZGP1	APOO
CEACAM6	COPS6	dJ341D10.1	C1orf190	CANT1	AZI1	APP
CEP350	CORO1A	DLC1	C1orf200	CAPN11	B2M	APPL2
CERCAM	CPA3	DLGAP4	C1orf212	CAPN2	B3GALNT1	AQP11
CFDP1	CPNE8	DLK2	C1orf216	CAPNS1	B3GALNT2	AQP3
CFTR	CPOX	DNAJC25-GNC	C1orf52	CASZ1	B3GALT5	ARAP3
CGB	CR1L	DNAJC4	C1orf81	CATSPER2	B3GNTL1	ARCN1
CGB7	CREBL2	DNAJC5	C1orf85	CBLB	B4GALT6	ARFGF1
CGB8	CSAG1	DNASE1L1	C1orf89	CBLL1	B9D2	ARG2
CHCHD7	CSH1	DNHD1	C20orf11	CBWD3	BAAT	ARHGAP10
CHD2	CSH2	DNLZ	C20orf196	CBY1	BAG5	ARHGAP12
CHD6	CST7	DOCK5	C20orf45	CCDC125	BAIAP2L1	ARHGAP22
CHERP	CTGLF1	DOCK8	C20orf62	CCDC21	BAK1	ARHGAP24
CHKB	CTSG	DPM1	C21orf119	CCDC23	BAT2D1	ARHGAP28
CHST11	CUL4A	DPY19L1	C21orf126	CCDC24	BAZ1A	ARHGAP9
CHST14	CX3CR1	DPY19L2P2	C21orf24	CCDC49	BBOX1	ARHGDI1
CIAO1	CXADR	DSC2	C21orf55	CCDC66	BBS10	ARHGEF1
CISD1	CXCR4	DSC3	C21orf56	CCDC8	BBS2	ARHGEF12
CIZ1	CYBB	DST	C2orf18	CCDC88A	BBS4	ARHGEF17
CKAP4	CYGB	DUSP5	C2orf43	CCDC93	BCAP29	ARHGEF19
CLCN6	CYorf14	DUSP9	C2orf44	CCND1	BCHE	ARHGEF3
CLDN9	CYTH4	DVL3	C2orf89	CCNE2	BCL2L10	ARHGEF5
CLEC1A	DAAM2	DYRK2	C3orf19	CD320	BCL2L11	ARHGEF9
CLEC4D	DARC	E2F3	C3orf36	CD44	BCL9	ARID3A
CLN6	DCDC5	ECSCR	C3orf37	CD46	BDH1	ARID5B
CLPP	DCHS1	EFNB1	C3orf39	CD72	BDNF	ARL16
CLSTN2	DCUN1D1	EGFL7	C3orf41	CDA	BFAR	ARL17B
CMC1	DCUN1D2	EGR2	C4A	CDC14C	BHMT	ARL2
CNTN4	DDX5	EIF2C3	C4B	CDC2	BHMT2	ARL4A
CNTROB	DEFA1	EIF2S2	C4orf32	CDC20	BID	ARL6
COG1	DEFA1B	EIF3CL	C4orf38	CDC25A	BLOC1S1	ARL6IP6
COL11A2	DEFA3	EIF4A1	C5orf22	CDC25B	BLVRB	ARMC10
COL15A1	DEFA4	EIF4G2	C5orf39	CDC40	BMP2K	ARMC4
COL18A1	DEPDC4	EIF5A	C5orf43	CDC42BPB	BMPER	ARMC6
COL8A2	DERL2	ELF4	C5orf46	CDC42EP1	BMX	ARMC7
COLQ	DFFB	ELL3	C6orf122	CDC45L	BNC2	ARMCX2
COMMD5	DGCR8	ELMOD2	C6orf130	CDCA8	BNIP3L	ARMCX4

COPA	DHFR	EML2	C6orf138	CDH10	BOAT	ARNT2
COPB1	DHFRL1	EMP1	C6orf142	CDH11	BOLA3	ARPC1B
COPB2	DHRS13	EPB41	C6orf165	CDIPT	BPTF	ARPC4
COPG2IT1	DHX29	EPDR1	C6orf167	CDK2	BRAF	ARSA
COPS3	DKFZP564O05	EPS8L1	C6orf222	CDK4	BRD3	ARSD
COPS5	DLEU2	ERCC1	C6orf225	CDK9	BRD7	ARSE
CORO1C	DNAJA2	ERP29	C6orf26	CDKN1C	BRD7P2	ARSG
CORO7	DNAJB11	ESPL1	C6orf62	CDKN2B	BRD9	ART3
COX4NB	DNASE1L3	EVC	C6orf64	CDKN2C	BRP44L	ART4
CPA4	DOCK10	EVI1	C6orf70	CDKN3	BRSK1	ART5
CREBBP	DOCK6	EYA2	C7orf13	CDRT4	BRSK2	ARTN
CRH	DOK2	FAM101A	C7orf29	CDT1	BRWD1	ASAH1
CRKL	DPEP2	FAM120B	C7orf49	CECR1	BRWD2	ASAM
CRNKL1	DPT	FAM125B	C7orf58	CECR7	BRWD3	ASAP1
CRSP9	DPYSL5	FAM150B	C7orf59	CENPA	BSCL2	ASAP2
CRYBA1	DRAP1	FAM178A	C7orf65	CENPL	BSDC1	ASB3
CSGALNACT1	DSCR10	FAM179B	C8orf37	CENPM	BSN	ASB7
CSN1S1	DSCR3	FAM20B	C8orf45	CENPN	BTBD16	ASB8
CSPP1	DTNB	FAM80A	C8orf46	CENPO	BTBD2	ASB9
CST4	DUSP13	FAM90A2P	C9	CENPP	BTN3A3	ASCC3
CTAGE5	DUSP15	FAM92A1	C9orf100S	CENPV	BVES	ASGR1
CTNNAL1	DUSP21	FANCF	C9orf114	CENTG3	C10orf11	ASGR2
CTPS	DYNLT1	FBXL13	C9orf119	CEP135	C10orf116	ASMTL
CUBN	DYRK4	FBXL18	C9orf130	CEPT1	C10orf65	ASNS
CUL1	E2F4	FBXO18	C9orf167	CGB1	C10orf68	ASPHD1
CUL7	E2F6	FBXO2	C9orf38	CGB5	C10orf82	ASPHD2
CUL9	E2F8	FBXO38	C9orf7	CGGBP1	C10orf88	ASRGL1
CUX1	ECSIT	FBXO44	C9orf75	CGI-96	C11orf17	ASS1
CXCR6	EDEM3	FBXW7	C9orf89	CGN	C11orf45	ASTN2
CXorf40B	EEF1D	FCHO2	CA13	CGNL1	C11orf60	ASXL1
CXorf56	EGLN3	FCHSD2	CABIN1	CHAC2	C11orf61	ATAD1
CXXC5	EHD3	FIP1L1	CADM3	CHD8	C11orf70	ATE1
CYB5D1	EIF1AY	FJX1	CALN1	CHMP1A	C11orf84	ATF3
CYC1	EIF2C2	FLJ10996	CAMK2B	CHMP4B	C12orf30	ATF5
CYHR1	EIF4EBP2	FLJ20489	CAMKK2	CHPF	C12orf35	ATF6
CYP46A1	ELANE	FLJ20628	CAMTA1	CICE	C12orf4	ATG2A
DAGLA	ELN	FMOD	CAMTA2	CIDEA	C12orf43	ATG4A
DCAKD	ELOVL7	FNTA	CAPN5	CKAP2	C12orf49	ATG4C
DCLK2	ELP2P	FOXA3	CASC4	CKS2	C12orf57	ATG5
DCTD	ELP3	FOXC1	CASD1	CLDN19	C12orf62	ATHL1
DCX	EMCN	FOXI3	CBR4	CLIP1	C14orf105	ATIC
DDA1	EMID1	FOXJ2	CBX5	CLN5	C14orf131	ATN1
DDAH1	EMILIN1	FYB	CC2D1B	CLUAP1	C14orf132	ATOX1
DDAH2	ENG	FZD4	CC2D2A	CMAS	C14orf133	ATP11B
DDX24	ENO1	GAA	CCDC103	CMIP	C14orf143	ATP11C
DEFA6	ENTPD1	GAB1	CCDC106	CMTM6	C14orf145	ATP12A
DERA	EPB42	GAB2	CCDC107	COG6	C14orf166	ATP1A2
DFNA5	ERCC6	GABPB1	CCDC121	COL13A1	C14orf179	ATP1B2
DFNB31	ERGIC2	GAPVD1	CCDC13	COL4A1	C14orf4	ATP1B3
DGCR6	ERI2	GAR1	CCDC130	COL6A1	C14orf68	ATP2B4

DIP2B	ERICH1	GAS6	CCDC14	COL6A2	C14orf73	ATP2C1
DIP2C	EXD3	GATA5	CCDC15	COL9A1	C14orf78	ATP5E
DIRAS2	EXOD1	GDPD3	CCDC150	COLEC12	C15orf41	ATP5EP2
DISP1	F13A1	GDPD5	CCDC17	COMTD1	C15orf42	ATP5F1
DKFZP434L18	F2RL1	GNB1L	CCDC25	COPG	C15orf52	ATP5G2
DKK1	FAAH2	GNL3L	CCDC47	COPS4	C16orf13	ATP5I
DLD	FABP3	GNS	CCDC53	COQ2	C16orf50	ATP5J2
DMPK	FAIM3	GOLGA1	CCDC72	COQ6	C16orf52	ATP5L
DMRT1	FAM109B	GOLGA2	CCDC76	CORO2B	C16orf62	ATP5O
DNAH2	FAM111A	GPBAR1	CCDC81	CPD	C16orf7	ATP6V0B
DNAJC13	FAM113A	GPC5	CCDC88B	CPNE1	C16orf70	ATP6V0C
DNAJC14	FAM117A	GPRC5A	CCDC88C	CPNE3	C16orf73	ATP6V0D1
DNAJC17	FAM129C	GREM1	CCDC94	CREB1	C16orf86	ATP6V1B1
DNAJC19	FAM171A1	GRRP1	CCL13	CRELD1	C16orf93	ATP6V1E2
DNAJC7	FAM178B	GTF3C6	CCL16	CRELD2	C17orf106	ATP6V1G2
DOC2A	FAM188A	GTPBP4	CCNB1	CRYM	C17orf48	ATP6V1H
DOCK9	FAM22A	GUCY1A3	CCNL2	CSNK1G1	C17orf71	ATP7B
DPP3	FAM22D	H3F3B	CCNY	CSPG4	C18orf54	ATP8B3
DSC1	FAM26F	HACL1	CCR2	CSTB	C19orf43	ATP9A
DUOX2	FAM53B	HAND2	CCT5	CTCF	C19orf50	ATPBD1B
DUOXA2	FAM55C	HCG18	CCT8	CTDP1	C1GALT1	ATPBD4
DUSP18	FAM73B	HCN3	CD300E	CTDSPL	C1orf112	ATRN
DUSP5P	FAM76A	HEBP1	CD40	CTGLF3	C1orf162	AUTS2
DVL2	FAM82A2	HECTD1	CD83	CTSF	C1orf168	AVL9
DYNC1L12	FAM83F	HES2	CDC34	CUGBP2	C1orf26	AVP
DYNLRB2	FAM90A6P	HES4	CDC37L1	CUTL1	C1orf41	AXIN2
DYRK1A	FAM99A	HIST1H4K	CDC42EP2	CXCL14	C1orf53	AXL
EAPP	FAM9A	HIST3H3	CDCA2	CXCR7	C1orf55	AXUD1
ECE1	FBXL12	HLA-DMA	CDH2	CYP2U1	C1orf96	AYP1p1
EDC4	FBXL17	HLA-DMB	CDH20	CYP4X1	C1QA	AZIN1
EEA1	FBXO16	HNRNPAB	CDH6	CYTH3	C1QB	B3GALT6
EFCAB3	FBXO9	HNRNPC	CDK10	DACH2	C1QC	B3GAT1
EI24	FBXW11	HNRNPM	CDKL2	DACT3	C1QL2	B3GNT2
EIF3J	FCER1A	HNRPM	CDNF	DAD1	C2	B3GNT6
EIF4ENIF1	FCGBP	HOPX	CDV3	DAPK1	C20orf111	B4GALNT4
EIF4H	FCGR2B	HOXA6	CDYL	DCAF7	C20orf127	B4GALT1
ELAVL3	FCN1	HOXB5	CDYL2	DCHS2	C20orf177	B4GALT4
ELF2	FCN2	HP1BP3	CENPI	DCP1A	C20orf20	BACE1
ELMOD1	FCRL2	HPS1	CEP110	DCPS	C20orf54	BACE2
ELOVL5	FCRLA	HSD17B1	CEP120	DCTN1	C21orf2	BAIAP2
ENOX1	FDXR	HSD17B14	CEP164	DCTPP1	C21orf34	BAIAP2L2
ENPP1	FECH	HSMT1	CEP192	DDEF2	C21orf57	BAMBI
ENY2	FEM1B	HTR2A	CEP27	DDHD2	C21orf66	BAPX1
EPHB3	FGD3	HTRA2	CEP290	DDX12	C21orf7	BARD1
EPM2A	FKBPL	HYLS1	CES1	DDX17	C22orf36	BARX1
ERBB2	FLI1	IER2	CES4	DDX39	C2orf37	BASP1
ERGIC3	FLII	IFI16	CFHR3	DEF6	C2orf49	BAT1
ERVWE1	FLJ11827	IFRD1	CFHR5	DEF8	C2orf7	BAT2L
ESD	FLJ23152	IFT122	CFL2	DEFB1	C3	BAT5
ETV7	FLJ23834	IL12A	CHAD	DEK	C3orf18	BBS7

EWSR1	FLJ31945	ING5	CHADL	DENND2C	C3orf21	BBS9
EXOC5	FLJ32255	INHBE	CHCHD10	DENND4B	C3orf25	BBX
EXOC7	FLJ33996	IP6K2	CHCHD5	DEPDC1B	C3orf31	BCAM
EXOSC2	FLJ36070	IPO13	CHD1	DEPDC5	C3orf46	BCAN
EXPH5	FLJ39827	IRX3	CHKA	DEPDC7	C3orf54	BCAR1
EYA1	FLJ41170	ITGB4	CHMP1B	DERL1	C3orf59	BCAS4
FADD	FLJ41603	JAK2	CHRDL2	DGCR14	C3orf60	BCAT1
FAF2	FLJ42627	JAZF1	CHRNA2	DHDDS	C4BPA	BCCIP
FAM100B	FLJ44290	JMJD7	CHST1	DHH	C4BPB	BCKDHB
FAM108A2	FLJ44606	JPH4	CHST10	DHPS	C4orf14	BCL10
FAM10A4	FLYWCH1	KCMF1	CHTF8	DHRS11	C4orf33	BCL11A
FAM118A	FOLR2	KCNJ16	CIAPIN1	DHTKD1	C4orf41	BCL11B
FAM119B	FOXC2	KCNJ4	CIDEC	DHX32	C5orf13	BCL2L1
FAM156A	FOXD4	KCNN4	CLCN3	DHX37	C5orf32	BCL2L12
FAM156B	FOXO1	KCNT2	CLDN20	DHX40	C5orf33	BCL6
FAM158A	FOXS1	KCTD1	CLDN23	DICER1	C6	BCOR
FAM160B2	FPR1	KCTD3	CLEC4A	DKFZP5861142	C6orf108	BCORL1
FAM168B	FPR3	KDELR2	CLIP2	DLEU1	C6orf111	BCR
FAM173B	FREQ	KHNYN	CLIP4	DLST	C6orf115	BEND3
FAM175B	FTSJ3	KIAA0430	CLMN	DMD	C6orf124	BEND4
FAM183A	GAB3	KIAA0892	CLN8	DNAJA3	C6orf132	BEND6
FAM193A	GABARAPL2	KIAA0922	CLRN1	DNAJB14	C6orf141	BEND7
FAM19A3	GALNT2	KIAA1143	CLTC	DNAJC28	C6orf173	BEST1
FAM20A	GALNT5	KIAA1345	CLU	DNAJC3	C6orf192	BEST2
FAM23B	GAPT	KIAA1539	CNDP1	DNASE1	C6orf52	BEST4
FAM39DP	GAS2L1	KIAA1641	CNGB1	DNMT3L	C7orf23	BEX1
FAM47E	GATA1	KIFAP3	CNNM2	DOHH	C7orf31	BEX5
FAM49A	GDF1	KLHDC8B	CNOT10	DOLK	C7orf38	BHLHB9
FAM53A	GDF15	KLHL17	CNOT8	DOPEY1	C7orf55	BICD1
FAM57B	GDF5OS	KLRAQ1	COBRA1	DOPEY2	C8A	BIN1
FAM62B	GF11B	KPNA6	COG3	DPEP1	C8B	BIRC2
FAM72B	GGT5	KRCC1	COMMD8	DPH2	C8G	BLMH
FARS2	GGT7	KRT7	COPZ2	DPP10	C8orf41	BLVRA
FASTKD2	GGTL3	KRTCAP2	COQ10B	DPP8	C8orf42	BMI1
FASTKD3	GIMAP1	KRTCAP3	CORO6	DPY19L4	C8orf47	BMP1
FBXL21	GIMAP4	LARP7	COX16	DRAM1	C8ORFK36	BMP4
FDX1L	GIMAP5	LASS4	COX19	DSP	C9orf100	BMP7
FHIT	GIMAP6	LATS2	COX4I1	DTL	C9orf102	BMPR1A
FIBCD1	GIMAP7	LCOR	COX5B	DUS3L	C9orf126	BMPR2
FKRP	GIMAP8	LEF1	COX6C	DUSP1	C9orf150	BNIP3
FLJ11235	GIYD1	LEMD1	COX7A2	DUSP19	C9orf156	BOK
FLJ16779	GJA4	LGALS2	COX7A2L	DUSP22	C9orf21	BOP1
FLJ20444	GJC2	LIN54	COX7C	DUSP23	C9orf37	BP75
FLJ20718	GJC3	LITAF	CPLX1	DUSP3	C9orf64	BRIX1
FLJ22222	GKN2	LLGL2	CPPED1	DUSP8	C9orf78	BRP44
FLJ22639	GLCC1	LOC10000858	CPSF1	DUT	C9orf93	BST2
FLJ23584	GLRX5	LOC10000858	CRB3	DYNC1I2	CA5A	BTBD10
FLJ31306	GLUD2	LOC10012820	CRCP	DYNLL2	CABP1	BTBD11
FLJ31568	GLUL	LOC10012868	CRCT1	DZIP3	CACNA2D3	BTBD12
FLJ35429	GMIP	LOC10012878	CRHR1	EAF2	CACNA2D4	BTD



FLJ35776	GNA15	LOC10012889	CRKRS	EBF3	CACNG1	BTF3
FLJ41327	GNB1	LOC10012990	CROCCL2	EBF4	CACNG6	BTF3L4
FLJ44313	GOSR2	LOC10013018	CRYAA	EBPL	CALY	BTG1
FLJ45422	GP1BA	LOC10013036	CSAG3	ECE2	CAMLG	BTN3A1
FLJ45983	GP6	LOC10013116	CSAG3A	ECHDC1	CAPG	BTRC
FLJ46552	GP9	LOC10013138	CSAG3B	ECHDC3	CAPZB	BUB1B
FLJ90757	GPD1L	LOC10013164	CSF1	EDC3	CARM1	BUD31
FN1	GPD2	LOC10013172	CSTF2	EDNRA	CARS2	BZW2
FNBP1	GPR124	LOC10013208	CTBP1	EEF1A1	CASC3	C10orf10
FNBP4	GPR172A	LOC10013228	CTBS	EEF1G	CASP1	C10orf125
FNDC3B	GPR180	LOC10013228	CTDSP2	EFTUD2	CASP2	C10orf140
FOXF1	GPR34	LOC10013239	CTNNBL1	EGFR	CBX1	C10orf32
FOXR1	GPR4	LOC10013241	CTNND1	EGLN1	CBX6	C10orf33
FOXRED1	GPR44	LOC10013360	CTR9	EGLN2	CCDC101	C10orf35
FOXRED2	GPR65	LOC10013380	CTRB1	EHBP1	CCDC113	C10orf47
FTO	GPT2	LOC10013392	CTSK	EHD2	CCDC123	C10orf54
FTSJD2	GRAP2	LOC10013436	CUL2	EIF2AK3	CCDC151	C10orf58
FUBP3	GRASP	LOC10013440	CUL5	EIF2C4	CCDC45	C10orf59
FUCA2	GSK3B	LOC10017093	CWF19L1	EIF4EBP3	CCDC64B	C10orf6
FZD1	GSTM2	LOC143666	CXCL13	EIF4G1	CCDC68	C10orf75
G3BP1	GSTM5	LOC152195	CXCL2	EIF5	CCDC69	C10orf78
GABRB1	GTSF1	LOC220686	CXorf12	ELAVL1	CCDC84	C10orf96
GABRE	GUCY2E	LOC283683	CXorf40A	ELMO1	CCL14	C11orf52
GALIG	GYPA	LOC283932	CYB561D2	EML3	CCL15	C11orf54
GALNT1	GYPB	LOC285016	CYB5RL	ENC1	CCL20	C11orf58
GAN	GYPE	LOC285296	CYLD	ENOX2	CCL3	C11orf63
GAS2L3	GZMA	LOC285943	CYP1A2	ENPEP	CCL3L1	C11orf73
GATAD2B	GZMK	LOC286016	CYP2A6	ENTPD6	CCL3L3	C11orf80
GATS	H2AFV	LOC340598	CYP2A7	EOMES	CCL4L1	C11orf82
GDAP1	HABP4	LOC345645	CYP2B6	EPB41L1	CCL4L2	C11orf9
GDE1	HAPLN4	LOC346085	CYP2B7P1	EPB41L2	CCM2	C12orf11
GDF6	HARBI1	LOC388312	CYP2C18	EPB41L3	CCND2	C12orf23
GFM1	HBA1	LOC388481	CYP2C19	EPB41L4B	CCNF	C12orf24
GFM2	HBA2	LOC388556	CYP2C9	EPHA4	CCNG1	C12orf27
GGA1	HBB	LOC389599	CYP2D7P1	EPPB9	CCNI	C12orf31
GGTLC1	HBBP1	LOC389641	CYP3A4	EPR1	CCNJL	C12orf32
GIN51	HBD	LOC399491	CYP4B1	EPS8	CCNK	C12orf44
GIPC1	HBE1	LOC400558	CYP4F11	ERMP1	CCNL1	C12orf45
GJA5	HBG1	LOC400986	CYP4F22	ERN1	CCRK	C12orf47
GLB1	HBM	LOC401052	CYP7A1	ESRRG	CCT4	C12orf5
GLI3	HBZ	LOC401233	CYSLTR2	ETS1	CD302	C12orf51
GLS	HCFC1	LOC402377	CY TSA	ETS2	CD58	C12orf56
GLTSCR1	HCG27	LOC440122	CYYR1	ETV6	CD59	C12orf60
GM2A	HDC	LOC440157	DACT2	EXO1	CD74	C13orf15
GNAS	HDDC3	LOC440353	DAK	EXOC3	CD79A	C13orf23
GNG7	HEBP2	LOC440354	DAO	EXOSC3	CD82	C13orf3
GOLGA3	HEMGN	LOC441124	DAPK2	EXT1	CD86	C13orf33
GOLGA5	HEPACAM2	LOC441131	DAPP1	FABP7	CD93	C13orf34
GOLGA7	HES5	LOC493754	DARS2	FAHD2A	CD99L2	C13orf37
GOLGA8B	HEXA	LOC552889	DAXX	FAM101B	CDC23	C14orf102

GPR101	HEXB	LOC641823	DC36	FAM102A	CDC42EP5	C14orf104
GPR137	HEYL	LOC642127	DCAF15	FAM113B	CDCA3	C14orf109
GPR162	HHIP	LOC642361	DCAF4L1	FAM120AOS	CDH1	C14orf115
GPR61	HIF3A	LOC642393	DCBLD1	FAM122B	CDH13	C14orf118
GPR87	HIST1H2BH	LOC642615	DCLRE1A	FAM126B	CDH17	C14orf129
GRAMD1B	HIST1H3F	LOC642678	DCLRE1B	FAM127B	CDK7	C14orf139
GRAMD2	HIST1H3G	LOC642784	DCTN5	FAM127C	CDKN1A	C14orf149
GRAMD3	HIST1H3H	LOC642921	DCTN6	FAM129B	CDKN2AIPNL	C14orf173
GRB2	HIST1H4E	LOC643507	DCUN1D3	FAM133B	CDR2	C14orf176
GRINL1A	HIST1H4H	LOC643624	DDTL	FAM160B1	CDX1	C14orf37
GRTP1	HIVEP3	LOC643668	DDX1	FAM172A	CECR6	C14orf43
GRWD1	HK3	LOC643856	DDX20	FAM176B	CELSR2	C14orf80
GTF2A2	HLA-DQA1	LOC643949	DDX27	FAM189B	CELSR3	C15orf23
GTF2I	HLA-DRB6	LOC644012	DDX42	FAM190B	CENPE	C15orf27
GTF3A	HMOX2	LOC644330	DDX46	FAM72D	CENPF	C15orf33
GTF3C5	HOXA2	LOC644589	DDX52	FAM73A	CENPJ	C15orf57
HARS2	HOXA5	LOC644684	DDX55	FAM83H	CENTB2	C16orf11
HDAC11	HOXD11	LOC644774	DDX60	FAM86B1	CEP152	C16orf35
HELQ	HRAS	LOC644860	DEPDC1	FAM86C	CEP55	C16orf48
HELZ	HSD11B2	LOC644931	DERPC	FAM96A	CEP70	C16orf59
HERV-FRD	HSPB6	LOC644935	DET1	FBXL6	CES2	C16orf68
HES6	HSPC159	LOC645086	DEXI	FBXO32	CES8	C16orf74
HIST1H4J	HYOU1	LOC645159	DGCR11	FBXO33	CFH	C16orf75
HIST3H2A	ICK	LOC645233	DGUOK	FBXO5	CFHR1	C17orf100
HLA-A29.1	IFI44L	LOC645367	DHDH	FBXW8	CFHR2	C17orf53
HNRNPA3P1	IFIT1L	LOC645558	DHRSX	FCAR	CFI	C17orf58
HNRPK	IFT20	LOC645733	DHX34	FER1L4	CHAF1B	C17orf59
HOOK3	IFT74	LOC645969	DHX57	FGFR1OP2	CHD3	C17orf61
HOXB3	IGLL1	LOC647009	DHX58	FGFR3	CHD7	C17orf63
HOXB4	IGLL3	LOC647012	DIRAS3	FGFRL1	CHES1	C17orf68
HOXB7	IGSF6	LOC647081	DIS3	FHL1	CHFR	C17orf69
HOXC4	IGSF9B	LOC647340	DIS3L2	FICD	CHIC2	C17orf80
HOXC8	IKZF1	LOC647349	DKFZp434K19	FIGNL1	CHMP4C	C17orf91
HS2ST1	IL10RA	LOC648024	DKFZp434M1:	FILIP1L	CHP	C17orf93
HS3ST1	IL13RA2	LOC648434	DKFZp451M2:	FKBP5	CHRFAM7A	C17orf95
HSPB1	IL21R	LOC648476	DKFZp686I15:	FLJ10213	CHRM3	C17orf96
HSD3B1	IL2RB	LOC648608	DKFZp686K16	FLJ10374	CHST13	C18orf26
HSPB2	IL33	LOC648984	DKFZp686O24	FLJ10986	CHST15	C19orf12
HSPB7	IL7R	LOC649841	DKFZP779L18:	FLJ11783	CHSY1	C19orf2
HSPG2	IL8RB	LOC650020	DKFZp779M0:	FLJ14213	CHTF18	C19orf4
HTR1E	IL8RBP	LOC650128	DMAP1	FLJ20021	CHURC1	C19orf48
HTRA4	IMPA1	LOC650515	DMXL2	FLJ21839	CICK0721Q.1	C19orf54
HTT	ING1	LOC651143	DNAJB4	FLJ35220	CLCC1	C19orf56
HYAL2	INSC	LOC651309	DNAJC1	FLJ35801	CLCF1	C19orf6
IAPP	INTS10	LOC652595	DNAJC27	FLJ41484	CLCN5	C19orf66
IDH3B	IP6K3	LOC652676	DNCL1	FLJ44124	CLDN3	C19orf70
IGF2AS	ISG15	LOC652755	DNM3	FLJ45032	CLDN5	C1orf104
IGF2R	ITGA2B	LOC652826	DNMT1	FLJ46309	CLDN7	C1orf106
IHH	ITGA4	LOC652903	DNPEP	FNDC3A	CLDND1	C1orf115
IKBIP	ITGAD	LOC653108	DOCK7	FOXN4	CLEC11A	C1orf122

IL17C	ITGB3	LOC653171	DPF1	FOXP4	CLRN3	C1orf133
ILDR2	ITLN1	LOC653308	DSEL	FREM1	CMBL	C1orf135
INHA	ITPK1	LOC653496	DSG1	FRZB	CMTM7	C1orf156
INMT	KCNK1	LOC653764	DUS2L	FSIP1	CMTM8	C1orf163
INPP5E	KCNK4	LOC653930	DUXA	FSTL3	CNIH2	C1orf182
INPP5K	KCNMB1	LOC727773	DUXAP3	FTHL7	CNO	C1orf187
INSL4	KCNU1	LOC728098	DYM	FUT6	CNOT1	C1orf188
INSM1	KEL	LOC728188	DYNLL1	FXR2	CNOT3	C1orf19
INVS	KIAA0240	LOC728428	DYNLT3	FXD6	CNOT6	C1orf203
IRAK1	KIAA0319L	LOC728484	DYSFIP1	FYTTD1	COIL	C1orf218
IRF3	KIAA0649	LOC728537	EAF1	FZD9	COL11A1	C1orf24
ISM2	KIAA0748	LOC728661	EDAR	GALK2	COL17A1	C1orf51
ITGA11	KIAA0831	LOC728844	EDF1	GALNS	COL27A1	C1orf57
ITGA8	KIAA0895L	LOC728855	EEF2K	GALNT11	COL7A1	C1orf61
ITGB6	KIAA1383	LOC729004	EFHD1	GALNT6	COL9A2	C1orf63
ITIH5	KIAA1409	LOC729231	EGFL6	GALNTL4	COL9A3	C1orf74
ITPA	KIAA1571	LOC729298	EGOT	GAS1	COLEC11	C1orf86
JMJD2A	KIAA1737	LOC729581	EHMT2	GATA2	COMMD2	C1orf88
KANK3	KIAA1908	LOC729602	EID3	GATA6	COMT	C1orf94
KATNB1	KIF6	LOC729680	EIF1AD	GBA2	COPG2	C1orf97
KAZALD1	KIFC3	LOC729841	EIF2AK2	GCC1	COPS7B	C1QBP
KBTBD10	KIR2DS5	LOC729858	EIF2AK4	GCM1	COPZ1	C1QL1
KBTBD2	KIR3DL1	LOC730012	EIF2B5	GCSH	COQ9	C1QL4
KCNJ13	KIR3DL2	LOC730052	EIF2C1	GINS2	CORO1B	C1QTNF6
KCNK13	KISS1R	LOC730153	EIF2S1	GINS3	CORO2A	C1R
KCNK17	KLF1	LOC730273	EIF3D	GJB6	COX10	C1RL
KCNK9	KLK1	LOC731878	EIF4B	GLDN	COX11P	C1S
KCNQ10T1	KLK10	LOC732007	ELAC1	GLE1	COX17	C2orf100
KCNQ4	KLRB1	LOC732165	ELMOD3	GLO1	COX6A2	C2orf103
KCTD20	KPNA4	LOC732360	ELOVL6	GMNN	COX7A1	C2orf108
KCTD6	KPTN	LOC732425	EML4	GMPS	COX7B	C2orf199
KIAA0040	KRT1	LOC88523	ENDOG	GNB4	COX8A	C2orf201
KIAA0100	KRT13	LOC91316	ENTPD7	GNPAT	CP	C2orf29
KIAA0182	KRT6C	LOC96610	ENTPD8	GOLGA8A	CP110	C2orf3
KIAA0195	L3MBTL2	LPPR4	EP300	GOLGB1	CPB2	C2orf46
KIAA0460	LAT	LRFN3	EPC1	GON4L	CPEB2	C2orf52
KIAA0556	LCE1E	LRRC17	EPHA3	GORASP1	CPEB3	C2orf55
KIAA0753	LCN1L1	LRRC2	EPHA6	GOT1	CPEB4	C2orf56
KIAA1024	LDHAL6A	LRRC23	EPHB4	GPR125	CPSF3	C2orf72
KIAA1045	LGALS14	LRRC34	EPN2	GPR137B	CPSF3L	C2orf75
KIAA1107	LGALS9	LRRC38	EPS15L1	GPR89B	CPSF4	C2orf45
KIAA1199	LHX2	LTV1	ERLIN2	GPR89C	CPT2	C2orf51
KIAA1202	LHX4	LY6H	ERO1LB	GPRASP2	CPVL	C2orf58
KIAA1407	LILRA2	LYPLAL1	ERRFI1	GPRC5C	CREB3	C2orf63
KIAA1429	LILRA3	LYST	ESM1	GPSM3	CREBZF	C2orf70
KIAA1522	LILRA5	MAF1	ESPNL	GPX1	CRHBP	C2orf13
KIAA1549	LILRA6	MAGED1	ESR1	GRAMD4	CRIM1	C2orf25
KIAA1772	LILRB2	MAGEH1	ESRRA	GREM2	CRIP2	C2CD2
KIDINS220	LILRB4	MAK16	ESRRAP2	GRHL1	CRISPLD1	C2orf15
KIF26B	LILRB5	MANSC1	ESYT1	GRM2	CRLF3	C2orf25

KLHDC4	LOC10012792	MAP3K13	ETFA	GRM3	CRLS1	C2orf28
KLHL24	LOC10012795	MAP3K9	ETHE1	GRPEL1	CROCC	C2orf34
KLHL26	LOC10012818	MAP7D3	ETV2	GSC	CRP	C2orf56
KLK11	LOC10012848	MAPK6	EVI5	GSTA4	CRYGS	C2orf65
KLK3	LOC10012854	MAPK7	EVI5L	GTF2H5	CS	C2orf68
KLK7	LOC10012869	MAPK8IP1	EXOC8	GTF2IRD2B	CSDC2	C2orf82
KLK8	LOC10012874	MARS2	EXOSC10	GTF3C1	CSHL1	C3orf10
KRBA2	LOC10012890	MCAM	EXOSC6	GVIN1	CSNK1A1L	C3orf14
KRT17P3	LOC10012897	MCTS1	F2RL3	H1FO	CSNK1G3	C3orf23
KRT18P19	LOC10012900	MDH1	FAAH	H2AFZ	CSNK2A2	C3orf26
KRT18P26	LOC10012909	MECP2	FADS3	HARS	CSRNP2	C3orf38
KRT18P30	LOC10012911	MED10	FAM100A	HAT1	CSRP1	C3orf64
KRT18P34	LOC10012920	MED12	FAM102B	HDAC7	CSRP2BP	C3orf67
KRT20	LOC10012953	MEIS1	FAM103A1	HDAC7A	CTDSPL2	C3orf71
KRT23	LOC10012965	MEIS2	FAM114A1	HDHD2	CTNNB1	C3orf72
KRTAP10-5	LOC10012967	MERTK	FAM115A	HEATR2	CTNND2	C3orf75
KRTAP19-6	LOC10012975	MESDC1	FAM118B	HEATR3	CTSD	C4orf18
KRTAP21-1	LOC10013000	METTLL11A	FAM128A	HEATR5B	CTSS	C4orf19
KRTAP21-2	LOC10013025	METTLL11B	FAM139A	HECA	CTTNBP2NL	C4orf27
KSR1	LOC10013031	MEX3A	FAM153B	HEG1	CTU2	C4orf43
LAG3	LOC10013049	MFSD6	FAM164C	HERPUD1	CWF19L2	C4orf46
LARP4B	LOC10013055	MGC3032	FAM174A	HEY1	CX3CL1	C4orf51
LASP1	LOC10013059	MGC3731	FAM175A	HHAT	CXCL10	C5
LDHC	LOC10013074	MGC45491	FAM186B	HHLA1	CXCL16	C5orf28
LGALS13	LOC10013082	MGC5457	FAM18B	HIAT1	CXorf23	C5orf34
LGALS3	LOC10013085	MGP	FAM19A4	HIATL2	CXorf45	C5orf37
LHB	LOC10013085	MIB2	FAM21C	HIF1AN	CYB5A	C5orf4
LHFP	LOC10013116	MICALL1	FAM40B	HIGD1A	CYBA	C5orf41
LIG4	LOC10013124	MIR155HG	FAM43A	HIP1R	CYBASC3	C5orf42
LIMA1	LOC10013133	MIR9-1	FAM45B	HIST1H1D	CYLN2	C5orf44
LIMCH1	LOC10013139	MLF2	FAM58A	HLA-A	CYP21A2	C5orf62
LMAN2L	LOC10013171	MLL5	FAM59A	HLA-H	CYP26B1	C6orf117
LMO1	LOC10013172	MMP11	FAM59B	HLTF	CYP2D6	C6orf125
LMOD1	LOC10013173	MPDZ	FAM69B	HM13	CYP2E1	C6orf126
LNX1	LOC10013190	MPHOSPH6	FAM76B	HMGB1L1	CYP2R1	C6orf129
LOC10012805	LOC10013214	MRPL21	FAM91A1	HMGB2	CYP39A1	C6orf148
LOC10012823	LOC10013224	MRPL44	FAM96B	HMMR	CYP3A43	C6orf160
LOC10012847	LOC10013245	MRPL55	FAM98A	HNRNPD	CYP3A5	C6orf168
LOC10012856	LOC10013249	MRPS15	FANCA	HNRNPH1	CYP4A11	C6orf170
LOC10012859	LOC10013250	MRPS30	FANCG	HNRNPH2	CYP4A22	C6orf204
LOC10012864	LOC10013270	MRPS34	FANCI	HNRNPK	CYP4F12	C6orf211
LOC10012899	LOC10013274	MSTO1	FASTKD5	HNRNPUL1	CYP4F2	C6orf48
LOC10012919	LOC10013276	MSX1	FBLN2	HNRPH1	CYP4F3	C6orf54
LOC10012954	LOC10013281	MTF1	FBXL15	HNRPUL1	CYP4V2	C6orf57
LOC10012955	LOC10013296	MTFMT	FBXL19	HOXB2	CYP8B1	C6orf59
LOC10012956	LOC10013297	MTMR12	FBXL5	HOXC13	D4S234E	C6orf66
LOC10012962	LOC10013303	MUSTN1	FBXL7	HOXC6	DACT1	C6orf89
LOC10012967	LOC10013307	MYADM	FBXO10	HS1BP3	DAD1L	C7orf10
LOC10012984	LOC10013327	MYCL1	FBXO15	HSD17B6	DAPK3	C7orf20
LOC10012995	LOC10013343	MYCT1	FBXO25	HSD17B7	DAZL	C7orf28A

LOC10012997	LOC10013343	MYL1	FBXO42	HSDL2	DBH	C7orf28B
LOC10012998	LOC10013345	MYLK4	FBXO46	HSN2	DBN1	C7orf40
LOC10013030	LOC10013347	MYO9B	FCAMR	HSPA12A	DCAF16	C7orf41
LOC10013045	LOC10013350	N4BP2L2	FCF1	HSPC171	DCBLD2	C7orf44
LOC10013079	LOC10013354	NAB1	FER1L5	HSPCAL3	DCP1B	C7orf46
LOC10013083	LOC10013356	NARF	FGF6	HSPD1	DCP2	C7orf50
LOC10013090	LOC10013367	NARG1	FGF9	HSZFP36	DCTN2	C7orf54
LOC10013104	LOC10013377	NAT13	FHOD1	HUWE1	DCUN1D4	C7orf57
LOC10013116	LOC10013388	NCK1	FIGN	HVCN1	DCXR	C7orf70
LOC10013119	LOC10013400	NCOA1	FIS	HYDIN	DDO	C8orf13
LOC10013125	LOC10013410	NCOA6IP	FIZ1	ICMT	DDR GK1	C8orf4
LOC10013128	LOC10013427	NCRNA00152	FKTN	ID3	DDT	C8orf55
LOC10013129	LOC10013429	NECAB2	FLJ11292	IDH1	DDX26B	C8orf58
LOC10013133	LOC10013436	NECAP2	FLJ12949	IER5L	DDX50	C8orf59
LOC10013147	LOC10019237	NGDN	FLJ16793	IFFO1	DDX51	C8ORFK29
LOC10013167	LOC10019237	NICN1	FLJ20397	IFIT3	DDX54	C9orf103
LOC10013173	LOC113386	NIN	FLJ20581	IFRD2	DDX56	C9orf125
LOC10013181	LOC124216	NMB	FLJ21687	IFT140	DDX59	C9orf129
LOC10013219	LOC133491	NMD3	FLJ25363	IFT52	DDX6	C9orf135
LOC10013221	LOC138652	NMNAT3	FLJ32011	IGF1	DECR2	C9orf140
LOC10013229	LOC142937	NOB1	FLJ32810	IGFBP5	DEDD2	C9orf3
LOC10013267	LOC151457	NOSTRIN	FLJ34047	IGSF21	DENND2D	C9orf40
LOC10013300	LOC153684	NPC2	FLJ35390	IL17D	DENND4A	C9orf46
LOC10013301	LOC200493	NPEPL1	FLJ35785	IL17RC	DGAT2	C9orf58
LOC10013311	LOC201229	NQO2	FLJ38379	IL28RA	DGKA	C9orf61
LOC10013317	LOC201651	NSUN4	FLJ40330	IL4R	DGKQ	C9orf72
LOC10013319	LOC282997	NT5C3	FLJ40722	IL8	DHRS1	C9orf80
LOC10013339	LOC285033	NUDCD3	FLJ42289	IMMP2L	DHRS12	C9orf85
LOC10013355	LOC285741	NUDT5	FLJ42709	IMP4	DHRS4L1	C9orf95
LOC10013369	LOC345630	NUMA1	FLJ44054	INO80C	DHRS7	CA10
LOC10013371	LOC347364	OAZ2	FLJ45513	INPP5D	DHRS9	CA11
LOC10013391	LOC347376	OGFOD1	FLJ45966	INTS4	DHX33	CA12
LOC10013425	LOC389102	OLFML1	FN3KRP	INTS5	DHX35	CA14
LOC10013454	LOC390712	OLIG2	FNDC4	INTS6	DHX36	CA2
LOC10013458	LOC390876	ONECUT1	FNIP2	IPP	DIP2A	CA4
LOC10014460	LOC391692	OR4K13	FNTB	IRAK3	DKFZp667M2	CABLES2
LOC10019093	LOC400236	OSBPL9	FOSL2	IRF2BP1	DKKL1	CABYR
LOC128192	LOC400879	OXSRI	FOX D2	IRS1	DLAT	CACHD1
LOC132241	LOC401002	P704P	FOX H1	IRX6	DLG4	CACNA1H
LOC137107	LOC401010	PAFAH1B2	FOX J1	ISCA1	DLL1	CACNA2D2
LOC146517	LOC401076	PALLD	FPGS	ISCA2	DMGDH	CACNB2
LOC154761	LOC401237	PAQR7	FRAG1	ISM1	DMRT2	CACNB3
LOC162073	LOC440509	PAR D6A	FRRS1	ISY1	DMTF1	CAD
LOC202051	LOC440570	PCBP4	FRY	ITGAE	DNA2	CADM1
LOC221442	LOC440900	PCDH17	FTH1	ITGB4BP	DNAJB1	CALB2
LOC257396	LOC441007	PCDHGB6	FTHL3	ITPKC	DNAJB5	CALCB
LOC25845	LOC441018	PCK2	FTHL8	ITPRIPL2	DNAJC10	CALCOCO1
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LOC283953	LOC441191	PCNT	FUNDC1	JARID1D	DNAJC9	CALM1
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LOC341457	LOC441528	PGAM1	GAGE5	KANK1	DNM1	CAMK1
LOC341784	LOC441714	PGGT1B	GAK	KBTBD11	DNM1L	CAMK2G
LOC347292	LOC441743	PGM5	GALNT13	KBTBD8	DNTTIP1	CAMK2N1
LOC387723	LOC441763	PHYHIPL	GALNT3	KCNE1L	DNTTIP2	CAMK2N2
LOC387856	LOC442229	PIK3R2	GARNL3	KCNJ2	DOCK11	CAMKV
LOC389000	LOC442366	PILRA	GBAP	KCNK6	DPYD	CAMSAP1L1
LOC389322	LOC541471	PLAC8	GBE1	KCNMB3	DPYSL2	CAND2
LOC389332	LOC606724	PLAGL1	GBP3	KCTD10	DPYSL3	CAPN12
LOC389342	LOC641705	PLCD3	GBP7	KCTD13	DR1	CAPN13
LOC389901	LOC641804	PLEKHB2	GCET2	KCTD2	DRD4	CAPN3
LOC390372	LOC641992	PLEKHG3	GCN1L1	KDELC2	DRG2	CAPRIN1
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LOC391811	LOC642580	PLSCR1	GDI2	KDM6B	DSN1	CAPZA2
LOC392382	LOC642621	PLXNA2	GDPD4	KDSR	DSTN	CARD10
LOC400455	LOC642732	PLXNB3	GGA3	KIAA0284	DSTYK	CARD11
LOC400831	LOC642933	PMS2L4	GHITM	KIAA0355	DTX1	CARD8
LOC400890	LOC642953	PMS2L5	GIYD2	KIAA0408	DTX3	CARS
LOC400968	LOC643008	PNO1	GJB3	KIAA0415	DUOX1	CART1
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LOC402644	LOC644399	PPA1	GLB1L	KIAA1128	DUSP16	CASP4
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LOC441050	LOC644596	PPFIA1	GLOD4	KIAA1530	DYNC1I1	CASP7
LOC441073	LOC644624	PPIA	GLOD5	KIAA1600	DYNC2H1	CAST
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LOC643109	LOC647195	PSMA1	GPS1	LACTB	EIF2B2	CCDC18
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LOC643401	LOC647742	PTTG1IP	GRK6	LEMD3	EIF4G3	CCDC50
LOC643550	LOC647747	PURA	GRN	LGALS1	ELK4	CCDC51
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LOC644019	LOC648470	RAB11FIP4	GTDC1	LMAN1	ELP2	CCDC74A
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LOC644701	LOC651959	RBM7	HDAC3	LOC10012907	EPHX1	CCNC
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LOC645241	LOC652183	RFNG	HERC2	LOC10012921	ERAP2	CCPG1
LOC645332	LOC652346	RFX5	HERPUD2	LOC10012926	ERC2	CCS
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LOC645837	LOC652679	RNASE1	HIST1H3D	LOC10012953	ETF1	CCT7
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LOC646567	LOC653468	RNASEH2C	HIT-40	LOC10012966	EVI2B	CD163
LOC646779	LOC653600	RNASEL	HIVEP2	LOC10012972	EVL	CD164
LOC646786	LOC653657	RNF130	HJURP	LOC10012975	EXD2	CD19
LOC647174	LOC653895	RNF138	HK1	LOC10013009	EXOC1	CD200
LOC647262	LOC654078	RNF167	HLA-C	LOC10013015	EXOC2	CD24
LOC647264	LOC654126	RNF4	HLA-G	LOC10013022	EXOC4	CD248
LOC647346	LOC654127	RNPEP	HLCS	LOC10013027	EXT2	CD2AP
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LOC648366	LOC727914	RRP12	HNRNPF	LOC10013080	F8	CD79B

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LOC648622	LOC728453	RTF1	HNRPUL2	LOC10013089 FA2H	CD99
LOC648814	LOC728556	RTN2	HOXA9	LOC10013109 FABP1	CDAN1
LOC648907	LOC728608	RUFY3	HPDL	LOC10013154 FADS1	CDC123
LOC649379	LOC728758	RXRB	HPS4	LOC10013178 FADS2	CDC16
LOC649946	LOC728772	S100Z	HRCT1	LOC10013185 FAHD1	CDC25C
LOC650116	LOC728888	SAC3D1	HSD11B1	LOC10013189 FALZ	CDC2L5
LOC650144	LOC728934	SALL1	HSD11B1L	LOC10013244 FAM104A	CDC42
LOC650251	LOC728942	SCMH1	HSD17B12	LOC10013249 FAM105B	CDC42BPA
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LOC650867	LOC729123	SEH1L	HSPA1L	LOC10013274 FAM120A	CDCA5
LOC650885	LOC729148	SEMA4F	HSPA7	LOC10013311 FAM125A	CDCA7
LOC651102	LOC729200	SEMA5A	HSPE1	LOC10013348 FAM134C	CDCA7L
LOC651450	LOC729234	SENP2	HTR2B	LOC10013351 FAM135A	CDCP1
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LOC652481	LOC729519	SESN2	IARS2	LOC10013366 FAM162A	CDH26
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LOC652634	LOC729768	SETD4	ICAM1	LOC10013386 FAM184A	CDH4
LOC652674	LOC729792	SETMAR	ICOSLG	LOC10013399 FAM195B	CDK2AP1
LOC652685	LOC729799	SEZ6	IDO2	LOC10013424 FAM30A	CDK2AP2
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LOC652864	LOC730427	SFRS3	IFNGR2	LOC120376 FAM50A	CDKAL1
LOC653079	LOC730525	SFTPD	IFP38	LOC147727 FAM50B	CDKL3
LOC653188	LOC730995	SGCA	IFT172	LOC148430 FAM53C	CDO1
LOC653197	LOC731444	SGPL1	IGF2BP1	LOC148915 FAM63B	CDR2L
LOC653242	LOC731486	SH3BGRL2	IGHMBP2	LOC149501 FAM65A	CDS1
LOC653269	LOC731999	SH3BP5L	IGSF8	LOC151162 FAM65C	CDX2
LOC653316	LOC732316	SHC3	IKZF2	LOC200030 FAM78A	CDX4
LOC653423	LOC791120	SHE	IKZF5	LOC253039 FAM80B	CEACAM1
LOC653471	LOC92017	SHRM	IL10	LOC255275 FAM83D	CEBPA
LOC653596	LONP1	SIAH2	IL15RA	LOC283267 FAM90A3	CEBPB
LOC653857	LPCAT1	SIX2	IL17RA	LOC283755 FANCB	CEBPD
LOC654069	LPXN	SKIV2L	IL18	LOC284023 FANCE	CEBPZ
LOC654085	LRMP	SLA	IL1RAPL1	LOC284293 FAR1	CECR2
LOC654128	LRP11	SLAIN1	IL1RL1	LOC284821 FASTKD1	CEL
LOC654189	LRRC19	SLBP	IL1RL2	LOC285550 FAT1	CELP
LOC727762	LRRC28	SLC16A3	IL23A	LOC339970 FBLIM1	CENPB
LOC727882	LRRC29	SLC22A23	IL6ST	LOC341965 FBXL14	CENPH
LOC727901	LRRC42	SLC25A17	IMMT	LOC344328 FBXL20	CENPK
LOC728060	LRRN3	SLC25A4	IMPACT	LOC344405 FBXO3	CENPQ
LOC728178	LST1	SLC2A12	IMPDH1	LOC347544 FBXO36	CENPT
LOC728263	LY6G5C	SLC36A1	INCENP	LOC388796 FBXO4	CENTA1
LOC728320	LY6G6D	SLC36A4	INHBB	LOC388814 FBXO45	CEP68



LOC728408	LY86	SLC43A1	INPP4A	LOC388969	FBXO8	CEP78
LOC728493	LY9	SLC9A1	INPP5F	LOC389386	FBXW2	CER1
LOC728518	LYL1	SLC9A4	INTS1	LOC390183	FBXW5	CETN3
LOC728653	LYVE1	SLIT3	INTS12	LOC390354	FCER1G	CFB
LOC728924	M160	SLN	INTS3	LOC390940	FCGR2A	CFD
LOC729051	MAGEA12	SMARCC2	INTS9	LOC391132	FCGR3B	CFLAR
LOC729222	MAGI1	SMARCD2	IPO11	LOC391764	FCHO1	CGRRF1
LOC729279	MAP2K1	SNAP25	IPO9	LOC399815	FCN3	CHAC1
LOC729374	MAP3K5	SNAPC2	IPPK	LOC400750	FCRLB	CHAF1A
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LOC729408	MAP7D1	SNORA64	IRAK4	LOC401720	FERMT3	CHCHD3
LOC729466	MARCH7	SNORA70B	IRS2	LOC439949	FES	CHCHD4
LOC729495	MARCO	SNORD10	IRX5	LOC440927	FETUB	CHCHD6
LOC729513	MARVELD1	SNORD100	ITGB3BP	LOC441046	FEZ2	CHCHD9
LOC729642	MARVELD2	SNORD12	ITGB7	LOC441066	FGD1	CHD4
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LYPD3	MT1B	TAF9	KIF4A	LOC647954	FNDC1	CKAP5
LYPD5	MTHFD2L	TAP1	KILLIN	LOC648000	FOLH1B	CKB
LYPLA2P1	MUC12	TAS2R10	KLHDC3	LOC648638	FOXD4L1	CKMT1A
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MED15	NKD2	TIPRL	LFNG	LOC653210	G6PC3	CLK1
MED16	NKG7	TJP2	LGALS4	LOC653333	GABARAP	CLK2
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MIER1	NSUN2	TNFSF4	LOC10012798	LOC727970	GATM	CNIH4
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MON2	PAFAH1B1	TSPAN12	LOC10012902	LOC730167	GLIPR1	COL22A1
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MRPL16	PECAM1	TUFT1	LOC10012944	LPAR1	GMPPA	COL6A3
MRPL20	PET112L	TWIST2	LOC10012944	LPIN1	GMPPB	COL8A1
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MRPL32	PEX5L	TXNDC9	LOC10012954	LPP	GNA13	COMMMD3
MRPL4	PF4V1	UBE1DC1	LOC10012960	LRBA	GNAT1	COMMMD7
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MRPS11	PGLYRP1	UBE2E1	LOC10012974	LRRIC3	GNL2	COPS7A
MRPS17	PHC3	UBE3B	LOC10012978	LRRIC45	GNMT	COQ10A
MRPS18B	PHF12	UBTD1	LOC10012993	LRRIC61	GNPDA1	COQ3
MRPS2	PHOSPHO1	UEVLD	LOC10012995	LSR	GOLGA4	COQ5
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MTP18	PI4KA	ULK4	LOC10012997	LUM	GOLM1	COX11
MTRR	PIN4	UMPS	LOC10013005	LYSMD1	GOLT1B	COX6B1
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MTX1	PIP5K1B	UPF1	LOC10013016	MAD2L1BP	GPATCH2	CPM
MUC15	PIP5KL1	URB2	LOC10013017	MAGED2	GPC6	CPN1
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MUS81	PLEKHA3	UTP11L	LOC10013038	MALL	GPKOW	CPNE4
MUTED	PLGLA	VCAM1	LOC10013038	MAN1C1	GPN1	CPO
MXRA8	PLIN	VEZT	LOC10013042	MAN2B1	GPR116	CPS1
MYBBP1A	PLVAP	VISA	LOC10013042	MANEAL	GPR128	CPSF2
MYBPHL	PMF1	VKORC1L1	LOC10013044	MAP3K1	GPR146	CPSF6
MYCBP2	PMS2L3	VSIG2	LOC10013046	MAP3K2	GPR175	CPT1A
MYL3	PNMT	VSTM2B	LOC10013051	MAP3K6	GPR27	CPT1B
MYNN	PODN	VWF	LOC10013052	MAP3K7IP1	GPS2	CPT1C
MYO3A	POGK	WDR20	LOC10013054	MAP3K8	GPSM1	CPXM1
NACAD	POLR2C	WDR21A	LOC10013055	MAP4K4	GPT	CPXM2

NANS	POLRMT	WDR26	LOC10013055 MAP7D2	GPX3	CPZ
NARFL	POP7	WDR40A	LOC10013057 MAPK10	GRAP	CR2
NAT1	POU2AF1	WDR59	LOC10013059 MAPK3	GRB7	CRABP1
NAT14	PPAPDC1B	WDR60	LOC10013063 MAPK8IP3	GRHL3	CRABP2
NCOA3	PPDPF	WDR82	LOC10013080 MAPKAPK3	GRHPR	CRADD
NCOR1	PPFIA3	WDR91	LOC10013093 MAT2A	GRIN3B	CRAT
NCRNA00095	PPIL2	WFIKKN1	LOC10013093 MATK	GRIP2	CREB3L3
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NDUFA6	PPP1R14D	WRNIP1	LOC10013109 MCFD2	GSTM4	CREG1
NDUFAB1	PPTC7	WWP2	LOC10013122 MCM10	GSTO1	CRIP1
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NDUFB9	PRB3	YWHAE	LOC10013134 MCM5	GTF2H4	CRLF1
NEDD4L	PRKAA2	YWHAG	LOC10013136 MCM6	GTF2IRD1	CRMP1
NEU1	PRKG2	ZBTB40	LOC10013145 MCM7	GTF3C2	CROP
NF1	PRMT8	ZBTB80S	LOC10013146 MCMDC1	GTF3C3	CROT
NFAT5	PRND	ZC3H15	LOC10013151 MDP1	GTPBP2	CRSP2
NGLY1	PRO0132	ZC3H4	LOC10013169 MED28	GUCA1A	CRTAP
NHLRC3	PRPF3	ZCCHC14	LOC10013170 METTL13	GUCA2A	CRTC2
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NIPSNAP1	PRSS21	ZER1	LOC10013178 MFSD11	GUK1	CRY1
NKX2-3	PRSS8	ZFAND6	LOC10013189 MGA	GUSB	CRY2
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NTF5	PTCRA	ZNF346	LOC10013252 MIR1974	HAL	CSF2RA
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NUP214	PTPRB	ZNF470	LOC10013258 MLF1IP	HAO2	CSNK1D
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OBSCN	PTPRCAP	ZNF491	LOC10013272 MLST8	HAUS4	CSNK2A1
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ODAM	PTPRO	ZNF526	LOC10013286 MOCS1	HBG2	CSRP2
OFD1	PTPRU	ZNF670	LOC10013286 MOCS2	HCCA2	CST1
OLR1	PUSL1	ZNF791	LOC10013296 MOGS	HCFC1R1	CST3
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OSAP	RAB6A		LOC10013307 MRPL37	HDDC2	CTAGE6
OSBPL11	RAB6B		LOC10013312 MRPL43	HDGF2	CTBP2
OSGEP	RAD23A		LOC10013314 MRPL50	HDHD1A	CTCF
OSTF1	RAD23B		LOC10013317 MRPS12	HERC4	CTDSP1
OTUD4	RAG1AP1		LOC10013318 MRPS25	HES1	CTGF

OVCA2	RAMP3	LOC10013323 MRPS6	HEXDC	CTGLF7
OVOL1	RAP2A	LOC10013326 MRPS9	HFM1	CTH
OXGR1	RAPGEF2	LOC10013331 MSRB3	HGD	CTHRC1
OXTR	RARS	LOC10013346 MTERFD1	HGFAC	CTNNA1
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PABPC4	RBM16	LOC10013348 MXRA7	HINT2	CTSB
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PAK4	RBM38	LOC10013359 MYLIP	HIST1H2AC	CTSH
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PCP4	RETN	LOC10013408 NASP	HLX	CUZD1
PCSK7	RFX2	LOC10013408 NAT10	HMBOX1	CXCL1
PDCD6IP	RFXDC2	LOC10013409 NAT12	HMGA2	CXCL12
PDGFB	RGS18	LOC10013415 NAT5	HMGCL	CXCL5
PDRG1	RGS6	LOC10013418 NAV3	HMGCLL1	CXCL6
PDXDC2	RHAG	LOC10013421 NBEAL2	HMOX1	CXorf15
PDZD3	RHBDD3	LOC10013422 NBPF11	HMX2	CXorf38
PDZRN3	RHBG	LOC10013425 NBPF14	HNF1A	CXorf57
PELI3	RHCE	LOC10013426 NBPF3	HNF4G	CXorf64
PER3	RHOH	LOC10013436 NCAPD2	HNRNPA0	CXXC1
PES1	RHOJ	LOC10013458 NCAPG2	HNRNPH3	CXXC6
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PLCXD3	S100A8	LOC197350 NOXA1	HULC	CYP2J2
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PLEKHG4B	SAMD1	LOC203547	NPLOC4	IAH1	CYP3A7
PLEKHJ1	SAMD8	LOC220433	NPY	ICA1L	CYP51A1
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PMS2	SAMSN1	LOC283481	NR2F6	ICAM3	CYTL1
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POLH	SATB2	LOC285095	NRBP2	ID4	D2HGDH
POLR2J2	SCARNA13	LOC285176	NRCAM	IFI27L1	DAB2
POLR2J3	SCFD2	LOC285908	NRD1	IFI44	DALRD3
POLR3E	SCGB3A1	LOC286002	NRIP1	IFITM4P	DAP
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POTEE	SDPR	LOC338870	NTAN1	IGFALS	DBC1
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PPIE	SELL	LOC342979	NTN4	IKBKAP	DBNDD2
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PRAMEF13	SFI1	LOC388327	NUP62CL	IL1B	DCLRE1C
PRDM7	SFRS2B	LOC388339	NUP88	IL1RAP	DCN
PRDX3	SFRS8	LOC388503	NUPL2	IL1RN	DCTN3
PRINS	SGIP1	LOC388514	NVL	IL22RA1	DCUN1D5
PRKAR2A	SHROOM3	LOC388564	OGG1	IL6	DDB1
PRKCE	SIGLEC10	LOC388681	OGT	IL6R	DDB2
PRKRIP1	SIGLEC11	LOC388955	OLFML2A	ILD1R1	DDC
PRPF18	SIGLEC14	LOC389053	OPLAH	ILKAP	DDIT3
PRPF40A	SIGLEC16	LOC389072	OPRL1	IMP3	DDIT4
PRPSAP1	SIGLEC7	LOC389156	ORC1L	IMPA2	DDIT4L
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PRRT1	SLC12A4	LOC389523	OSBPL5	INA	DDR1
PRSS22	SLC12A8	LOC389634	OSBPL7	INO80D	DDR2
PRTG	SLC13A3	LOC389791	OSCAR	INPP1	DDX10
PSKH1	SLC17A8	LOC390298	OSTC	INPP5B	DDX11
PSMA5	SLC1A4	LOC390671	OTUD1	INTS2	DDX19B
PSMB3	SLC22A16	LOC390956	P2RY2	INTS8	DDX21
PSMC4	SLC22A4	LOC391126	P2RY5	INTU	DDX25
PSMD3	SLC25A38	LOC391359	P4HB	IPO8	DDX28
PSMD8	SLC26A1	LOC391370	PAF1	IPW	DDX31
PSME3	SLC26A10	LOC391656	PAFAH2	IRAK2	DDX47
PSMG1	SLC26A3	LOC391817	PALM	IREB2	DEAF1
PSMG3	SLC30A2	LOC392145	PAM	IRF5	DECR1
PTAFR	SLC35E4	LOC392197	PAMR1	IRF7	DEFB130
PTOV1	SLC38A5	LOC399900	PANK2	IRX1	DEGS1
PUF60	SLC38A6	LOC400027	PAPOLA	ISCU	DEM1
PUM2	SLC4A1	LOC400174	PAPPA	ISG20	DENND1A
PURB	SLC4A3	LOC400446	PAQR8	ISG20L2	DENND2A
PVRL3	SLC5A11	LOC400578	PARP16	ISOC1	DENND4C
PVRL4	SLC9A7	LOC400657	PARP3	ITFG3	DENR

PYGO2	SLC9A9	LOC400721	PBX2	ITGA3	DEPDC6
QSOX2	SLCO5A1	LOC400759	PCBD2	ITGA5	DFFA
RAB11A	SMPD2	LOC401007	PCDH20	ITGAL	DFNB59
RAB13	SMPD4	LOC401218	PCDH7	ITGAM	DGAT1
RAB8B	SNAP47	LOC401398	PCDHB9	ITGB2	DGCR2
RABGAP1L	SNF8	LOC401588	PCTK3	ITGB5	DGCR5
RABL2B	SNHG3-RCC1	LOC401640	PCYOX1	ITIH2	DHCR24
RALGPS2	SNHG9	LOC401676	PDCD4	ITIH3	DHCR7
RANGRF	SNN	LOC401847	PDE4D	ITIH4	DHRS2
RAP1BL	SNORA13	LOC402342	PDE4DIP	ITSN1	DHRS3
RAPGEF1	SNORA70	LOC402571	PDE6G	IWS1	DHRS4
RAPGEFL1	SNORA78	LOC402677	PDE8A	IYD	DHRS4L2
RASA2	SNORD114-1	LOC407835	PDF	JAG1	DHX15
RBM15B	SNORD114-3	LOC440055	PDGFC	JAM3	DHX38
RBM42	SNORD15B	LOC440280	PDGFRB	JDP2	DHX9
RBM4B	SNORD1A	LOC440503	PDHB	JMJD4	DIABLO
RELT	SNORD33	LOC440551	PDLIM7	JMY	DIAPH1
REPIN1	SNORD35A	LOC440589	PDP2	JUNB	DIAPH2
RETNLB	SNORD42B	LOC440776	PDXDC1	KANK2	DIAPH3
RFP	SNORD4A	LOC440925	PEF1	KARS	DIDO1
RFPL3S	SNORD69	LOC440926	PEPD	KAT2A	DIMT1L
RFX6	SNRNP25	LOC440991	PEX11G	KAT5	DIO1
RG9MTD1	SNRPB2	LOC441114	PEX6	KCNA6	DIO2
RGAG1	SNRPG	LOC441150	PFAS	KCNF1	DKC1
RGAG4	SNX12	LOC441208	PGAM2	KCNH2	DKFZP564J102
RGL2	SNX21	LOC441282	PGBD1	KCNH6	DKFZp761P04
RGP1	SNX31	LOC441461	PGBD3	KCNJ10	DKK3
RGS19	SOBP	LOC441488	PGM2	KCNMB2	DLG2
RHOBTB1	SOX6	LOC441511	PGM3	KCNS1	DLG3
RHOBTB2	SP2	LOC441550	PGP	KCTD11	DLG5
RIC8A	SPESP1	LOC441775	PHF1	KDM4D	DLGAP5
RICS	SPI1	LOC442421	PHF13	KEAP1	DLK1
RICTOR	SPIB	LOC442519	PHF19	KENAE	DLL3
RIN3	SPO11	LOC554223	PHIP	KHDC1	DLX3
RIOK1	SPTA1	LOC641710	PHKG2	KHDRBS1	DLX5
RLN1	SPTB	LOC641741	PHLDB3	KHDRBS2	DMC1
RMND5B	SPTBN4	LOC641772	PI4KAP2	KHK	DMKN
RN7SK	SRCRB4D	LOC641798	PIAS1	KIAA0101	DMRTA1
RNASET2	SRL	LOC641819	PIGA	KIAA0146	DMWD
RNF112	SSH3	LOC641848	PIGN	KIAA0174	DNAH1
RNF24	STAB1	LOC641941	PIGS	KIAA0363	DNAH14
RNF31	STAB2	LOC641972	PIGW	KIAA0427	DNAJA1
RNF43	STAG3	LOC641983	PIM3	KIAA0586	DNAJA4
RNMTL1	STAG3L2	LOC641989	PIN1	KIAA0907	DNAJB12
RNU1-5	STAG3L3	LOC642109	PIPOX	KIAA0947	DNAJB2
RNU1F1	STAT5B	LOC642373	PITPNM1	KIAA1012	DNAJB6
RNY3	STX8	LOC642441	PITRM1	KIAA1026	DNAJB9
RPA4	SUCNR1	LOC642458	PJCG6	KIAA1279	DNAJC12
RPL23	SULT1C2	LOC642628	PKD1	KIAA1688	DNAJC15
RPL26L1	SUMF2	LOC642656	PKMYT1	KIAA1797	DNAJC18

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RPL35	TAX1BP3	LOC642769	PLCE1	KIAA1920	DNAJC22
RPL36	TBC1D10C	LOC642812	PLCG1	KIAA2010	DNAJC24
RPRD2	TBC1D19	LOC642828	PLD3	KIF12	DNAJC25
RPS15A	TBRG1	LOC642889	PLEC1	KIF20A	DNAJC30
RPS27	TBXAS1	LOC642947	PLEKHA4	KIF3C	DNALI1
RPS28	TEX13A	LOC642968	PLEKHA9	KIF7	DNHL1
RPS6KB1	TFDP1	LOC642981	PLEKHF2	KIFC2	DNM2
RPTOR	TFDP2	LOC643011	PLEKHM1	KISS1	DNMT3A
RPUSD2	TFE3	LOC643187	PLK1	KIT	DNMT3B
RQCD1	TFF3	LOC643373	PLK4	KLC1	DNTT
RRP15	THRA	LOC643382	PLLP	KLF4	DOCK1
RSPO1	THRAP5	LOC643446	PLOD1	KLHL36	DOCK2
RSPO2	TIMD4	LOC643509	PLS1	KLHL5	DOCK3
RUNX3	TJP3	LOC643534	PLTP	KMO	DOK4
S100A13	TLR4	LOC643768	PLXNA3	KNG1	DOK5
S100A3	TLR5	LOC643772	PLXNB2	KNTC1	DOLPP1
SAFB	TMC8	LOC643882	PMP22	KPNB1	DONSON
SAMD4B	TMCC2	LOC643897	POLD1	KRAS	DPAGT1
SAP30BP	TMCO6	LOC643905	POLD2	KRIT1	DPEP3
SAR1A	TMED10	LOC644029	POLE3	KRT17	DPF2
SBSN	TMED9	LOC644126	POLG	KRT222	DPH3
SCARNA16	TMEM100	LOC644128	POLR3C	KRT24	DPH5
SCARNA3	TMEM117	LOC644132	POLR3K	KRT75	DPM2
SCD5	TMEM119	LOC644162	POLS	KRTAP10-2	DPM3
SCN2B	TMEM137	LOC644250	POM121L4P	KRTAP4-8	DPP4
SCRG1	TMEM191C	LOC644343	POMGNT1	L1CAM	DPP7
SCUBE3	TMEM204	LOC644353	POMT1	LAMA3	DPP9
SCYL2	TMEM26	LOC644500	PPAPDC2	LAMB3	DPPA2
SCYL3	TMEM33	LOC644511	PPARD	LAMC3	DPPA3
SDCCAG1	TMEM4	LOC644584	PPIF	LANCL1	DPPA4
SDF2	TMEM43	LOC644590	PPIL5	LAPTM5	DPY19L3
SDHD	TMEM8	LOC644591	PPM1A	LARP4	DPY30
SDK1	TMIE	LOC644619	PPP1CA	LASS1	DPYS
SEC23A	TMPRSS9	LOC644642	PPP1R10	LASS2	DPYSL4
SEC31A	TNF	LOC644686	PPP1R12C	LAT2	DRD1IP
SEMA3B	TNFAIP8L3	LOC644689	PPP1R14A	LAYN	DRG1
SEMA3C	TNFRSF11B	LOC644733	PPP1R3F	LBA1	DSCC1
SEMA4B	TNFRSF6B	LOC644738	PPP1R8	LBP	DSCR1L1
SEMA6C	TNPO2	LOC644949	PPP1R9A	LBR	DSCR6
SEMA6D	TOMM7	LOC644990	PPP2R2D	LBX2	DSE
SEMA7A	TOP1	LOC644992	PPP3CB	LCAT	DTD1
SEP15	TOP1P1	LOC645094	PPP3CC	LCMT2	DTNA
SEPT1	TOP1P2	LOC645098	PQBP1	LCN12	DTNBP1
SERHL	TOR1A	LOC645128	PQLC2	LDOC1	DTWD1
SERINC3	TPD52	LOC645289	PRIC285	LEAP-2	DTWD2
SERPINE3	TPK1	LOC645312	PRKCA	LECT2	DTX2
SETBP1	TRAF3IP1	LOC645330	PRKCB	LEMD2	DTX3L
SF1	TRAPPC6B	LOC645362	PRKCB1	LENG8	DULLARD



SF3A1	TRIM32	LOC645452	PRKCH	LEPR	DUSP11
SF3B2	TRIM39	LOC645478	PRKCQ	LEPROTL1	DUSP12
SFMBT2	TRIM58	LOC645522	PRMT6	LGALS3BP	DUSP14
SFRS10	TRIM62	LOC645566	PRMT7	LGMN	DUSP26
SFRS12	TRIM66	LOC645671	PRPF19	LIG1	DUSP28
SGK	TRMT12	LOC645676	PRPS1	LILRB3	DUSP6
SGK1	TRPA1	LOC645726	PRPS2	LIMK1	DYNC1H1
SGSH	TSPAN32	LOC645762	PRRG4	LIMS1	DYNC2LI1
SGSM2	TTC35	LOC645848	PRUNE	LIN52	DYRK1B
SGSM3	TTC9	LOC645937	PSAP	LINCR	DYSF
SH2B1	TTL7	LOC646044	PSEN2	LIPA	DZIP1
SH3BP5	TTY11	LOC646109	PSG5	LIPC	E2F5
SHROOM2	TTY5	LOC646214	PSMB8	LIX1L	E2F7
SIGLEC6	TUBAL3	LOC646272	PSMC6	LLGL1	EBI3
SIRT4	TUBB1	LOC646276	PSMD4	LMAN2	ECD
SIVA	TYW1B	LOC646330	PSMG4	LMO2	ECEL1
SIVA1	UBE2H	LOC646346	PTCD1	LMO3	ECGF1
SLC12A5	UBP1	LOC646482	PTGFR	LNX2	ECH1
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SLC1A6	UCP3	LOC646547	PTMS	LOC10012801	ECM1
SLC22A11	UFC1	LOC646576	PTN	LOC10012833	ECOP
SLC26A8	ULBP2	LOC646585	PTPN23	LOC10012842	EDEM1
SLC2A5	UNC13D	LOC646665	PTPN3	LOC10012865	EDG1
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SLC39A2	UPP2	LOC646743	PTTG1	LOC10012897	EDN1
SLC6A4	UROS	LOC646836	PTTG3P	LOC10012912	EDNRB
SLC7A4	USP45	LOC646908	PUS7	LOC10012921	EED
SLCO6A1	VAV1	LOC646916	PZP	LOC10012946	EEF1A2
SMAD3	VDAC1	LOC646936	QARS	LOC10012955	EEF1B2
SMAD9	VN1R1	LOC646942	QDPR	LOC10012958	EEF1E1
SMCR7L	VNN2	LOC646982	QPRT	LOC10012958	EFCAB4A
SMG5	VPREB1	LOC646996	RAB11FIP3	LOC10012959	EFCBP1
SMO	VPS26B	LOC647000	RAB11FIP5	LOC10012988	EFEMP1
SMPX	VPS29	LOC647060	RAB18	LOC10012989	EFHD2
SMTNL2	VPS36	LOC647104	RAB26	LOC10012998	EFNA1
SMUG1	VPS37A	LOC647229	RAB7L1	LOC10013011	EFNB2
SND1	VSIG4	LOC647276	RAB8A	LOC10013028	EFNB3
SNHG11	VWC2	LOC647357	RABAC1	LOC10013029	EFS
SNORA24	WBSCR22	LOC647363	RABGAP1	LOC10013050	EGFLAM
SNORA25	WDR25	LOC647389	RABGEF1	LOC10013051	EGR1
SNORA3	WDR44	LOC647509	RANGAP1	LOC10013092	EHD1
SNORA32	WDR5	LOC647570	RASA1	LOC10013098	EHD4
SNORA52	WDR87	LOC647588	RASGRP1	LOC10013113	EHHADH
SNORA55	WDR89	LOC647704	RASGRP4	LOC10013144	EIF1AX
SNORA6	WFDC1	LOC647718	RASSF6	LOC10013147	EIF1B
SNORA62	XLKD1	LOC647834	RASSF7	LOC10013151	EIF2AK1
SNORA66	YIPF1	LOC647854	RBBP6	LOC10013157	EIF2B3
SNORA70C	YOD1	LOC647910	RBBP7	LOC10013160	EIF2S3
SNORA7A	YPEL4	LOC647965	RBM12	LOC10013171	EIF3I

SNORD104	YTHDF1	LOC648059	RBM39	LOC10013173	EIF3K
SNORD13	ZBED4	LOC648153	RBM5	LOC10013183	EIF3M
SNORD14A	ZBTB45	LOC648226	RBM6	LOC10013197	EIF4E
SNORD32A	ZBTB8A	LOC648517	RBP7	LOC10013206	EIF4E3
SNORD56	ZC3H7A	LOC648600	RC3H2	LOC10013211	EIF4EBP1
SNORD57	ZEB2	LOC648659	RCBTB2	LOC10013211	ELF1
SNORD6	ZFAND3	LOC648691	RCN3	LOC10013232	ELF3
SNORD65	ZFP3	LOC648732	RDBP	LOC10013236	ELF5
SNUPN	ZFP92	LOC648742	RELL2	LOC10013242	ELL
SNX13	ZFPL1	LOC648744	RENBP	LOC10013247	ELL2
SNX6	ZFPM1	LOC648749	RERG	LOC10013249	ELOVL1
SOD3	ZMAT2	LOC648852	RFC5	LOC10013272	ELP4
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SOX17	ZNF140	LOC648921	RHBDL2	LOC10013279	EMD
SP6	ZNF250	LOC649044	RHOB	LOC10013283	EMG1
SPAG16	ZNF37A	LOC649071	RHOBTB3	LOC10013293	EMILIN2
SPATA20	ZNF438	LOC649076	RHOC	LOC10013294	EML1
SPATA22	ZNF460	LOC649160	RHOD	LOC10013305	ENAH
SPCS1	ZNF48	LOC649214	RHOU	LOC10013343	ENDOD1
SPDYA	ZNF496	LOC649238	RHPN2	LOC10013351	ENO2
SPIN2B	ZNF579	LOC649431	RIOK3	LOC10013355	ENO3
SPNS3	ZNF583	LOC649456	RMI1	LOC10013357	ENOPH1
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SPPL3	ZNF597	LOC649497	RNASEH2B	LOC10013374	ENSA
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SPTBN2	ZNF7	LOC649540	RNF126	LOC10013384	ENTPD5
SRCAP	ZNF75A	LOC649711	RNF141	LOC10013397	EP400
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SRRD	ZZZ3	LOC649873	RNF214	LOC10013453	EPHB1
SRRM2		LOC650034	RNF26	LOC10013463	EPHB2
SSNA1		LOC650132	RNF8	LOC10013468	EPHB6
SST		LOC650157	RNFT1	LOC134505	EPM2AIP1
ST6GALNAC2		LOC650254	RNPC3	LOC143543	EPN3
STAM2		LOC650280	RNPEPL1	LOC145853	EPO
STK17A		LOC650293	RNPS1	LOC146177	EPOR
STK32B		LOC650346	RNU105C	LOC146909	EPSTI1
STON1		LOC650491	RNU1-3	LOC147710	ERAL1
STS		LOC650628	RNU1A3	LOC148413	ERBB3
STX19		LOC650681	RNU6-1	LOC150223	ERC1
STX7		LOC650840	RNU6-15	LOC169834	ERCC5
STXBP2		LOC650889	RNY5	LOC199800	ERCC6L
SURF6		LOC650909	RPL14L	LOC202227	ERCC8
SYNM		LOC650930	RPL34	LOC205251	ERF
SYNPO2		LOC651029	RPL36A	LOC221710	ERGIC1
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TANC1	LOC651302	RPS27A	LOC284422	ERO1L
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TAX1BP1	LOC651987	RPS4X	LOC285500	ERVK6
TBC1D13	LOC652002	RPS4Y2	LOC285548	ESAM
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TBCC	LOC652322	RRAD	LOC286157	ETFB
TBX19	LOC652456	RRAGA	LOC286467	ETNK1
TCL6	LOC652545	RRAGC	LOC338799	ETNK2
TCP1	LOC652565	RRAGD	LOC339047	ETV4
TECPR1	LOC652627	RRAS	LOC344741	ETV5
TFAP2B	LOC652694	RRM2	LOC346950	EXOC6
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TGS1	LOC652712	RSPH3	LOC387647	EXOSC1
THAP11	LOC652722	RSPRY1	LOC387686	EXOSC5
THBS3	LOC652768	RTN1	LOC387763	EXOSC7
THEM2	LOC653082	RUNX2	LOC387841	EXOSC8
THG1L	LOC653086	RUSC2	LOC387882	EXOSC9
THSD3	LOC653147	S100A10	LOC388275	EXTL3
TIMM10	LOC653162	S100A14	LOC388692	EYA3
TIMM23	LOC653199	S1PR3	LOC388820	EZH2
TINAGL1	LOC653232	SAMD14	LOC388907	EZR
TLCD1	LOC653234	SAR1B	LOC389286	F10
TLN2	LOC653270	SBDS	LOC389293	F11R
TM9SF3	LOC653284	SBDSP	LOC389662	F12
TMCC3	LOC653324	SBNO2	LOC389765	F2R
TMCO7	LOC653342	SCAMP2	LOC390414	F3
TMEM104	LOC653354	SCAND3	LOC390530	F7
TMEM126A	LOC653419	SDCBP	LOC390705	FABP5
TMEM160	LOC653489	SDCBP2	LOC391044	FABP5L2
TMEM25	LOC653513	SDHAF1	LOC391075	FABP5L3
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TMEM35	LOC653650	SEC22B	LOC391532	FAIM
TMEM39A	LOC653658	SEC61A1	LOC391833	FAM105A
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TMPRSS13	LOC653881	SETX	LOC400389	FAM119A
TMUB2	LOC654109	SFRP1	LOC400713	FAM122A
TncRNA	LOC654123	SFRS15	LOC400836	FAM123A
TNFSF12-TNFSF13	LOC654135	SFRS16	LOC401074	FAM124A
TNRC9	LOC654260	SFRS5	LOC401357	FAM124B
TOR1B	LOC654350	SGSM1	LOC401397	FAM126A
TOR3A	LOC654433	SH2B3	LOC401431	FAM127A
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TRAPPC1	LOC727947	SHROOM4	LOC440080	FAM136B
TRAPPC3	LOC728105	SIK1	LOC440313	FAM13A
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TRIL	LOC728138	SLC10A4	LOC440396	FAM149B1
TRIM17	LOC728139	SLC13A4	LOC440563	FAM150A
TRIM41	LOC728160	SLC15A3	LOC440595	FAM151A
TRIM78P	LOC728181	SLC22A18	LOC440928	FAM159B
TRIP11	LOC728208	SLC24A3	LOC441019	FAM160A2
TRMU	LOC728211	SLC25A22	LOC441179	FAM161A
TRNP1	LOC728285	SLC25A3	LOC441237	FAM162B
TSGA10	LOC728288	SLC25A5	LOC441268	FAM164A
TSPAN10	LOC728310	SLC2A1	LOC441294	FAM165B
TSPAN3	LOC728457	SLC2A10	LOC441377	FAM167A
TTC14	LOC728467	SLC30A1	LOC441505	FAM174B
TTC23	LOC728553	SLC30A7	LOC442041	FAM176A
TTC26	LOC728558	SLC31A1	LOC54103	FAM177A1
TTC28	LOC728564	SLC35B2	LOC553137	FAM179A
TTC8	LOC728565	SLC35C1	LOC553158	FAM181B
TTY6	LOC728672	SLC35C2	LOC554235	FAM188B
TWSG1	LOC728711	SLC35D2	LOC55908	FAM195A
TXNL1	LOC728779	SLC35D3	LOC641765	FAM20C
TXNRD2	LOC728802	SLC38A7	LOC641825	FAM24B
TYW1	LOC728903	SLC44A3	LOC641942	FAM26A
U2AF1	LOC728908	SLC44A4	LOC642076	FAM35A
UBAP2	LOC728973	SLC7A8	LOC642113	FAM38A
UBASH3B	LOC728975	SLC9A6	LOC642160	FAM38B
UBE1	LOC728992	SLCO2A1	LOC642267	FAM3A
UBE2F	LOC729008	SLFN13	LOC642282	FAM3C
UBE2QP2	LOC729081	SLIT2	LOC642377	FAM44B
UBE2W	LOC729090	SMA4	LOC642399	FAM46A
UBE3C	LOC729101	SMAD5	LOC642469	FAM46B
UBQLNL	LOC729120	SMARCD3	LOC642489	FAM46C
UBR2	LOC729252	SMC6	LOC642530	FAM49B
UBR3	LOC729313	SMG7	LOC642567	FAM54A
UCHL5	LOC729340	SMURF1	LOC642590	FAM54B
ULK1	LOC729348	SNORA12	LOC642726	FAM57A
ULK2	LOC729350	SNORA16A	LOC642780	FAM60A
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USF1	LOC729603	SNORD96B	LOC643438	FAM71F1
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VEZF1	LOC729859	SNRPF	LOC643933	FAM84B
VGLL1	LOC729885	SNX33	LOC644033	FAM86A
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VIT	LOC729985	SOD2	LOC644191	FAM8A1
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VPS16	LOC730176	SOSTDC1	LOC644322	FANCL
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WNT6	LOC731196	SRPX	LOC645979	FBXL16
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XPC	LOC732146	SSBP4	LOC646197	FBXO17
YIPF5	LOC732424	SSH2	LOC646282	FBXO21
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	MFSD2	TM9SF1	LOC654074	FLJ30092
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	MGC13005	TMC6	LOC654164	FLJ35024
	MGC27348	TMCO3	LOC654174	FLJ35767

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MTDH	TSPAN15	LOC730805	FXYD1
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MUCL1	TTYH3	LOC731969	FZD6
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MYO3B	TXNDC14	LPA	GABPB2
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NAGK	TXNRD1	LPGAT1	GABRB3
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NANP	U2AF1L4	LPPR1	GAD1
NAPA	UBA1	LRCH1	GADD45A
NARG1L	UBA52	LRCH4	GADD45G
NAT11	UBE2C	LRFN5	GAL
NAT2	UBE2L6	LRG1	GAL3ST3
NAT6	UBE2M	LRRC16	GAL3ST4
NBAS	UBE2Q2	LRRC16A	GALC
NBN	UBE2T	LRRC16B	GALM
NBPF1	UBE4B	LRRC31	GALNT10
NBPF15	UBL3	LRRC37A	GALNT12
NCAPD3	UBL7	LRRC3B	GALNT14
NCAPH2	UBN2	LRRC6	GALNT4
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NCF1	UBXN11	LRRC8E	GALR1
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NDUFV3	URG4	LYRM1	GBA
NEB	USHBP1	LYRM5	GBF1
NEIL1	USP1	LYZ	GBGT1
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NFYC	USP49	MAFB	GCGR
NGB	USP5	MAGEE1	GCH1
NHLRC2	USP6	MAGEF1	GCHFR
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NKRF	VAMP3	MAL	GCNT2
NLK	VAMP4	MAMLD1	GCNT3
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NOS2	VPS18	MAP3K15	GFPT2
NOS2A	VPS39	MAP3K7IP3	GFRA1
NOTCH2	VSNL1	MAP9	GFRA2
NOTCH2NL	VWA1	MAPK14	GFRA3
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OGDHL	ZADH2	MED20	GLT25D2
OLA1	ZBED1	MED21	GLT8D2

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OR6M1	ZDHHC18	METT11D1	GNAQ
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PAX9	ZNF236	MGC15634	GPATCH4
PBK	ZNF248	MGC16121	GPBP1
PBXIP1	ZNF260	MGC18216	GPBP1L1
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PDK2	ZNF606	MIR599	GPR37
PDLIM5	ZNF629	MIR877	GPR56
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PDS5B	ZNF662	MKNK2	GPR64
PDSS2	ZNF684	MKRN1	GPR83
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PIK3CD		MREG	GSN
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PLDN		MRPL40	GSTA5
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PNPLA4		MS4A6A	GTF2F2
PNPT1		MSRA	GTF2H2
PNRC1		MSRB2	GTF2H2B
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POLA2		MSX2P1	GTF2IP1
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POLDIP3		MTA1	GTPBP3
POLL		MTAP	GTPBP8
POLM		MTCH1	GUCA1B
POLN		MTCH2	GUF1
POLQ		MTCP1	GULP1
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PSMA7	NFIC	HIP1
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PSMD5	NFKBIE	HIST1H2BC
PSMD9	NFKBIL2	HIST1H2BD
PSME2	NFKBIZ	HIST1H2BE
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PTK6	NFYB	HIST1H2BK
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PTPRN	NGFRAP1	HIST2H2AA4
PTPRT	NHEDC2	HIST2H2AC
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PXDNL	NIPA1	HKDC1
PXMP3	NIPA2	HKR1
QRSL1	NIT2	HLA-B
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RAB10	NLGN2	HLA-DPB2
RAB12	NLGN4Y	HLA-DRA
RAB14	NMT2	HLA-E
RAB1A	NNAT	HLA-F
RAB1B	NOD1	HMBS
RAB21	NOL6	HMG20B
RAB2A	NOMO2	HMGA1
RAB2B	NONO	HMGB3
RAB35	NOS3	HMGCR
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RABL4	NR0B2	HMGN2
RAD1	NR1H2	HMGN4
RAD18	NR1H3	HMGXB4
RAD51L3	NR1H4	HN1
RAD52	NR1I2	HNF1B
RAD54L	NR1I3	HNMT
RAD9A	NR2C1	HNRNPA1
RAI2	NR2E3	HNRNPA1L2
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RALY	NRAS	HNRNPU
RANBP2	NRGN	HNRPDL
RANBP3L	NRK	HNRPLL
RANBP6	NRM	HOMER2
RAP1B	NSF	HOOK1
RAPGEF4	NSMAF	HOXB8
RAPSN	NSUN6	HPGD
RARB	NSUN7	HPN
RASA3	NT5DC3	HPRT1
RASD1	NT5M	HPS3
RASL11A	NTN1	HPS6
RASSF2	NTNG1	HPSE
RASSF4	NUAK2	HPX
RAVER2	NUCB1	HRASLS
RAXL1	NUDT16	HRASLS3
RBAK	NUMBL	HRASLS5
RBBP4	NUP107	HRK
RBBP9	NUP155	HRSP12

RBED1	NUP160	HS3ST3A1
RBL1	NUP205	HS6ST2
RBM17	NUP43	HSCB
RBM26	NUP85	HSD17B10
RBM41	NUP93	HSD17B11
RBMY2FP	NUTF2	HSD17B2
RCP9	NXN	HSD17B8
REC8	OAS1	HSP90AA1
REL	OBFC1	HSPA13
RELB	OBP2B	HSPA14
RELL1	OBSL1	HSPA1A
REV1	OCEL1	HSPA1B
REV3L	ODF2L	HSPA4
REXO2	ODF3B	HSPA4L
RFC1	OKL38	HSPA5
RFPL4A	OLFML3	HSPA6
RFX4	OMA1	HSPA8
RGPD8	OPA1	HSPA9
RGR	OR2W5	HSPB1
RGS14	OR3A2	HSPB8
RGS3	ORC3L	HSPBAP1
RHBDD1	ORM1	HSPBL2
RHOF	ORM2	HSPC111
RIG	ORMDL1	HSPC157
RIPK4	OS9	HTATIP2
RMND5A	OSBP2	HTR2C
RNF114	OSBPL3	HTR3A
RNF115	OSBPL8	HTRA1
RNF13	OSGIN1	HYAL3
RNF148	OSTbeta	IARS
RNF152	OTC	ICA1
RNF165	OVOL2	ICAM4
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RNF187	OXSM	ID2
RNF20	OXT	IDH2
RNF207	P2RX7	IDH3G
RNF219	P76	IDI1
RNF25	PA2G4	IDO1
RNGTT	PABPC1	IDS
RNPC2	PABPC1L	IER3
ROBLD3	PABPC3	IER5
ROBO1	PACRG	IFI27
ROM1	PACS2	IFI27L2
RORC	PAH	IFI30
RP11-529I10.4	PAIP1	IFI35
RPA1	PALB2	IFI6
RPA2	PALMD	IFIH1
RPA3	PAN2	IFIT1
RPL23A	PANK1	IFIT2
RPL23AP53	PANX1	IFITM1

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RPL37A	PARD3	IFNAR1
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RRM1	PCDH21	IGSF11
RRP8	PCDH24	IGSF3
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RSRC2	PCDHA3	IGSF9
RTEL1	PCDHB18	IKZF4
RTP4	PCDHB3	IL10RB
RUFY1	PCDHGA3	IL11RA
RUNDC1	PCDHGB3	IL13RA1
RUNDC2A	PCGF5	IL15
RUNDC3B	PCLO	IL17RD
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RWDD2B	PCSK6	IL1A
RYBP	PCYOX1L	IL1R1
SAA1	PDCD7	IL1R2
SAA2	PDCL	IL20RB
SAMD4A	PDDC1	IL27RA
SAMM50	PDE3B	IL32
SASS6	PDE5A	IL34
SAT1	PDE9A	ILF2
SCAF1	PDGFRL	ILF3
SCAMP3	PDHX	IMPAD1
SCAMP4	PDLIM1	INADL
SCAMP5	PDLIM2	INDO
SCAP	PDPR	INF2
SCAPER	PDZD8	ING3
SCARNA14	PEA15	INO80B
SCARNA7	PEBP1	INSIG1
SCARNA9L	PECI	INSIG2
SCFD1	PELO	INS-IGF2
SCNM1	PEX1	IP6K1
SCXA	PFDN1	IPO5
SDC3	PFDN6	IPO7
SDCCAG8	PFKFB1	IQCB1
SDF2L1	PFN2	IQCK
SDHAF2	PGAP3	IQGAP1

SDHB	PGBD2	IQGAP2
SDHC	PGCP	IQSEC1
SDS	PGLYRP2	IRAK1BP1
SEC14L2	PGPEP1	IRF1
SEC24D	PGRMC2	IRF2BP2
SEC61G	PHACS	IRF6
SENP1	PHACTR1	IRF8
SEPT11	PHACTR2	IRF9
SEPT13	PHF14	IRX2
SEPT2	PHF15	IRX4
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SESTD1	PHLDB1	ISOC2
SETD6	PI4K2B	ISYNA1
SETDB2	PI4KAP1	ITCH
SF3A2	PIAS4	ITFG2
SF3B3	PIGB	ITGA1
SF3B4	PIGH	ITGA2
SFRS4	PIGL	ITGA6
SFRS6	PIGQ	ITGA9
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SGK2	PIK3C2A	ITGB1
SGMS2	PIK3C2G	ITGB1BP1
SGOL2	PIP4K2B	ITGB1BP3
SH3BP2	PJA1	ITIH1
SH3D19	PKD1L2	ITLN2
SHCBP1	PKIB	ITM2A
SHFM1	PKLR	ITM2B
SHOC2	PKN1	ITM2C
SHPRH	PKN3	ITPKA
SHROOM1	PKP3	ITPR2
SIAE	PLA1A	ITPR3
SIGLEC15	PLA2G10	IVNS1ABP
SIRT7	PLA2G12A	JAG2
SKA2	PLA2G16	JAKMIP2
SKP1	PLA2G1B	JAM2
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SLAMF6	PLA2G7	JARID2
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SLC1A2	PLEK2	JUN



SLC20A2	PLEKHA5	JUP
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SNORA26	PRAP1	KIAA0368
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SNORA68	PRDM5	KIAA0528
SNORA72	PREB	KIAA0562
SNORA75	PREPL	KIAA0664
SNORA7B	PREX1	KIAA0672

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SNORD55	PRKAB2	KIAA0913
SNRNP40	PRKACB	KIAA1009
SNTA1	PRKCDBP	KIAA1033
SNX26	PRKCI	KIAA1161
SNX8	PRKX	KIAA1217
SORCS2	PRKY	KIAA1244
SPA17	PRO1853	KIAA1267
SPAG4	PROC	KIAA1274
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SPATA13	PROM1	KIAA1370
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SPCS2	PROZ	KIAA1545
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SRP54	PSMB5	KIF15
SRPRB	PSMB9	KIF17
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SSX4	PTEN	KIFC1
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ST8SIA2	PTPN14	KLC3
STAG2	PTPN7	KLF10
STAT4	PTPRD	KLF12
STAU2	PTPRH	KLF13
STK36	PUS7L	KLF2
STK4	PVR	KLF5
STT3A	PWP2	KLF8
STT3B	PXMP4	KLHDC5
STUB1	PXN	KLHDC9
STX10	PYCR1	KLHL12
STX1A	PYGL	KLHL21

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SUPT4H1	RAB24	KLKB1
SUPV3L1	RAB30	KLRA1
SURF1	RAB34	KLRG1
SUSD4	RAB37	KLRG2
SYCE1L	RAB3GAP2	KPNA2
SYN1	RAB3IL1	KREMEN2
SYNJ2BP	RAB7B	KRT18
SYT3	RACGAP1	KRT18P13
TADA2A	RAD17	KRT18P17
TAF10	RADIL	KRT18P28
TAF13	RAF1	KRT19
TAF5	RAGE	KRT8P9
TAF5L	RAI14	KRTAP6-3
TAF8	RALA	KRTDAP
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TBCD	RARRES3	LAMA2
TBKBP1	RASAL2	LAMA4
TBL3	RASAL3	LAMA5
TBX10	RASGRP3	LAMB2
TBX15	RASSF5	LAMC1
TCEAL1	RBM15	LAMC2
TCF3	RBM20	LAMP2
TCP11L1	RBM24	LAMP3
TEC	RBM25	LAPTM4B
TEF	RBMS2	LARGE
TFAP2E	RBMS2P	LARP1
TGM3	RBMX	LARP1B
THOC1	RBMX2	LARP6
THOC5	RBP5	LARS
TIAM1	RCAN1	LAS1L
TICAM1	RCAN3	LBH
TIFA	RCBTB1	LCK
TIGD1	RCCD1	LCMT1
TIGD6	RCN1	LCN15
TIGIT	RDH5	LCN2
TIMM17A	RECQL	LCP1
TIMM22	RECQL4	LCTL
TJAP1	REEP4	LDB2

TK1	RELA	LDHB
TLK1	RER1	LDHD
TLR1	RFFL	DLDR
TLR10	RFTN2	LEAP2
TLR3	RFWD2	LECT1
TLR6	RFX1	LEFTY1
TMBIM4	RFX7	LEFTY2
TMCO1	RGL4	LEPREL1
TMED2	RGN	LEPREL2
TMEM1	RGS1	LEPROT
TMEM105	RGS11	LETMD1
TMEM106A	RGS16	LGALS8
TMEM11	RGS20	LGI2
TMEM110	RHBDD2	LHFPL4
TMEM123	RHBDF1	LHX6
TMEM129	RHOG	LIAS
TMEM134	RIC3	LIFR
TMEM138	RILP	LIG3
TMEM161B	RILPL1	LIME1
TMEM169	RILPL2	LIMK2
TMEM184A	RIPK5	LIMS2
TMEM187	RIT1	LIN28
TMEM191A	RLTPR	LIN28B
TMEM191B	RN5S9	LIN37
TMEM199	RND1	LINGO2
TMEM207	RNF10	LIPG
TMEM39B	RNF11	LIPT1
TMEM41A	RNF123	LMBRD1
TMEM45B	RNF126P1	LMCD1
TMEM55B	RNF160	LMF2
TMEM66	RNF19A	LMNA
TMEM83	RNF19B	LMO4
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TRAF3	RSPH9	LOC10012906
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TREH	RTN4	LOC10012914
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TTRAP	SDR42E1	LOC10013194
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TUBD1	SEC23B	LOC10013232
TUFM	SEC61A2	LOC10013239
TXNDC16	SEC62	LOC10013249
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UBQLN4	SENP6	LOC10013290
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UCKL1	SEPT9	LOC10013299
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USP48	SFXN2	LOC10013430
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USP7	SGCB	LOC10013430
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UTP23	SGMS1	LOC10013439
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VEGFC	SHMT1	LOC10019098
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VPS37B	SIPA1L3	LOC126767
VPS37D	SIRPA	LOC133993
VPS45	SIX4	LOC144481
VPS72	SKAP1	LOC146439
VTRNA1-1	SKIL	LOC147645
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WRN	SLC22A9	LOC23117
WSB2	SLC24A1	LOC283116
WVOX	SLC24A6	LOC283174
XDH	SLC25A1	LOC283340
XIAP	SLC25A10	LOC283663
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XKRX	SLC25A14	LOC284988
XPO6	SLC25A18	LOC285053
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YES1	SLC25A28	LOC285141
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UFSP2

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UGT2B28  
UGT2B7  
UGT3A2  
UGT8  
UHRF1  
ULBP1  
UNC119  
UNC5A  
UNC5D  
UNC84B  
UNC93A  
UNG  
UNQ9433  
UPF2  
UPF3A  
UPF3B  
UPP1  
UQCRQ  
USO1  
USP15  
USP24  
USP28  
USP3  
USP32  
USP33  
USP36  
USP38  
USP44  
USP47  
USP53  
USP9X  
UST  
UTF1  
UTP15  
UTP18  
UTS2  
UTX  
UVRAG  
UXT  
VAMP1  
VAMP2  
VAMP8  
VANGL1  
VANGL2  
VAPA  
VASH1  
VASH2

VASN  
VAT1  
VAT1L  
VAV3  
VCL  
VEGFB  
VENTX  
VGF  
VHL  
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VIL2  
VIM  
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VLDLR  
VOPP1  
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VPS25  
VPS28  
VPS41  
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VRK3  
VTCN1  
VTI1B  
VTN  
VWA5A  
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WDR4  
WDR41  
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WDR53  
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WDR8  
WDR81  
WDR86  
WDSOF1  
WDSUB1  
WDYHV1  
WEE1  
WFDC2  
WFS1

WHAMM  
WIPF3  
WIP12  
WNK1  
WNK2  
WNT10B  
WNT3  
WRB  
WSB1  
WSCD1  
WTAP  
WWC3  
XAF1  
XK  
XKR6  
XPNPEP2  
XPO1  
XPO5  
XPO7  
XPOT  
XPR1  
XRCC3  
XRCC5  
XRN1  
XRN2  
XYLB  
YAF2  
YAP1  
YARS  
YARS2  
YBX2  
YEATS2  
YEATS4  
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YJEFN3  
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YPEL2  
YRDC  
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ZC3HC1  
ZC4H2  
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ZDHHC14  
ZDHHC15  
ZDHHC22  
ZDHHC23  
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ZFAND2A  
ZFHX3  
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ZFP91  
ZFR2  
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ZKSCAN2  
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ZNF483  
ZNF485  
ZNF493  
ZNF502  
ZNF503  
ZNF512B  
ZNF519  
ZNF524  
ZNF525  
ZNF544



ZSCAN10

ZSCAN12

ZSCAN2

ZSCAN21

ZSCAN4

ZSWIM1

ZWILCH

ZXDB

ZXDC

ZZEF1

Primary antibodies				
Human antigene	Species raised in	Company	Catalog Nr.	Dilution
OCT4	mouse	Santa Cruz Biotechnology	sc-5279	1:200
SOX17	goat	R&D Systems	AF1924	1:100
alpha fetoprotein (AFP)	mouse	Sigma-Aldrich	WH0000174M1	1:300
E-Cadherin (E-CAD)	mouse	Santa Cruz	sc-21791	1:200
Albumin (ALB)	mouse	Sigma-Aldrich	A-6684	1:200
HNF4a	mouse	Santa Cruz	sc-8987	1:200
A1AT	mouse	R&D Systems	MAB1268	1:200
BSEP	goat	Santa Cruz	sc-17292	1:200

Secondary antibodies				
Antigene	Species raised in	Company	Catalog Nr.	Dilution
anti-goat IgG, Alexa fluor 488	donkey	Invitrogen	A11055	1:300
anti-goat IgG, Alexa fluor 594	chicken	Invitrogen	A21468	1:300
anti-mouse IgG, Alexa fluor 488	goat	Invitrogen	A11001	1:300
anti-mouse IgG, Alexa fluor 594	goat	Invitrogen	A11005	1:300

Supplementary Table S11: Quantitative real-time PCR (QPCR) primer sequences.

Gene	Size (bp)	Primer	Sequence 5'-3'
OCT4	119	forward	GTGGAGGAAGCTGACAACAA
		reverse	ATTCTCCAGGTTGCCTCTCA
GAPDH	81	forward	CTGGTAAAGTGGATATTGTTGCCAT
		reverse	TGGAATCATATTGGAACATGTAAACC
SOX2	78	forward	GTATCAGGAGTTGTCAAGGCAGAG
		reverse	TCCTAGTCTTAAAGAGGCAGCAAAC
NANOG	78	forward	CCTGTGATTTGTGGGCCTG
		reverse	GACAGTCTCCGTGTGAGGCAT
LEFTY1	76	forward	AATGTGTCATTGTTTACTTGTCTGTC
		reverse	CAGGTCTTAGGTCCAGAGTGGTG
GDF3	96	forward	TTGGCACAAGTGGATCATTGC
		reverse	TTGGCACAAGTGGATCATTGC
FGF4	109	forward	CCCTTCTCACCAGATGAGTGC
		reverse	CATTCTTGCTCAGGGCGATG
DPPA4	91	forward	TGGTGTGAGGTGGTGTGTGG
		reverse	CCAGGCTTGACCAGCATGAA
DNMT3B	93	forward	GCTCACAGGGCCCGATACTT
		reverse	GCAGTCTGCAGCTCGAGTTTA
SOX17	86	forward	ACGTGTACTACGGCGCGATG
		reverse	CTGGTGCTGGTGCTGGTGTT
FOXA2	97	forward	TTCAGGCCCGGCTAACTCTG
		reverse	CCTTGCGTCTCTGCAACACC
HNF4 $\alpha$	102	forward	GTGCGGAAGAACCACATGTACTC
		reverse	GAAGCATTCTTGAGCCTGCAGTA
AFP	88	forward	AGCAGCTTGGTGGTGGATGA
		reverse	CCTGAGCTTGGCACAGATCCT
ALB	77	forward	GCGCAGATGACAGGGCGGAA
		reverse	GTGCCGTAGCATGCGGGAGG
A1AT	76	forward	GGTCACAGAGGAGGCACCC
		reverse	AGTCCCTTCTCGTCGATGGT
TBX3	88	forward	AGTCCCTCCAGTGAACAAGCAG
		reverse	TCTTTGAGGTTTCGATGTCCC
FAH	79	forward	CGGGCCGGAGCCAGAAAAC
		reverse	ACCATTCCCCAGGTCTATG
TDO2	77	forward	GGTGAAGACGGCTGTCATACAG
		reverse	TGGAACCTAGGCTCTTCCCTG
PROM1/CD133	69	forward	GACTTGCGAACTCTCTTGAATGA
		reverse	GGTAGTGTGTACTGGGCCAAT
LGR5	118	forward	TTTGGACAAGGGAGACCTGGAGAA
		reverse	AGAGGAGAAGGACAAGAAAGCCACA
CYP1A1	195	forward	AAACAGGGCCACATAGATGC
		reverse	AGGGTCTGGTTTGGCTAGT
CYP3A4	79	forward	GTGACTTTGCCATTGTTTAGAAAG
		reverse	CAGGCGTGAGCCACTGTG
CYP3A7	77	forward	GATTCTGTACGTGCATTGTGCTC

		reverse	ATTGGTCATCTCCTCTATATTACCAAGT
CYP11A1	83	forward	CTGCATCTTCAGTCGTCTGTCC
		reverse	GGTGACCACTGAGAACCCATTC
CYP19A1	100	forward	TGGCTGTGCAGGAAAGTACATC
		reverse	AACACACTGTCCTTGCAATGTCTTC