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Direct reprogramming of somatic cells is promoted by maternal transcription factor Glis1

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Induced pluripotent stem cells (iPSCs) are generated from somatic cells by the transgenic expression of three transcription factors collectively called OSK: Oct3/4 (also called Pou5f1), Sox2 and Klf4¹. However, the conversion to iPSCs is inefficient. The proto-oncogene *Myc* enhances the efficiency of iPSC generation by OSK but it also increases the tumorigenicity of the resulting iPSCs². Here we show that the Gli-like transcription factor Glis1 (Glis family zinc finger 1) markedly enhances the generation of iPSCs from both mouse and human fibroblasts when it is expressed together with OSK. Mouse iPSCs generated using this combination of transcription factors can form germline-competent chimaeras. Glis1 is enriched in unfertilized oocytes and in embryos at the one-cell stage. DNA microarray analyses show that



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Glis1 promotes multiple pro-reprogramming pathways, including Myc, Nanog, Lin28, Wnt, Essrb and the mesenchymal–epithelial transition. These results therefore show that Glis1 effectively promotes the direct reprogramming of somatic cells during iPSC generation.

The generation of iPSCs is technically simple and highly reproducible^{3,4} but only a small proportion of cells become iPSCs after introduction of the four transcription factors⁵. In addition, the generation of iPSCs is slow and requires multiple cell divisions⁶. Reprogramming towards pluripotency can also be achieved by nuclear transfer to meiotic oocytes⁷ or mitotic zygotes⁸: this strategy is technically more demanding but it is efficient, rapid and independent of cell division. These differences may indicate that oocytes and zygotes contain factor(s) that promote reprogramming during the generation of iPSCs.

In this study, we initially evaluated a library of 1,437 human transcription factors for their ability to replace Kruppel-like factor 4 (Klf4) or POU domain, class 5, transcription factor 1 (Pou5f1, also known as Oct3/4) during iPSC generation from mouse skin fibroblasts containing a green fluorescent protein (GFP) reporter driven by the nanog homeobox (*Nanog*) promoter and enhancers⁹ (Supplementary Table 1). We found that 18 factors could replace Klf4 reproducibly, although with much lower efficiencies of iPSC generation (Supplementary Table 2); we failed to identify any factors that replaced Oct3/4.

Among these 18 factors, we found that GLIS1, a GLI transcription factor¹⁰, markedly increased the number of GFP-positive colonies when it was co-introduced with the 'OSK' transcription factors Oct3/4, SRY-box 2 (Sox2) and Klf4 into adult mouse skin fibroblasts (Fig. 1a). The effect of GLIS1 was comparable to that of MYC, as judged by



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the number of GFP-positive colonies (Fig. 1b). We also observed a synergistic increase in the number of GFP-positive colonies when both GLIS1 and MYC were co-introduced with OSK. Notably, GLIS1 specifically promoted the generation of GFP-positive colonies, but not GFP-negative colonies, which represent either partially reprogrammed cells or transformed cells (Fig. 1c). In contrast, MYC increased the number of GFP-negative colonies more than the number of GFP-positive ones. This undesired effect of MYC was counteracted when GLIS1 was co-expressed.

Mouse iPSCs generated with OSK and GLIS1 showed morphologies similar to embryonic stem (ES) cells (Supplementary Fig. 1a). Pluripotency markers such as *Nanog* were expressed at comparable levels to those in ES cells (Supplementary Fig. 1b) and the iPSCs formed teratomas in nude mice (Supplementary Fig. 1c). Furthermore, they produced germline-competent chimaeras (Fig. 1d and Supplementary Table 3).

In human adult fibroblasts, GLIS1 showed a similar effect: it promoted the generation of ES-cell-like colonies to a comparable degree to MYC when it was co-introduced with OSK (Fig. 2a). Notably, GLIS1 specifically promoted the generation of ES-cell-like colonies with a flat, round shape and a distinct edge, but did not promote the generation of non-ES-cell-like colonies, which were granular with an irregular edge (Fig. 2b and Supplementary Fig. 2). In contrast, MYC increased the number of non-ES-cell-like colonies more than the number of ES-cell-like ones (Fig. 2b). The iPSCs generated with OSK and GLIS1 were similar to ES cells in morphology (Supplementary Fig. 3a) and in their expression of undifferentiated-ES-cell marker genes, such as *OCT3/4*, *SOX2, NANOG* and *ZFP42* (zinc finger protein 42 homolog (mouse), also known as *REX1*) (Supplementary Fig. 3b). DNA microarray analyses showed that human iPSCs established with OSK and GLIS1 had similar global gene expression to cells generated



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with OSK and MYC (OSKM) (Fig. 2c). The promoter region of the *OCT3/4* gene showed a hypomethylation pattern (Supplementary Fig. 3c) and the iPSCs differentiated into various cells of the three germ layers in the embryoid body (Supplementary Fig. 3d) and also into teratomas (Fig. 2d). These results demonstrate that GLIS1 strongly and specifically promotes the generation of both mouse and human iPSCs by OSK.

We next studied the expression pattern of *Glis1* in mouse cells. Analyses of expressed sequence tag (EST) databases predicted that *Glis1* expression would be enriched in zygotes, especially in the fertilized ovum

(http://www.ncbi.nlm.nih.gov/UniGene/ESTProfileViewer.cgi?uglist=Mm.331757 as of 7 December 2010). In addition, the gene expression data from reverse transcription PCR (RT–PCR), provided by the mouse genome database MGI, showed that there was moderate expression of *Glis1* in metaphase II oocytes and weak expression in two-cell embryos, but that expression was either absent or at trace levels in embryos at the four-cell to embryonic-day-4.5 stages

(http://www.informatics.jax.org/searches/expression.cgi?32989 as of 7 December 2010, also reported in ref. 11 in their Supplementary Table 1). To confirm the specific expression of *Glis1* in oocytes and one-cell embryos, we isolated total RNA from oocytes, early embryos and several adult mouse tissues. Real-time PCR detected the highest expression of *Glis1* in one-cell embryos and unfertilized eggs. A modest level of expression was detected in two-cell embryos and placentas and weak expression was detected in several adult tissues (Fig. 3a). These data confirmed that *Glis1* RNA is enriched in unfertilized eggs and one-cell embryos.

We next examined whether endogenous Glis1 has a role during iPSC generation by OSK. We found that Glis1 is expressed at a low level in mouse fibroblasts before and



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after the introduction of OSK (Supplementary Fig. 4a). We constructed retroviral vectors to express several *Glis1* small hairpin RNAs (shRNAs), as well as scrambled controls, and tested the knockdown efficiency of each shRNA retrovirus in skin fibroblasts. We found that shRNA2 and shRNA6 were effective (Supplementary Fig. 4b). We then introduced each of these shRNAs, together with OSK, into mouse embryonic fibroblasts (MEFs) containing the *Nanog*–GFP reporter. We found that both shRNA2 and shRNA6 significantly decreased the number of GFP-positive colonies (Supplementary Fig. 4c), in contrast to the scrambled control shRNA. These results show that endogenous Glis1 may have a supportive role during the generation of mouse iPSCs by OSK.

Finally, we tried to elucidate how Glis1 enhances iPSC generation by OSK. We previously reported that suppression of the p53 pathway markedly enhanced iPSC generation from both mouse and human cells¹². We therefore hypothesized that Glis1 may enhance direct reprogramming by inhibiting p53. If this is the case, Glis1 should not be able to promote iPSC generation in cells with a p53-null background. To test this hypothesis, we introduced OSK plus mock (control) or OSK plus Glis1 into either wild-type or p53-knockout MEFs, both containing the *Nanog*–GFP reporter. Five days after transduction, we measured the proportion of *Nanog*–GFP-positive cells by flow cytometry. We found that even in p53-knockout MEFs, in which the generation of *Nanog*–GFP-positive cells by OSK was increased about 10-fold (to about 2%), the addition of Glis1 further increased the proportion of GFP-positive cells up to about 17% (Supplementary Fig. 5). These data indicate that Glis1 promotes iPSC generation irrespective of p53.

We then used the very high reprogramming efficiency in cells with the p53-null background to elucidate the function of Glis1. We sorted and collected



Nanog-GFP-positive cells 5 days after the transduction of OSK plus mock or OSK plus Glis1 into the p53-knockout MEFs. We then conducted microarray analysis to compare the gene expression levels of these cell populations undergoing reprogramming (Fig. 3b, c and Supplementary Table 4). We found that Glis1 markedly increased the expression of several genes whose products have been shown to enhance iPSC generation. These included estrogen-related receptor, beta $(Esrrb)^{13}$, several Wnt ligands (Wnt3, Wnt6, Wnt8a and Wnt10a)¹⁴, lin-28 homologue A (Lin28a)¹⁵, Nanog (ref. 16), Mycn and *Mycl1*(ref. 17). In contrast, the expression of *Myc* was suppressed by Glis1 (Fig. 3c). We have previously shown that Mycn and Mycl1 predominantly increase the numbers of ES-cell-like colonies, whereas Myc increases both ES-cell-like and non-ES-cell-like colonies¹⁷. Therefore, the altered balance between Mycn/Mycl1 and Myc should contribute, at least in part, to the specific promotion of iPSC generation by Glis1. Glis1 also markedly enhanced the expression of forkhead box A2 (Foxa2), a transcription factor that antagonizes the epithelial-to-mesenchymal transition. Because this transition is a prerequisite for iPSC generation^{18,19}, the activation of *Foxa2* should also have a role in the promotion of iPSC generation by Glis1. We confirmed the effect of Glis1 on Nanog, *Mycn*, *Myc*, neurogranin and tetraspanin 18 in a p53 wild-type background by quantitative PCR (Supplementary Fig. 6). Taken together, these data demonstrate that Glis1 promotes iPSC generation by activating multiple pro-reprogramming pathways.

We next performed chromatin immunoprecipitation assays to identify the direct transcriptional targets of Glis1. Cell lysates were isolated from p53-knockout MEFs transduced with OSK plus mock or OSK plus Glis1. Candidate target genes identified from the microarray analyses were amplified by PCR (Fig. 4a). We found that significantly higher amounts of *Mycn*, *Mycl1* and *Myc* were precipitated from the cells





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transduced with OSK plus Glis1 than from those transduced with OSK plus mock. In contrast, no such specific precipitation was observed with *Esrrb*, *Lin28a*, *Foxa2* or *Nanog*. These results indicate that the three *Myc* genes are direct targets of Glis1, whereas *Esrrb*, *Lin28a*, *Foxa2* and *Nanog* may be indirect targets.

We next examined whether Glis1 physically associates with the OSK proteins. Using Flag-tagged Glis1, we saw that Oct3/4 and Sox2 co-purified with Glis1 (Fig. 4b), whereas co-purification was not observed with a Flag-tagged Venus protein. In addition, we observed the co-purification of Flag–Klf4 with Myc-tagged Glis1 (Fig. 4b). The zinc-finger domain of Glis1 and its N-terminal region were required for the interaction with Klf4 (Supplementary Fig. 7). The interaction between Klf4 and Glis1 was further confirmed with an *in vitro* protein fragment complementation assay (Supplementary Fig. 8). These data indicate that Glis1 can associate with OSK by a protein–protein interaction and thereby might promote the activation of OSK target genes.

In contrast to oocytes and one-cell-stage embryos, we found that the expression of Glis1 was very low in ES cells. We therefore examined the effects of forced expression of Glis1 in mouse ES cells²⁰ and found that this suppressed their proliferation (Supplementary Fig. 9). This effect may have contributed to the smaller number of partially reprogrammed cells observed with OSK plus Glis1, because such cells would fail to silence retroviruses and would still express Glis1 transgenes, which would suppress proliferation.

This study shows that the transcription factor Glis1, which is highly enriched in unfertilized eggs and one-cell-stage embryos, promotes iPSC generation effectively and specifically by activating multiple pro-reprogramming pathways. Glis1 might thus be a



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link between reprogramming during iPSC generation and reprogramming after nuclear transfer. Furthermore, iPSCs generated by OSK and Glis1 did not cause a marked increase in mortality of chimaeric mice, although this did occur with iPSCs generated by Oct3/4, Sox2, Glis1 and Myc (Supplementary Fig. 10) and with iPSCs generated by OSK and Myc, as reported previously¹⁷. The identification of Glis1 might therefore be beneficial for future applications of iPSC technology.

METHODS SUMMARY

To screen transcription factors for their effects on iPSC generation, cDNAs were used from the human proteome expression resource (HuPEX) library²¹. Gateway entry clones of 1.437 human transcription factors were transferred to pMXs-GW retroviral expression vectors using the Gateway LR reaction. MEFs were isolated from 13.5 days post coitum (d.p.c.) embryos and adult skin fibroblasts were isolated from 20-week-old mice. The generation of mouse iPSCs with retroviruses was performed as described previously^{2,9}. Human iPSCs were also generated as described previously²². The shRNA-mediated knockdown was performed as described in ref. 12. Retroviruses (pMXs) were generated with Plat-E packaging cells²³. ES cells and iPSCs were cultured on SNL feeder cells²⁴. The analyses of iPSCs, such as RT-PCR, alkaline phosphatase staining, DNA microarrays, in vitro differentiation, teratoma formation, bisulphite genomic sequencing and chimaera experiments, were performed as previously described^{1,9,22}. Animal experiments were approved by committees of Kyoto University and the Japan Science and Technology Agency. To examine whether Glis1 is physically associated with the OSK proteins, immunoprecipitation and immunoblotting analyses were performed, as well as an *in vitro* protein fragment complementation assay²⁵. In addition, a ChIP analysis was performed on Glis1 to identify its target genes. Sequences of primers and shRNAs





are listed in Supplementary Tables 5 and 6, respectively. Microarray data are available through GEO with accession number GSE26431.

- 1. Takahashi, K. & Yamanaka, S. Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. Cell 126, 663-676 (2006).
- Nakagawa, M. et al. Generation of induced pluripotent stem cells without Myc from mouse and human fibroblasts. Nat Biotechnol 26, 101-106 (2008).
- 3. Yamanaka, S. A fresh look at iPS cells. Cell 137, 13-7 (2009).
- 4. Yamanaka, S. Strategies and new developments in the generation of patient-specific pluripotent stem cells. . Cell Stem Cell 1, 39-49 (2007).
- Yamanaka, S. Elite and stochastic models for induced pluripotent stem cell generation. Nature 460, 49-52 (2009).
- Yamanaka, S. & Blau, H. M. Nuclear reprogramming to a pluripotent state by three approaches. Nature 465, 704-12 (2010).
- Wilmut, I., Schnieke, A. E., McWhir, J., Kind, A. J. & Campbell, K. H. Viable offspring derived from fetal and adult mammalian cells. Nature 385, 810-3. (1997).
- Egli, D., Rosains, J., Birkhoff, G. & Eggan, K. Developmental reprogramming after chromosome transfer into mitotic mouse zygotes. Nature 447, 679-85 (2007).
- 9. Kim, Y. S. et al. Identification of Glis1, a novel Gli-related, Kruppel-like zinc finger protein containing transactivation and repressor functions. J Biol Chem 277, 30901-13 (2002).
- 10. Guo, G. et al. Resolution of cell fate decisions revealed by single-cell gene expression analysis from zygote to blastocyst. Dev Cell 18, 675-85 (2010).
- Hong, H. et al. Suppression of induced pluripotent stem cell generation by the p53-p21 pathway. Nature 460, 1132-5 (2009).
- 12. Feng, B. et al. Reprogramming of fibroblasts into induced pluripotent stem cells with orphan nuclear receptor Esrrb. Nat Cell Biol 11, 197-203 (2009).
- Marson, A. et al. Wnt signaling promotes reprogramming of somatic cells to pluripotency. Cell Stem Cell 3, 132-5 (2008).
- Yu, J. et al. Induced pluripotent stem cell lines derived from human somatic cells. Science 318, 1917-20 (2007).
- 15. Silva, J. et al. Nanog is the gateway to the pluripotent ground state. Cell 138, 722-37 (2009).
- Nakagawa, M., Takizawa, N., Narita, M., Ichisaka, T. & Yamanaka, S. Promotion of direct reprogramming by transformation-deficient Myc. Proc Natl Acad Sci U S A 107, 14152-7 (2010).



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- Samavarchi-Tehrani, P. et al. Functional genomics reveals a BMP-driven mesenchymal-to-epithelial transition in the initiation of somatic cell reprogramming. Cell Stem Cell 7, 64-77 (2010).
- Li, R. et al. A mesenchymal-to-epithelial transition initiates and is required for the nuclear reprogramming of mouse fibroblasts. Cell Stem Cell 7, 51-63 (2010).
- Niwa, H., Burdon, T., Chambers, I. & Smith, A. Self-renewal of pluripotent embryonic stem cells is mediated via activation of STAT3. Genes Dev 12, 2048-60. (1998).
- 20. Goshima, N. et al. Human protein factory for converting the transcriptome into an in vitro-expressed proteome. Nat Methods 5, 1011-7 (2008).
- 21. Okita, K., Ichisaka, T. & Yamanaka, S. Generation of germ-line competent induced pluripotent stem cells. Nature 448, 313-7 (2007).
- 22. Takahashi, K. et al. Induction of pluripotent stem cells from adult human fibroblasts by defined factors. Cell 131, 861-72 (2007).
- 23. Morita, S., Kojima, T. & Kitamura, T. Plat-E: an efficient and stable system for transient packaging of retroviruses. Gene Ther 7, 1063-6 (2000).
- 24. McMahon, A. P. & Bradley, A. The Wnt-1 (int-1) proto-oncogene is required for development of a large region of the mouse brain. Cell 62, 1073-85. (1990).
- 25. Hashimoto, J. et al. Novel in vitro protein fragment complementation assay applicable to high-throughput screening in a 1536-well format. J Biomol Screen 14, 970-9 (2009).

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Author Contributions M.M. conducted most of the experiments in this study. K.Y. analysed the interactions of proteins. T.N. performed the computer analyses of the DNA microarray data, teratoma experiments, overexpression in ES cells and statistical analysis. R.S. generated mouse iPSCs and characterized mouse and human iPSCs. I.K. generated human iPSCs. T.I. performed the chimaera and teratoma experiments and maintained the mouse lines. Y.K. selected cDNA clones from HuPEX with bioinformatics. H.M. produced the retroviral expression clones. N.G. and S.Y. supervised the project. M.M. and S.Y. wrote the manuscript.

Author Information The microarray data are available from the Gene Expression Omnibus (GEO, http://www.ncbi.nlm.nih.gov/geo/) with the accession number GSE26431. Reprints and permissions information is available at www.nature.com/reprints. The authors declare no competing financial interests. Readers are welcome to comment on the online version of this article at www.nature.com/nature. Correspondence and requests for materials should be addressed to S.Y. (<u>vamanaka@cira.kyoto-u.ac.jp</u>) and N.G. (n-goshima@aist.go.jp).

Figure 1 Promotion of mouse iPSC generation by GLIS1. a, Number of

Nanog–GFP-positive colonies from mouse skin fibroblasts in a 100-mm dish, 28 d after infection. Three days after infection, fibroblasts were re-seeded on feeder cells. Exp, experiment. **b**, Number of *Nanog*–GFP-positive colonies from mouse skin fibroblasts in a 6-well plate, 22 d after infection. **c**, Proportion of *Nanog*–GFP-positive colonies to total number of colonies. Fig. 1c is derived directly from the experiments in 1b. **, *P*-values <0.01. Error bars, s.d.; n = 3. **d**, Upper panel: chimaeric mouse derived from iPSCs obtained by transfection of MEFs with OSK + GLIS1. Lower panel: coat colour of offspring, showing germline transmission.



Figure 2 Promotion of human iPSC generation by GLIS1. a, Number of ES-cell-like colonies from human dermal fibroblasts 30 d after infection. **b**, ES-cell-like colonies as a proportion of total colonies. **, P < 0.01 compared to cells expressing OSK alone. Error bars, s.d.; n = 3. **c**, Scatter plots comparing global gene expression patterns between iPSCs generated by OSK + GLIS1 and adult dermal fibroblasts (AHDF) (left panel), and between iPSCs from OSK + GLIS1 and iPSCs from OSKM (right panel). The green diagonal lines indicate twofold changes between the two samples. The correlation coefficient (R^2) is also shown. **d**, iPSCs generated by OSK + GLIS1 were subcutaneously transplanted into nude mice. Teratomas were analysed histologically with haematoxylin and eosin staining.

Figure 3 Characterization of Glis1: expression and roles during iPSC generation. a, Expression patterns of *Glis1* in different mouse tissues. Data are normalized to glyceraldehyde-3-phosphate dehydrogenase expression; *Glis1* expression in the kidney is set at a relative level of 1. Error bars, s.d.; n = 4. b, Ninety genes were found to be upregulated more than 20-fold in OSK + Glis1 cells compared to OSK + mock cells (upper panel). These included *Foxa2*, multiple Wnt-family genes and *Esrrb*. We also focused on 361 probes for which expression was more than 100-fold higher in ES cells

than in fibroblasts. Among these, 32 probes showed an expression level that was more than three-fold higher in OSK + Glis1 cells than in OSK + mock cells (lower panel). These included *Esrrb*, *Oct3/4*, *Mycn*, *Lin28a* and *Nanog*. **c**, Expression levels of the Myc-family genes (C, *Myc*; N, *Mycn*; L, *Mycl1*) in OSK + Mock and OSK + Glis1 cells. The green diagonal lines indicate twofold changes between the two cell types.

Figure 4 Characterization of Glis1: target genes and protein–protein interactions. a, Chromatin immunoprecipitation and quantitative PCR analysis were conducted on the



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basis of microarray data, using a Glis1-specific antibody and PCR primers specific for *Mycn, Mycl1, Myc, Nanog, Esrrb, Lin28a* and *Foxa2*. GATA binding protein 4 (*Gata4*) and NK2 transcription factor related, locus 5 (*Nkx2-5*) were used as negative controls. IP, immunoprecipitate. Error bars, s.d.; n = 2.*, *P*-values <0.05. **b**, Constructs encoding Flag-tagged Glis1 or Klf4 and untagged Oct3/4 (left panel), Flag-tagged Glis1 or Klf4 and untagged Oct3/4 (left panel), Flag-tagged Glis1 (right panel) were transfected into HEK293T cells alone or in combination. Flag-tagged Venus was transfected as a negative control. The cell lysates were immunoprecipitated (IP) with an anti-Flag antibody, followed by an immunoblot analysis (IB). The expression levels in whole-cell lysates were determined by IB (bottom panels).

METHODS

cDNA library

cDNAs used to screen for novel factors that alter the efficacy of iPSC generation were obtained from the human proteome expression resource (HuPEX) library²¹. Among the 33,275 cDNAs, we selected those known to be transcription factors or identified by keyword searches of the Human Gene and Protein Database (HGPD, http://www.HGPD.jp/) and Entrez gene (http://www.ncbi.nlm.nih.gov/gene). We used cDNAs that covered more than 80% of the open reading frame reported in RefSeq and had identity with the reported protein sequence of more than 95% at the amino acid level. cDNAs encoding OCT3/4, SOX2, KLF4 or MYC were excluded. This resulted in 1,437 cDNAs (Supplementary Table 1), which were transferred to the pMXs-GW retroviral expression vector using the Gateway LR reaction.



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Cell culture

Mouse iPSCs were maintained in ES cell medium (DMEM containing 15% fetal calf serum (FCS), 1× Non-Essential Amino Acids (NEAA), 1 mM sodium pyruvate, 5.5 mM 2-Mercaptoethanol (ME), 50 units ml⁻¹ penicillin and 50 μ g ml⁻¹ streptomycin) on feeder layers of mitomycin-C-treated SNL cells stably expressing the puromycin-resistance gene²⁴. As a source of leukaemia-inhibitory factor (LIF), we used the conditioned medium from Plat-E cell cultures that had been transduced with a LIF-expressing vector. Human iPSCs were generated and maintained in primate ES cell medium (ReproCELL), supplemented with 4 ng ml⁻¹ recombinant human basic fibroblast growth factor, 50 units ml⁻¹ penicillin and 50 μ g ml⁻¹ streptomycin. MEFs, mouse skin fibroblasts and human fibroblasts were maintained in DMEM containing 10% FCS, 50 units ml⁻¹ penicillin and 50 μ g ml⁻¹ streptomycin. Plat-E cells²³ were maintained in DMEM containing 10% FCS, 50 units ml⁻¹ penicillin, 50 μ g ml⁻¹ streptomycin, 1 μ g ml⁻¹ puromycin and 10 μ g ml⁻¹ blasticidin S. We used 13.5 d.p.c.

Mouse iPSC generation

The generation of mouse iPSCs with retroviruses was performed as previously described^{2,9} with some modifications. Briefly, Plat-E cells were seeded at 2.5×10^6 cells per 100-mm dish. On the next day, pMXs-based retroviral vectors for each gene were independently introduced into Plat-E cells using the FuGENE 6 transfection reagent. After 24 h, the medium was replaced with 10 ml of DMEM containing 10% FCS. Fibroblasts were seeded at 8×10^5 cells per dish, in 100-mm dishes covered with a layer of gelatin or feeder cells. The next day, virus-containing supernatants from the Plat-E cultures were recovered and mixed, for example OCT3/4, SOX2, KLF4, and GLIS1.



Fibroblasts were incubated in the virus/polybrene-containing supernatants at a final concentration of 4 μ g ml⁻¹ for 24 h. Three days after infection, the medium was changed to ES cell medium supplemented with LIF. Fibroblasts on gelatin-coated dishes were then re-seeded onto dishes with feeder cells. The shRNA-mediated knockdown was performed as previously described¹².

Generation of human iPSCs

Human iPSCs were generated as previously described²² with some modifications. Briefly, Plat-E cells were plated at 3.6×10^6 cells per 100-mm dish. The next day, pMXs-based retroviral vectors for each gene were independently introduced into the Plat-E cells using the FuGENE 6 transfection reagent. After 24 h, the medium was replaced with new medium. Human fibroblasts expressing the mouse *Slc7a1* (solute carrier family 7 (cationic amino acid transporter, y+ system), member 1) gene were seeded at 8×10^5 cells per 100-mm dish. The next day, virus-containing supernatants were recovered and mixed, for example OCT3/4, SOX2, KLF4, and GLIS1. Fibroblasts were incubated in the virus/polybrene-containing supernatants at a final concentration of 4 µg ml⁻¹ for 24 h. Six days after transduction, fibroblasts were harvested by trypsinization and replated at 5×10^4 or 5×10^5 cells per 100-mm dish on SNL feeder cells. The next day, the medium was replaced with primate ES cell medium supplemented with 4 ng ml⁻¹ basic fibroblast growth factor.

Characterization of iPSCs

The RT–PCR analyses, alkaline phosphatase staining, *in vitro* differentiation, teratoma formation, bisulphite genomic sequencing and chimaera experiments were performed as previously described^{1,9,22}. The primers used for RT–PCR are listed in Supplementary





Table 5. In the *in vitro* differentiation assay, differentiated cells were stained positive for α -fetoprotein (endoderm), α -smooth muscle actin (mesoderm) and nestin (ectoderm). Nuclei were stained with Hoechst. For bisulphite genomic sequencing, the white circles indicate unmethylated CpG dinucleotides, whereas the black circles indicate methylated CpG dinucleotides.

DNA microarray

Total RNAs were labelled with Cy3 and hybridized to either a Whole Mouse Genome Microarray or a Whole Human Genome Microarray (Agilent) according to the manufacturer's protocol. Arrays were scanned using the G2505C Microarray Scanner System (Agilent). The data were analysed using the GeneSpring GX11.0.1 software program (Agilent). The microarray data are available from the Gene Expression Omnibus (GEO, http://www.ncbi.nlm.nih.gov/geo/) with the accession number GSE26431.

Chromatin immunoprecipitation assay

We used the Active Motif ChIP-IT Express kit for the chromatin immunoprecipitation assay. Genomic DNA and nuclear proteins were fixed with formaldehyde. Immunoprecipitation was performed with either anti-Glis1 (Santa Cruz) or purified goat IgG antibody and the elutes were used as templates for quantitative PCR. We selected DNA fragments containing putative Glis1-binding sites for PCR amplification. The primers used for quantitative PCR in the ChIP assay are listed in Supplementary Table 5.

Immunoprecipitation and immunoblotting analyses

Because the expression levels of *Glis1* in ES cells and fibroblasts are low, we were not able to elucidate whether there was an association among the endogenous proteins. HEK293T cells were therefore transfected with each cDNA clone in an expression vector





and were lysed in CytoBuster (Novagen). Cell lysates were incubated with an anti-Flag M2 Affinity Gel (Sigma) for 2 h and then removed. The gel suspensions were boiled in sample buffer and analysed by SDS–polyacrylamide gel electrophoresis and immunoblotting. The immunoblot analyses were performed using the following antibodies: anti-Flag M2 (Sigma), anti-Myc (Roche), anti-Oct3/4 (Santa Cruz) and anti-Sox2 (MBL).

In vitro protein fragment complementation assay

We prepared split monomeric Kusabira-Green protein (mKG) fragment proteins (Amalgaam) fused to Glis1 and Klf4 using a wheat-germ cell-free protein synthesis system (CellFree Sciences)²⁵. Each protein solution was dispensed into a 384-well plate. After incubation at25°C for 8h or 23h, the fluorescence was measured using the Typhoon 9200 (GE Healthcare).

Overexpression of genes in ES cells

The mouse ES cell line MG1.19 was maintained in DMEM containing 10% FCS, 1× NEAA, 1 mM sodium pyruvate, 5.5 mM 2-ME, 50 units ml⁻¹ penicillin, 50 μ g ml⁻¹ streptomycin and LIF. The vectors pCAG-IP (Mock) or pCAG-Glis1-IP were introduced into MG1.19 cells using Lipofectamine 2000 on day –1. On day zero, 1 × 10⁵ cells were re-seeded on a gelatin-coated 6-well plate. On day 4, the cell number was counted.

Statistical analyses

A one-way repeated-measures ANOVA and a post-hoc Bonferroni test were used for the analyses of the data in Figs 1c and 2b. The unpaired *t*-test was used for statistical analysis of the data shown in Fig. 4a (between OSK and OSKGlis1). Differences were considered to be statistically significant for *P*-values <0.05 (*), <0.01 (**) or <0.001 (***).







cartilage

columnar cell

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neuron

smooth muscle

columnar cell

Supplementary Figure 1. (a) Phase contrast and fluorescent images of Nanog-GFP-positive colonies from mouse skin fibroblasts (P0; passage 0). (b) RT-PCR analyses of ESC-marker genes. (c) Teratoma formation from OSK+Glis1-iPSC.







Supplementary Figure 2. ESC-like colonie with a flat, round shape and a distinct edge (upper), and non-ESC-like colonie, which were granulous with an irregular edge (lower).











Supplementary Figure 3. (a) Phase contrast images and the results of alkaline phosphatase staining. (b) RT-PCR analyses of ESC-marker genes. (c) Bisulfite genomic sequencing of the promoter region of Oct3/4. (d) Embryoid body-mediated in vitro differentiation of OSK+Glis1-iPSC.





Supplementary Figure 4. (a) Glis1 expression levels in MEF three days after transfection with DsRed or OSK. The unpaired t-test was used for the statistical analyses. N=4. Error bars, s.d. (b) The quantitative RT-PCR analyses of endogenous Glis1 mRNA levels in skin fibroblasts exposed to Glis1 shRNAs. A paired t-test was used for the statistical analyses. N=2. Error bars, s.d. (c) Each of shRNAs or scrambled shRNAs was co-transfected with OSK into MEF. Three days after infection, the fibroblasts were reseeded on feeder cells (5,000 cells per 100-mm dish). About three weeks after transduction, the numbers of Nanog-GFP-positive colonies were counted. shRNA2 and shRNA6 significantly decreased the number of GFP-positive colonies. The actual values of three independent experiments are shown (1st, 2nd, and 3rd).





Supplementary Figure 5. Percentage of Nanog-GFP-positive cells from wt MEF or p53KO MEF five days after transduction with indicated factors. N=4. Error bars, s.d.





Supplementary Figure 6. The expression levels of factors identified from microarray analysis. Nanog-GFP-positive cells were sorted from OSK or OSK+Glis1-transduced wt or p53KO MEF five days after infection. Expression levels of factors from microarray analysis were analyzed. These factors showed similar expression pattern between wt and p53KO MEF. The unpaired t-test was used for the statistical analyses. N=3 for Nrgn, Nanog, N-Myc, and c-Myc. N=2 for Tspan18. Error bars, s.d.





Supplementary 7. A schematic diagram to illustrate various Glis1 deletion mutants (upper). The zinc-finger domain and its N-terminal region of Glis1 interact with Klf4 when expressed in HEK293T cells (lower). Constructs encoding FLAG-tagged Klf4 and Myc-tagged Glis1 deletion mutant were transfected into 293T cells. The cell lysates were immunoprecipitated (IP) with anti-FLAG antibody, followed by an immunoblot analysis (IB). The expression level of whole cell lysates was determined by IB.



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Supplementary Figure 8



Supplementary 8. Outline of in vitro protein fragment complementation assay (PCA) with mKG (upper). Shown in the lower panel are fluorescent emissions of mKG combinations. N-terminal mKG (mKG-N)-fused Klf4 protein was combined with either C-terminal mKG proteins (mKG-C)-Glis1 fusion, Glis1-mKG-G fusion, or two negative controls (mKG-C-ATG or ATG-mKG-C).





Supplementary Figure 9. We utilized the episomal expression system which allows the high and sustained expression of foreign genes in MG1.19 ESC. The overexpression of Glis1 in mouse ESC resulted in growth arrest or cell death. (a) The images of Mock or Glis1-introduced ESC on Day 4. (b) The graph shows number of Mock or Glis1-introduced ESC on Day 4. (b) The graph shows number of Mock or Glis1-introduced ESC on Day 4. (c) Dilution of Glis1 plasmid resulted in increase of cell number. The graph shows the mean of three independent experiments and a one-way ANOVA test and a post-hoc Bonferroni test were used. Error bars, s.d.





Supplementary Figure 10. Kaplan-Meier survival analysis showing survival rate of chimeric mice, which were derived from iPSC generated with OSK+Glis1 (red) or OS+Glis1+c-Myc (black). N=61 for OSK+Glis1. N=64 for OS+Glis1+c-Myc.





Supplementary Table S1. List of 1,437 human transcription factors which were selected from HuPEX.

ABR PC-000712 CON12 NM-0000011 COM2 NM-0000011 ABR MP-0000011 COM2 NM-0000011 COM2 NM-0000011 ABR MP-0000012 COM2 NM-00000011 COM2 NM-000000000000000000000000000000000000	Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID
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ATF3 NP_0010254691 CN077 NP_073807.2 ENO1 NP_001410.1 CTT2F1 NP_00700 ATF4 NP_004562.2 CN17F NP_00470.4 ENV2 NP_08474.1 CTT2F1 NP_00470.4 ATF6 NP_005062.2 CN17F NP_00405.1 EDMES NP_00543.2 CTF2F2 NP_00471.4 ATOH NP_00501.1 COBRA1 NP_00542.2 EPAS NP_00541.2 CTF2F1 NP_0055 ATOH NP_10217.1 COPS2 NP_00544.2 ERCC8 NP_0010724.1 GTF2H1 NP_1055 BACH NP_00532.2 CCPS7 NP_00544.2 ERCC8 NP_0010724.1 GTF2H3 NP_1055 BANP NP_00532.2 CCREF1 NP_00530.1 ESR NP_00546.2 GTF2H NP_1055 BANP NP_00530.1 CTES1 NP_00530.1 GTF2C3 NP_0055 MP_0055	ATE2	NP_005162.1	CNOTZ	NP_037486.2	EMAZ ENO1	NP_004069.1	GTE2E2	NP_001505.1
ATF5 NP_0016562 CN013 NP_004770.4 ENV2 NP_004574.1 CTEP1 NP_002770.4 ATF6 NP_005800.2 CNTF NP_004571.2 EPAS1 NP_00451.3 CTEP1 NP_00457.3 ATOH8 NP_1122161.1 COP83 NP_004271.2 EPAS1 NP_00455.1 CTEP1 NP_00457.3 ATOH8 NP_1122161.1 COP83 NP_00444.2 ERCC8 NP_004045.1 CTEP18 NP_0015 BAG1 NP_004314.4 COP85 NP_005405.1 ERG NP_00458.2 CTEP1 NP_015 BAAP NP_066339.2 COP85 NP_00588.1 ERR NP_00468.1 CTEP21 NP_015 BAAP NP_06439.2 CREB1 NP_00469.1 ERR NP_00468.2 CTEP1 NP_0057 BAAP NP_00448.2 CREB1 NP_00469.1 ETS2 NP_0010356.1 CTEP23 NP_0026 BAAP NP_00448.2 CREB1 NP_00469.1 ETS2 NP_001042.2 CTEP3 NP_0026 BAAP NP_00448.2 CREB1 NP_00469.1<	ATE3	NP 001025458.1	CNOT7	NP 473367.2	ENO1	NP 001419.1	GTF2F1	NP 002087.2
ATES NP_028202 CNTF NP_000805.1 EONES NP_00833.2 GTF2H1 NP_0083 ATOHA NP_01112 CORRAN NP_00341.2 EFC1 NP_00341.4 GTF2H1 NP_0035 ATOHA NP_10121.1 CORRAN NP_00344.2 EFCC3 NP_000452.1 GTF2H3 NP_0035 BACH NP_00334.4 CORRAN NP_00358.2 EFF NP_000458.2 GTF2H NP_0177 BANP NP_00339.2 CORRAN NP_00370.1 EFR NP_000458.2 GTF2G3 NP_00358 BANP NP_004352.2 CREB1 NP_004370.1 ESR1 NP_000156.2 GTF2G3 NP_0026 BANT NP_00446.1 CREB1 NP_004370.1 ESR1 NP_000162.2 GTF3C3 NP_0026 BAR1 NP_00446.2 CREB1.4 NP_01492.1 ESRR NP_00442.2 GTF3C3 NP_0026 BAR2 NP_00446.2 CREB1.4 NP_01492.1 ETS2 NP_00452.1 GTF3C3 NP_0026 BAR2 NP_004451.1 <td>ATF4</td> <td>NP 001666.2</td> <td>CNOT8</td> <td>NP 004770.4</td> <td>ENY2</td> <td>NP 064574.1</td> <td>GTF2F1</td> <td>NP 002087.2</td>	ATF4	NP 001666.2	CNOT8	NP 004770.4	ENY2	NP 064574.1	GTF2F1	NP 002087.2
ATOH NP_0601411 CORRA1 NP_0682712 EPAS1 NP_0014212 GTF2H1 NP_0035 ATOH8 NP_1162161 COFS3 NP_0003442 ERCC3 NP_00007311 GTF2H3 NP_0970 BACH1 NP_003392 COFS3 NP_000842 ERFC NP_0004615 GTF2H3 NP_0970 BAMP NP_003392 COFS5 NP_000803.2 ERF NP_004411 GTF3C3 NP_05740 BAMP NP_000392.2 CRABP2 NP_00180.1 EFR NP_004441 GTF3C3 NP_0328 BARD NP_004662.2 CREB1 NP_00493.1 ESR NP_00442.3 GTF3C3 NP_0328 BART NP_00530.1 CREB3.1 NP_14308.1 ETS2 NP_00422.3 GTF3C5 NP_0328 BATA NP_00530.1 CREB3.1 NP_14308.1 ETS2 NP_00422.3 GTF3C5 NP_00530.1 BATA NP_005491.2 CREB3.1 NP_14308.1 ETS2 NP_00422.4 HBC1 NP_00441.4 HP_0114 NP_00441.4 HP_0	ATF5	NP_036200.2	CNTF	NP_000605.1	EOMES	NP_005433.2	GTF2F2	NP_004119.1
ATOHB NP_114216.1 COPS2 NP_00342.4 EPC1 NP_079485.1 GTF2H1 NP_0051 BACH NP_00341.4 COPS3 NP_00344.2 ERCC3 NP_000452.1 GTF2H3 NP_0075 BACH NP_00341.4 COPS3 NP_00342.2 ERCS NP_00465.2 GTF2H NP_0172 BANP NP_003392.2 CORB7A NP_00740.1 ERG NP_00465.2 GTF2H NP_0016 BANP NP_00468.2 CREB1 NP_00470.1 ESRR NP_000366.1 GTF2GA NP_00586.1 GTF	ATOH7	NP_660161.1	COBRA1	NP_056271.2	EPAS1	NP_001421.2	GTF2H1	NP_005307.1
ATOHB NF_1152161 COPES NF_000364.2 ERCC8 NF_000731.1 GTT2HS NF_9970 BAG1 NF_00414.4 COPES NF_00484.2 ERCC8 NF_00107234.1 GTT2H NF_9970 BAMP NF_000339.2 COPSTA NF_00470.1 ERG NF_00116.2 GTT3HS NF_00470.1 BAMP NF_000392.2 CREBI NF_00498.1 ERG NF_00116.2 GTT3G3 NF_0028 BARDI NF_004843.3 CREBI NF_00498.1 ESRR NF_00116.2 GTT3G3 NF_0028 BATF NF_00509.1 CREBIA NF_04498.1 ESRRG NF_00444.2.3 GTT3G3 NF_0292 BATF NF_00509.1 CREBIA NF_11990.1 ETS2 NF_00502.1 GZF1 NF_07918 BATA NF_00509.1 CREBIA NF_00509.1 ETS2 NF_00502.1 GZF1 NF_00447.2 HBP1 NF_00508 BATA NF_00509.1 CREBIA NF_00509.1 GZF1 NF_00147.2 HBP1 NF_0028 <tr< td=""><td>ATOH8</td><td>NP_116216.1</td><td>COPS2</td><td>NP_004227.1</td><td>EPC1</td><td>NP_079485.1</td><td>GTF2H1</td><td>NP_005307.1</td></tr<>	ATOH8	NP_116216.1	COPS2	NP_004227.1	EPC1	NP_079485.1	GTF2H1	NP_005307.1
BACH1 NP_001177.1 COPPS NP_00084.2 ERCC & NP_001085.1 CFR20 NP_1274 BAMP NP_000393.2 COPSTA NP_007403.1 ERG NP_001484.1 CTF21PD1 NP_0174 BAMP NP_000393.2 CCRABP2 NP_00186.1 ERH NP_001414.2 CTF3C3 NP_0048 BAMP NP_004484.1 CTF3C3 NP_00486.2 CTF3C3 NP_0048 BARDI NP_004484.1 CREB3 NP_00458.3 ESRRA NP_001432.2 CTF3C5 NP_0492 BART NP_00458.2 CREB3 NP_11949.1 ESRRG NP_9037.1 GZF1 NP_0719 BATZ NP_012485.1 CREB3.1 NP_11949.1 ETS2 NP_00520.1 GZF1 NP_0719 BAZZA NP_030312.1 CREB3.1 NP_11047.2 ESRRG NP_90321.1 HAD1 NP_00431.4 BATZ NP_030412.2 CREB1.4 NP_000301.1 ETX2 NP_00431.1 HAD21 NP_00431.4 BCL11 NP_05544.2 CREG1 NP_000484.1	ATOH8	NP_116216.1	COPS3	NP_003644.2	ERCC8	NP_000073.1	GTF2H3	NP_001507.2
BAAG NP_004814.4 COPSS NP_006822.2 EHR NP_00583.2 GTP21 NP_074 BAMP NP_006333.2 CCRABP2 NP_00740.1 EHG NP_00116.2 GTT32G NP_0074 BAMP NP_006333.2 CRABP2 NP_00176.1 EBR NP_00116.2 GTT32G NP_0028 BARDI NP_006448.1 CREB1 NP_00458.3 ESRRA NP_00142.2 GTT32G NP_0028 BART NP_00590.1 CREB3.1 NP_44308.1 ESRRG NP_00442.3 GTT32G NP_0719 BATF NP_00590.1 CREB3.3 NP_115996.1 ETS2 NP_00520.1 GZP1 NP_0719 BATA NP_005437.1 CREB3 NP_37890.2 ETV1 NP_00447.2 HBP1 NP_00497 BC114 NP_056044.2 CREB3 NP_37890.2 ETV1 NP_00447.2 HBP1 NP_00497 BC114 NP_060442.2 CREB1 NP_00497.2 HBC2 NP_00477.2 HBP1 NP_00497 BC114 NP_005646.1	BACH1	NP_001177.1	COPS3	NP_003644.2	ERCC8	NP_001007234.1	GTF2H5	NP_997001.1
BANP NP_0003832 COPS/A NP_0548031 CH12ND1 NP_001603302 CGT3C1 CGT3C2 CGT3C3 NP_00163362 CGT3C3 CGT3C3 NP_00163362 CGT3C3 CGT3C3 NP_00163362 CGT3C3 CGT3C3 NP_00163362 CGT3C3 NP_00163363 NP_0016361 CDT2C3 NP_0016341 HOAC1 NP_0016362 NP_00163421 HOAC1 NP_0016362 CGT3C3 CGT2C3 CGT2	BAG1	NP_004314.4	COPS5	NP_006828.2	ERF	NP_006485.2	GTF2I	NP_127492.1
BANP NP_00533.2 CHABP2 NP_01058.1 ENT NP_000162 CITS.01 NP_013 BARDI NP_00542676.2 CREBI NP_005580.3 ESRRA NP_001362.1 GIT3CG NP_0052 BARTI NP_005448.3 CREBI NP_00580.3 ESRRA NP_004442.3 GIT3CG NP_0058 BART NP_00580.1 CREBIL NP_44086.1 ESRRG NP_00442.2 GIT3CG NP_019 BATZ NP_010580.1 CREBIL NP_119696.1 ETS2 NP_00447.2 HEP1 NP_0058 BC110 NP_003847.1 CREBIL NP_010166.1 ETV1 NP_00447.2 HEP1 NP_0038 BC114 NP_00548.2 CREBIL NP_010101.1 ETV2 NP_00523.1 HOA.1 NP_0048 BC114 NP_005616.2 CREGI NP_003084.1 ETV3 NP_00523.1 HOA.4 NP_0050 BL211 NP_005617.3 CSDC2 NP_005808.2 ETV4 NP_001073.1.4 HOA.4 NP_0050 BL211 NP_000	BANP	NP_060339.2	COPS7A	NP_057403.1	ERG	NP_891548.1	GTF2IRD1	NP_057412.1
BARD NP_003452 CHEB1 NP_004391.1 ESR22 NP_004442.3 GTT3C3 NP_00428 BARH NP_004442.3 GTT3C5 NP_00582 GTT3C5 NP_00582 BARH NP_00583.1 CREB3.1 NP_44086.1 ESRR6 NP_00423.2 GTT3C5 NP_0799 BATT NP_005930.1 CREB3.2 NP_910947.2 ESRR6 NP_005230.1 GZT1 NP_0799 BAZZA NP_005912.1 CREB3.1 NP_1796661.1 ETV1 NP_004947.2 HPIP NP_0049 BCL11 NP_050682.2 CREB1 NP_00301.1 ETV2 NP_005023.1.1 HDAC1 NP_0049 BCL13 NP_050682.2 CREG1 NP_0030842.1 ETV3 NP_0010341.1 HDAC1 NP_0049 BULHB NP_003667.1 CRCP NP_0030842.1 ETV3 NP_0010341.1 HDAC4 NP_0040 BULHB NP_003667.1 CRCP NP_0036842.2 ETV4 NP_001073.1 HDAC5 NP_0040 BUCH NP_003667.3 CSDC NP_005675.1 <td>BANP</td> <td>NP_000339.2 NP_524576.2</td> <td>CREB1</td> <td>NP 004370 1</td> <td>ESR1</td> <td>NP_000116.2</td> <td>GTF3C1</td> <td>NP_036218.1</td>	BANP	NP_000339.2 NP_524576.2	CREB1	NP 004370 1	ESR1	NP_000116.2	GTF3C1	NP_036218.1
BARHLI NP_064443.1 CREB3 NP_005395.3 ESRRA NP_004420.3 CTT3C5 NP_0522 BARX1 NP_005306.1 CREB3L1 NP_443086.1 ESRRG NP_004420.3 CTT3C5 NP_0512 BATT NP_005306.1 CREB3L3 NP_11696.1 ETS2 NP_005230.1 GZT1 NP_0171 BATZ NP_0054871.2 CREB3L4 NP_070808.1 ETS2 NP_005230.1 HAPD 1NP_0048 BCL10 NP_0050812.1 CREB5 NP_00101666.1 ETV1 NP_004847.2 HEP1 NP_0058 BCL14 NP_0056180.2 CREEG NP_00101666.1 ETV2 NP_005231.1 HDAC1 NP_0058 BCL3 NP_005619.2 CREG1 NP_0039842.1 ETV3 NP_0017314.3.1 HDAC3 NP_00398 BL21 NP_003661.1 CRV2 NP_00598.2 ETV4 NP_0017314.3.1 HDAC6 NP_00398 BL21 NP_003661.1 CRV2 NP_00598.4 EVV5 NP_0017314.3.1 HDAC6 NP_00406 BL21 N	BARD1	NP 000456.2	CREB1	NP 604391.1	ESR2	NP 001035365.1	GTF3C3	NP 036218.1
BARKI NP_06784.3 CREB3.1 NP_44308.1 ESRRG NP_0142.2 CFT2G NP_0719 BATF NP_015863.3 CREB3.12 NP_919047.2 ESRRG NP_905320.1 GZF1 NP_0719 BATZ NP_003917.1 CREB3.13 NP_175908.1 ETS2 NP_005230.1 GZF1 NP_0049 BCL10 NP_0053912.1 CREB5 NP_0011866.1 ETV1 NP_004947.2 HBP1 NP_0053 BCL11A NP_005842.1 CREB5 NP_001394.1 ETV3 NP_0056321.1 HGAC1 NP_0058 BCL3 NP_005687.1 CREG1 NP_003842.1 ETV3 NP_00104341.1 HDAC1 NP_0079 BLHB NP_005687.1 CRCP NP_0069842.2 ETV4 NP_001073.1.1 HDAC3 NP_00608 BL71 NP_005687.3 CSDA NP_00587.6.1 ETV4 NP_00173.1.1 HDAC4 NP_00698 BR1 NP_066170.3 CSDE1 NP_0019647.2 EVSR1 NP_00172.1 HDAC8 NP_00698 BR2	BARHL1	NP_064448.1	CREB3	NP_006359.3	ESRRA	NP_004442.3	GTF3C5	NP_036219.2
BATF NP_06380.1 CREB3.2 NP_919047.2 ESRRG NP_069817.1 GZF1 NP_0719 BAZZA NP_038477.2 CREB3.4 NP_159601.1 ETS2 NP_00820.1 HAND1 NP_079 BAZZA NP_003912.1 CREB5 NP_979601.2 ETV1 NP_004947.2 HGP1 NP_038 BCL11A NP_005169.2 CREB1 NP_001301.1 ETV2 NP_005042.2 HCRC1 NP_004947.2 HGC2 NP_003 BCL1A NP_005169.2 CREG1 NP_003842.1 ETV1 NP_005041.1 HDAC1 NP_003 BCL6 NP_005681.1 CRCG1 NP_003842.2 ETV5 NP_00173.1 HDAC3 NP_003 BL271 NP_00170.3 CSDC2 NP_003984.2 ETV5 NP_00178.1 HDAC4 NP_0056 BNC1 NP_006670.3 CSDC2 NP_00179.1 EZH1 NP_00178.1 HDAC8 NP_0056 BNC2 NP_066790.2 CTNR1 NP_00179.1 EZH1 NP_00178.1 HDAC8 NP_0056 >	BARX1	NP_067545.3	CREB3L1	NP_443086.1	ESRRG	NP_001429.2	GTF3C6	NP_612417.1
BATE NP_612486.3 CREB3L3 NP_115996.1 ETS2 NP_005230.1 GZ71 NP_079 BC2LA NP_003477.2 CREB3L4 NP_57096.1 ETV1 NP_005477.2 HBP1 NP_0058 BCL11A NP_005191.2 CREB5 NP_00110166.1 ETV1 NP_005477.2 HCC2 NP_075 BCL3 NP_005192.2 CREG1 NP_003042.1 ETV3 NP_005023.1.1 HDAC11 NP_0075 BCL8 NP_005087.1 CRFC61 NP_003042.2 ETV4 NP_001073143.1 HDAC3 NP_0050 BL71 NP_005087.1 CRFC9 NP_005087.2 ETV4 NP_001731.1 HDAC4 NP_0050 BNC2 NP_005073.1 CSDA NP_005087.2 ETV6 NP_00477.1 HDAC5 NP_0050 BRC1 NP_06378.1 CTRF1 NP_00598.4 EVNSR1 NP_00523.1 HDAC5 NP_0050 BRC2 NP_06379.2 CTCR1 NP_642165.2 EZH2 NP_064443.1 HES1 NP_00505 BRF1 NP_063	BATF	NP_006390.1	CREB3L2	NP_919047.2	ESRRG	NP_996317.1	GZF1	NP_071927.1
BA22A NP_038477.2 CREB3L4 NP_570861.1 ETS2 NP_00520.1 HAND1 NP_008 BCL11A NP_003912.1 CREB5 NP_278701.2 ETV1 NP_004947.2 HBP1 NP_005 BCL11A NP_005044.2 CREB5 NP_001016.1 ETV1 NP_004947.2 HCLS1 NP_005 BCL3 NP_005169.2 CREG1 NP_003842.1 ETV3 NP_0010731.1 HDAC1 NP_0017 BCL68 NP_003982.2 ETV4 NP_001773.1 HDAC3 NP_0018 BL71 NP_003861.1 CRV2 NP_006082.2 ETV6 NP_004445.1 HDAC4 NP_0008 BNC1 NP_001703.3 CSDC2 NP_006087.2 ETV7 NP_00571.1 HDAC5 NP_0058 BR72 NP_006087.0 CTTRL NP_65215.1 ETV7 NP_00573.1 HDAC5 NP_0058 BR72 NP_0060780.2 CTNNE1 NP_00583.1 HES1 NP_00583.1 HES2 NP_0658 BR72 NP_006073.1 CXXC1 NP_001942.2 </td <td>BATF2</td> <td>NP_612465.3</td> <td>CREB3L3</td> <td>NP_115996.1</td> <td>ETS2</td> <td>NP_005230.1</td> <td>GZF1</td> <td>NP_071927.1</td>	BATF2	NP_612465.3	CREB3L3	NP_115996.1	ETS2	NP_005230.1	GZF1	NP_071927.1
BCL10 NP_003812.1 CRH2B5 NP_007011686.1 ETV1 NP_004847.2 HBH NP_0373 BCL11A NP_005064.2 CREBL2 NP_00384.1 ETV3 NP_005062.4.2 HCL51 NP_005 BCL3 NP_005063.2 CREG1 NP_00384.1 ETV3 NP_005031.1 HDAC1 NP_004 BCL68 NP_003857.1 CRC9 NP_006082.2 ETV4 NP_0010143.1 HDAC3 NP_005 BUL71 NP_003857.1 CRV2 NP_06687.2 ETV6 NP_00178.1 HDAC4 NP_005 BNC1 NP_001073 CSDC2 NP_006827.1 ETV7 NP_005234.1 HDAC6 NP_0050 BR10 NP_06877.3 CSDC1 NP_0070131.1 EZH1 NP_005234.1 HDAC6 NP_0657 BR72 NP_060780.2 CTNH81 NP_00101676.1 EZH2 NP_60454.3.1 HES1 NP_0552 BR72 NP_060780.2 CDC14 NP_04044.2 FAM30A NP_04045.2 HEX1 NP_04044.2 HEX1 NP_04044.1 <td< td=""><td>BAZ2A</td><td>NP_038477.2</td><td>CREB3L4</td><td>NP_570968.1</td><td>ETS2</td><td>NP_005230.1</td><td>HAND1</td><td>NP_004812.1</td></td<>	BAZ2A	NP_038477.2	CREB3L4	NP_570968.1	ETS2	NP_005230.1	HAND1	NP_004812.1
BLL11A NP_000847.2 CREB12 NP_001301.1 ETV1 NP_005847.2 HPL22 NP_0053 BCL13 NP_0056169.2 CREG1 NP_003842.1 ETV3 NP_005031.1 HDAC1 NP_0059 BCL3 NP_003861.1 CROP NP_006984.2 ETV3 NP_00107314.1 HDAC1 NP_0058 BLLF1 NP_003861.1 CROP NP_006989.2 ETV4 NP_0010731.1 HDAC3 NP_0058 BNC1 NP_003671.1 CRV2 NP_006989.2 ETV6 NP_00170.1 HDAC3 NP_0058 BNC2 NP_006070.3 CSDC2 NP_069089.4 EWS1 NP_00572.1 HDAC3 NP_0058 BR72 NP_0060780.2 CTNEL NP_54245.2 EZH1 NP_00498.2.1 HDAC3 NP_0058 BR72 NP_0060780.2 CTNNE1 NP_00496.2 FAM36A NP_1052.1 HEX1 NP_0568 BR73 NP_00592.1 DCX1 NP_00496.2 FAM36A NP_1062.1 HEX1 NP_0069 BR431 NP_005521.	BCL10	NP_003912.1	CREB5	NP_878901.2	ETV1	NP_004947.2	HBP1	NP_036389.2
Back In NF_2003042 CREDIA NF_2003042 CREDIA NF_2003042 CREDIA NF_2003042 NF_2001073 NF_2003042 NF_2001073 NF_2003042 NF_2001073 NF_20020 NF_2003084 NF_20521 NF_2005082 NF_2005073 NF_2010182 NF_2005073 NF_2010118 NF_2005073 NF_2010118 NF_2005073 NF_2010118 NF_2005073 NF_2010118 NF_2005073 NF_2010118 NF_20010118 NF_20010118 <td>BCL11A</td> <td>NP_060484.2</td> <td>CREB5</td> <td>NP_001011666.1</td> <td>ETV1</td> <td>NP_004947.2</td> <td>HCFC2</td> <td>NP_037452.1</td>	BCL11A	NP_060484.2	CREB5	NP_001011666.1	ETV1	NP_004947.2	HCFC2	NP_037452.1
BCL6B NP_82827.1 CREG1 NP_003842.1 ETV3L NP_001004341.1 HDAC1 NP_0038 BHLHB2 NP_003861.1 CRCP1 NP_00688.2 ETV4 NP_001073143.1 HDAC3 NP_0038 BLT NP_003861.1 CRCP1 NP_00689.2 ETV5 NP_001073143.1 HDAC3 NP_0038 BNC1 NP_005013.3 CSDA NP_005824.2 ETV6 NP_00107314.3 HDAC5 NP_0058 BNC2 NP_060173.3 CSDC2 NP_05552.5 EZH1 NP_00582.2 HDX NP_0652 BRF2 NP_06070.2 CTCFL NP_542185.2 EZH2 NP_069454.1 HES2 NP_0659 BRF2 NP_06070.2 CTNNB1 NP_00196179.1 EZH2 NP_069454.1 HES3 NP_0649 BTB3 NP_00571.1 CXX1 NP_05480.2 FAM00A1 NP_060556.3 HEXIM NP_0064 BTF3 NP_00172.1 DBP NP_001343.2 FEV NP_0059991.1 HEXIM NP_004 BTG1 NP_001722.1	BCL3	NP_075044.2	CREG1	NP 003842 1	ETV2 ETV3	NF_005024.2 NP_005231_1	HDAC1	NP 004955 2
BHLHB2 NP OX8081.1 CRCP NP OX80808.2 ETV4 NP O101731.3.1 HDAC3 NP OX80808.2 BLZF1 NP_003657.1 CRY2 NP_006840.2 ETV5 NP_00446.1 HDAC4 NP_0050 BNC1 NP_00507.3 CSDA NP_005275.1 ETV7 NP_005234.1 HDAC8 NP_0655 BRC1 NP_006070.2 CTTNP1 NP_001319.1 EZH1 NP_001984.3.1 HES1 NP_0653 BRF2 NP_060700.2 CTTNP1 NP_001904.2 FAM136A NP_04553.3 HEX1M1 NP_00558.3 HEX1M1 NP_006458.3 HEX1M1 NP_006458.3 HEX1M1 NP_0064658.3 HEX1M1 NP_006658.3 HEX1M1 NP_006658.3 HEX1M1 NP_006658.3 HEX1M1 NP_00674.1 HEY1 NP_00674.1 HEY1 NP_00674.1 HEY1	BCL6B	NP 862827.1	CREG1	NP 003842.1	ETV3L	NP 001004341.1	HDAC11	NP 079103.1
BLZF1 NP_005857.1 CRY2 NP_06840.2 ETV5 NP_00445.1 HDAC4 NP_0056 BNC1 NP_00708.3 CSDA NP_00384.2 ETV6 NP_001978.1 HDAC3 NP_0086 BNC2 NP_006017.3 CSDC2 NP_00592.1 ETV7 NP_00572.1 HDAC8 NP_0058 BRD8 NP_006070.2 CTDF1 NP_001919.1 EZH1 NP_001982.2 HDX NP_0552 BRF2 NP_060700.2 CTGFL NP_44155.2 EZH2 NP_69453.1 HES1 NP_0069 BRMS1 NP_0056214.1 CUX1 NP_001942.2 FAM136A NP_116211.2 HES4 NP_00689 BTG1 NP_001972.1 DACH2 NP_44451.1 FARSA NP_004452.1 HEXIM1 NP_00689 BTG3 NP_001972.1 DBF2 NP_001043.2 FE2F1 NP_0010458.1 HEY1 NP_00363 C140rf169 NP_005712.3 DCP1A NP_00697.3 FHL2 NP_0010458.1 HEY1 NP_00363 C140rf169 NP_0578	BHLHB2	NP_003661.1	CROP	NP_006098.2	ETV4	NP_001073143.1	HDAC3	NP_003874.2
BNC1 NP_001708.3 CSDA NP_003642.2 ETV6 NP_00178.1 HDAC5 NP_0059 BNC2 NP_006687.3 CSDC1 NP_009089.4 EWSR1 NP_005234.1 HDAC8 NP_00555 BRF1 NP_605780.2 CTCFL NP_01319.1 EZH1 NP_004543.1 HES1 NP_00555 BRF2 NP_005780.2 CTNK1 NP_01019679.1 EZH2 NP_604543.1 HES1 NP_00569 BRF2 NP_005621.1 CUX1 NP_001904.2 FAM136A NP_116211.2 HES4 NP_00689 BTBD7 NP_005637.1 CXXC1 NP_00133.2 FEV NP_00101978.1 HEX1M1 NP_00689 BTG1 NP_001390.1.2 DBP NP_0010132.0.2 FEZ1 NP_0010378.1 HEX1M1 NP_00459.2 HEV1 NP_00369.2 BU031 NP_00571.3.1 DCP1A NP_060873.3 FHL2 NP_00103456.1 HEV1 NP_00369.2 HEV1 NP_00369.2 HEV1 NP_00369.2 HEV1 NP_00369.2 HEV1 NP_00363.1 C140	BLZF1	NP_003657.1	CRY2	NP_066940.2	ETV5	NP_004445.1	HDAC4	NP_006028.2
BNC2 NP_060107.3 CSDC2 NP_055275.1 ETV NP_05719.1 HDAC8 NP_0563 BRD8 NP_0663718.1 CTBP1 NP_001319.1 EZM1 NP_00524.1 HDAC9 NP_0553 BRF1 NP_060780.2 CTCFL NP_942185.2 EZH2 NP_66443.1 HES1 NP_06179 BRF2 NP_060780.2 CTNNB1 NP_001967.1 EZH2 NP_664453.1 HES2 NP_0619 BRM51 NP_060637.1 CXXC1 NP_055408.2 FAM90A1 NP_060568.3 HEXIM1 NP_0068 BTF3 NP_001198.2 DACH2 PAM4511.1 FARSA NP_004658.3 HEXIM1 NP_0068 BTG1 NP_00172.1 DBP NP_001343.2 FEV NP_004784.1 HEY1 NP_0338 C140r168 NP_057123.1 DCP1A NP_00474.2 FHL3 NP_00459.2 HEY1 NP_0338 C140r169 NP_05820.2 DDT31 NP_06423.1 FLJ3 NP_06523.3 HEY2 NP_0353 C170r167 NP_0505213	BNC1	NP_001708.3	CSDA	NP_003642.2	ETV6	NP_001978.1	HDAC5	NP_005465.2
BRDB NP_006867.3 CSDE1 NP_009089.4 EWR1 NP_005234.1 HDAG3 NP_0555 BRF1 NP_060780.2 CTCFL NP_642185.2 EZH1 NP_06453.1 HES1 NP_0055 BRF2 NP_060780.2 CTNNB1 NP_001091679.1 EZH2 NP_044543.1 HES2 NP_0019 BRMS1 NP_006637.1 CXX1 NP_00540.2 FAM136A NP_01452.1 HEXM1 NP_006658.3 HEXM1 NP_0066958.3 HEXM1 NP_006695.3 HEXM1 NP_006657.1 NP_00122.1 DBP NP_001343.2 FEV NP_006598.3 HEXM1 NP_006558.3 HEXM1 NP_006552.4 HEXM1 NP_006552.4 HEXM1 NP_006552.4 HEXM1 NP_006552.3 HEV1 NP_00552.4 HEV1 NP_0353.5 C140r166 NP_05792.2 HEV1 NP_00552.5 HID3 NP_006459.2 HEV1 NP_00537.3 FHL2 NP_064495.2 HEV1 NP_00537.5 C140r169 NP_079382.0 DDD54 NP_076977.3 FHL3 NP_004495.2 HEV1 NP_00537.5	BNC2	NP_060107.3	CSDC2	NP_055275.1	ETV7	NP_057219.1	HDAC8	NP_060956.1
BH-1 NP_603718.1 CTBP1 NP_001319.1 EZH1 NP_001982.2 HDX NP_60570 BRF2 NP_606700.2 CTTKI NP_001901679.1 EZH2 NP_604643.1 HES2 NP_0056 BRF2 NP_060670.2 CTNNE1 NP_001904.2 FAM136A NP_116211.2 HES4 NP_060570.3 HEXIM1 NP_006583.3 HEXIM1 NP_006658.3 HEXIM1 NP_006658.3 HEXIM1 NP_0064452.1 HEXIM1 NP_006658.3 HEXIM1 NP_00583 BUD31 NP_001982.2 DACH2 NP_444511.1 FARSA NP_00109784.1 HEXIM1 NP_00652 BUD31 NP_001390.1.2 DBS2 NP_001004329.2 FEZF1 NP_001037651.1 HEY1 NP_03633 C140rf166 NP_078920.2 DDT3 NP_006677.3 FHL2 NP_0013459.1 HEY1 NP_03633 C140rf166 NP_079339.2 DIDD1 NP_079877.3 FHL3 NP_004369.1 HEY1 NP_0057 C10 NP_006324.1 DEXF NP_005977.1 FU1 NP_001	BRD8	NP_006687.3	CSDE1	NP_009089.4	EWSR1	NP_005234.1	HDAC9	NP_055522.1
BRF2 NP_000780.2 CTONE NP_0019672.1 E2H2 NP_094943.1 HES1 NP_00780.2 BRF52 NP_060780.2 CTNNB1 NP_0019672.1 E2H2 NP_04943.1 HES3 NP_0619 BRMS1 NP_060980.2 CTNNB1 NP_001964.2 FAM90A1 NP_06058.3 HEXIM1 NP_00689 BTBD7 NP_00198.2 DACH2 NP_44451.1 FARSA NP_001452.1 HEXIM1 NP_00689 BTG1 NP_001702.2 DBX2 NP_001432.2 FEV NP_001978.1 HEXIM1 NP_00582 BUD31 NP_003901.2 DBX2 NP_001047.2 FHL3 NP_00101784.1 HEY1 NP_03363 C14ort169 NP_078920.2 DDIT3 NP_004074.2 FHL3 NP_004459.2 HEY1 NP_00363 C19orf2 NP_60431.1 DEX4 NP_00797.3 FHL5 NP_06528.3 HEY2 NP_00537 C19orf3 NP_277055.1 DEDD2 NP_579874.1 FL1 NP_0043973.1 HIFA NP_00577 C101	BRF1	NP_663718.1	CTBP1	NP_001319.1	EZH1	NP_001982.2	HDX	NP_653258.2
Divid IM0001052 OHNDI IM00030531 ELI2 FAM_50A1 Im004311 In0043051 BRMS1 NP_066637.1 CXXC1 NP_056408.2 FAM136A NP_16211.2 HES4 NP_0666 BTBD7 NP_0001982 DACH2 NP_444511.1 FARSA NP_005983.3 HEXIM1 NP_0058 BTG1 NP_003901.2 DBV NP_00104329.2 FEV NP_00109784.1 HEY1 NP_0363 C14orf166 NP_078920.2 DDIT3 NP_000473.2 FHL3 NP_004459.2 HEY1 NP_00303 C14orf166 NP_67820.2 DDIT3 NP_004073.3 FHL5 NP_004459.2 HEY1 NP_00303 C14orf166 NP_653280.1 DDX54 NP_076977.3 FHL5 NP_006228.3 HEY2 NP_00323 C19orf3 NP_20705.1 DEDD NP_579874.1 FL11 NP_002008.2 HH4X NP_00123 C101 NP_006324.1 DEK NP_909773.1 FOS NP_0012497.1 HIFA NP_69690 C20rd	BRF2 BDF2	NP_060780.2	CTUFL CTNNB1	NP_542185.2 NP_001001670.1	EZHZ EZH2	NP_694543.1	HES1 HES2	NP_005515.1
BTBD7 NP_060637.1 CXXC1 NP_055408.2 FAM00A1 NP_060558.3 HEXIM1 NP_00645 BTB7 NP_001198.2 DACH2 NP_04134.2 FEV NP_059991.1 HEXIM1 NP_0055 BUD31 NP_0057123.1 DBP NP_00104329.2 FEZT NP_00104359.2 HEXIM1 NP_0363 C14orf166 NP_057123.1 DCP1A NP_060673.3 FHL2 NP_0010459.2 HEY1 NP_0363 C14orf166 NP_657123.1 DDX54 NP_060677.3 FHL5 NP_06459.2 HEY1 NP_0333 C13orf17 NP_004074.2 FHL3 NP_004459.2 HEY1 NP_0333 C13orf3 NP_260431.1 DEX54 NP_066288.2 FIZ1 NP_116225.2 HEY1 NP_00527 C10 NP_00733.9.2 DID01 NP_071388.2 FLJ4894 NP_001034973.1 HIF1A NP_6900 C2ord50 NP_606584.1 DLX1 NP_98521.1 FOS NP_005424.1 HIF3A NP_6900 CALCOC01 NP_606984.1 D	BRMS1	NP 056214 1	CUX1	NP 001904 2	FAM136A	NP 116211 2	HES4	NP_066993_1
BTF3 NP_001198.2 DACH2 NP_444511.1 FARSA NP_004452.1 HEXIM1 NP_0064 BTG1 NP_000722.1 DBP NP_0010432.2 FEV NP_05991.1 HEXIM2 NP_6532 BUD31 NP_003901.2 DBX2 NP_0060873.3 FHL2 NP_001034581.1 HEY1 NP_0333 C14orf166 NP_078920.2 DDIT3 NP_004074.2 FHL3 NP_004459.2 HEY1 NP_00363 C19orf56 NP_6653280.1 DDX54 NP_078977.3 FHL5 NP_004459.2 HEY1 NP_00135 C19orf33 NP_277055.1 DEDD2 NP_579874.1 FL11 NP_00208.2 HEY1 NP_00527 C10 NP_006324.1 DEK NP_0071388.2 FLJ44894 NP_00134973.1 HIF1A NP_90513 C20orf20 NP_00540.1 DIZ1 NP_90973.1 FOS NP_005243.1 HIF3A NP_90900 CAND1 NP_005949.1 DLX1 NP_905211.1 FOSL2 NP_005429.1 HIF3A NP_90900 CANF_00594	BTBD7	NP_060637.1	CXXC1	NP_055408.2	FAM90A1	NP_060558.3	HEXIM1	NP 006451.1
BTG1 NP_001722.1 DBP NP_001343.2 FEV NP_059991.1 HEXIM2 NP_6532 BUD31 NP_003901.2 DBX2 NP_00104329.2 FEZF1 NP_001019784.1 HEY1 NP_0363 C14orf166 NP_076920.2 DDIT3 NP_004074.2 FHL3 NP_004459.2 HEY1 NP_00363 C17orf56 NP_653280.1 DDX54 NP_076977.3 FHL5 NP_065228.3 HEY2 NP_00363 C19orf3 NP_277055.1 DEDD2 NP_578787.1 FL1 NP_00403.2 HHEX NP_0027. C10 NP_006324.1 DEK NP_003663.1 FL14 NP_0013497.3.1 HIFX NP_0057. C101 NP_006324.1 DEK NP_003463.1 FL144894 NP_0013497.3.1 HIFX NP_0057. C20orf20 NP_006740.1 DPZA NP_9996773.1 FOS NP_00524.1 HIFX NP_6900 C20rf63 NP_669598.1 DLX1 NP_05322.2 FOSL1 NP_005429.1 HIFX NP_69000 CAND1	BTF3	NP_001198.2	DACH2	NP_444511.1	FARSA	NP_004452.1	HEXIM1	NP_006451.1
BUD31 NP_003901.2 DBX2 NP_001004329.2 FEZF1 NP_001019784.1 HEY1 NP_0363 C14orf166 NP_078920.2 DDIT3 NP_000074.2 FHL3 NP_004459.2 HEY1 NP_0363 C17orf56 NP_653280.1 DDX54 NP_066288.2 FHL5 NP_064359.2 HEY1 NP_0363 C19orf2 NP_604431.1 DEAF1 NP_066828.2 FIZ1 NP_118225.2 HEY1 NP_00533 C19orf3 NP_277055.1 DEDD2 NP_57874.1 FL1 NP_001034973.1 HIFA NP_00553 C1o1 NP_00533.1 FL36070 NP_872380.1 HIFA NP_00553 C1o1 NP_006740.1 DIP2A NP_906773.1 FOSL NP_005243.1 HIF3A NP_0799 C2orf63 NP_689598.1 DLX1 NP_835221.2 FOSL1 NP_005243.1 HIF3A NP_6900 CAND1 NP_060918.2 DLX3 NP_005211.1 FOXA1 NP_004486.2 HLX NP_0687 CBFA2T3 NP_0001035941.1 DLX4	BTG1	NP_001722.1	DBP		FEV	NP_059991.1	HEXIM2	NP_653209.1
C140rf166 NP_0757123.1 DCP1A NP_008773.3 FHL2 NP_001034581.1 HEY1 NP_001035 C140rf169 NP_078920.2 DDIT3 NP_004074.2 FHL3 NP_004459.2 HEY1 NP_001035 C170rf56 NP_653280.1 DDX54 NP_076977.3 FHL5 NP_06228.3 HEY1 NP_00575 C19orf2 NP_004431.1 DEAF1 NP_066288.2 FIZ1 NP_116225.2 HEYL NP_00573 C19orf33 NP_277055.1 DEDD2 NP_57874.1 FLI NP_00134973.1 HIF1A NP_00153 C101 NP_006324.1 DEK NP_003463.1 FLJ44894 NP_0015497.3.1 HIF1A NP_08513 C20rf20 NP_060740.1 DIP2A NP_996773.1 FOS NP_005493.1 HIF3A NP_69000 C20rf20 NP_0605941.1 DLX1 NP_85321.2 FOSL1 NP_005448.2 HLX NP_69000 CANCO1 NP_065949.1 DLX3 NP_00521.1 FOXA1 NP_004487.2 HLF NP_00677	BUD31	NP_003901.2	DBX2	NP_001004329.2	FEZF1	NP_001019784.1	HEY1	NP_036390.3
C14orf169 NP_078920.2 DDIT3 NP_00474.2 FHL3 NP_004459.2 HEY1 NP_00103 C170rf66 NP_653280.1 DDX54 NP_076977.3 FHL5 NP_065228.3 HEY2 NP_0363 C19orf2 NP_070431.1 DEAF1 NP_066288.2 FIZ1 NP_1020208.2 HEV1 NP_0053 C19orf33 NP_277055.1 DEDD2 NP_579874.1 FLI1 NP_00208.2 HHEX NP_0015 C101129 NP_079339.2 DIDO1 NP_07138.2 FLJ44894 NP_001034973.1 HIF3A NP_690015 C20orf20 NP_68598.1 DLX1 NP_835221.2 FOS NP_005429.1 HIF3A NP_69001 CAUCOC1 NP_665949.1 DLX2 NP_00436.1 FOSL2 NP_005243.1 HIF3A NP_69001 CARHSP1 NP_001035941.1 DLX4 NP_612138.1 FOXA1 NP_004487.2 HLF NP_0687 CBFA2T3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001445.2 HMG20A NP_00637 <	C14orf166	NP_057123.1	DCP1A	NP_060873.3	FHL2	NP_001034581.1	HEY1	NP_036390.3
C17orf56 NP_653280.1 DDX54 NP_076977.3 FHL5 NP_066228.3 HEY2 NP_0537 C19orf32 NP_604431.1 DEAF1 NP_066288.2 FIZ1 NP_116225.2 HEYL NP_0533 C19orf33 NP_277055.1 DEDD2 NP_579874.1 FL11 NP_00008.2 HHEX NP_0027 C1D NP_006324.1 DEK NP_07338.2 FLJ44894 NP_001034973.1 HIF1A NP_8152 C20orf20 NP_060740.1 DIP2A NP_909773.1 FOS NP_005429.1 HIF3A NP_6900 C20orf20 NP_669588.1 DLX1 NP_835221.2 FOSL1 NP_005429.1 HIF3A NP_6900 CALCOCO1 NP_069598.1 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_00621 CARHSP1 NP_000518.4 DLX4 NP_005212.1 FOXA1 NP_004487.2 HLK NP_00621 CARHSP1 NP_001035941.1 DLX4 NP_005213.2 FOXF1 NP_001448.2 HLX NP_00621 CBFA2T	C14orf169	NP_078920.2	DDIT3	NP_004074.2	FHL3	NP_004459.2	HEY1	NP_001035798.1
C19ort2 NP_0604431.1 DEAF1 NP_066288.2 FL21 NP_116225.2 HEYL NP_07055 C19ort33 NP_277055.1 DEDD2 NP_579874.1 FL11 NP_002008.2 HHEX NP_0027 C10 NP_006324.1 DEK NP_003463.1 FLJ36070 NP_872380.1 HIF1A NP_0015 C10rf129 NP_0079339.2 DID01 NP_071388.2 FLJ44894 NP_005243.1 HIF3A NP_06700 C20rf63 NP_669598.1 DLX1 NP_835221.2 FOSL1 NP_005243.1 HIF3A NP_06900 CAND1 NP_066949.1 DLX2 NP_005211.1 FOSL1 NP_005244.1 HIF3A NP_06900 CAND1 NP_060918.2 DLX3 NP_005213.1 FOXA1 NP_004487.2 HLK NP_0687 CBFA2T2 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_006033 CBFA2T3 NP_005178.4 DMRT1 NP_006264.1 FOX12 NP_907309.1 HMG20A NP_0060633 <	C17orf56	NP_653280.1	DDX54	NP_076977.3	FHL5	NP_065228.3	HEY2	NP_036391.1
CH90r33 NP_27/055.1 DEDD2 NP_5/9874.1 FLI NP_002608.2 FHEX NP_0026 C1D NP_0058241 DEK NP_003431 FLJ36070 NP_872380.1 HIFA NP_0015 C1off129 NP_0079339.2 DIDO1 NP_0071388.2 FLJ44894 NP_00134973.1 HIFA NP_6916 C20rf63 NP_689598.1 DLX1 NP_835221.2 FOSL1 NP_005244.1 HIF3A NP_6900 CAND1 NP_060918.2 DLX3 NP_005211.1 FOSL2 NP_004386.1 FOSL2 HLK NP_06900 CARHSP1 NP_005941.1 DLX4 NP_005212.1 FOXD41 NP_004488.2 HLX NP_0687 CBFA2T3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_0067 CBFA2T3 NP_005178.4 DMAP1 NP_00129195.1 FOXI1 NP_001445.2 HMG20A NP_0067 CBFA2 NP_00570.2 DMRT1 NP_006548.1 FOXI2 NP_001445.2 HMG20A NP_00556	C19orf2	NP_604431.1	DEAF1	NP_066288.2	FIZ1	NP_116225.2	HEYL	NP_055386.1
CID INP_000324.1 DER INP_003340.1 FLJ44894 NP_001236.1 HIF1A NP_01138 C10rf129 NP_060740.1 DIP2A NP_071388.2 FLJ44894 NP_001034973.1 HIF1A NP_8513 C20rf63 NP_689598.1 DLX1 NP_853221.2 FOSL1 NP_005243.1 HIF3A NP_6900 CACCO1 NP_066949.1 DLX2 NP_004396.1 FOSL2 NP_005241.1 HIF3A NP_6900 CAND1 NP_066948.2 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_0021 CARHSP1 NP_001035941.1 DLX4 NP_005212.1 FOXA3 NP_004488.2 HLX NP_0667 CBFA2T3 NP_005178.4 DLX6 NP_005212.1 FOXHL1 NP_006316.1 HLX NP_0667 CBFA2T3 NP_001746.1 DMAP1 NP_005212.2 FOXF1 NP_001442.2 HMG20A NP_00633 CBX2 NP_116036.1 DMRT1 NP_006570.2 FOX11 NP_001445.2 HMG820 NP_00212	C190H33	NP_2/7055.1	DEDDZ	NP_5/98/4.1	FLI1 EL 126070	NP_002008.2	HHEX UIE1A	NP_002720.1
Control NP_060740.1 DIP2A NP_996773.1 FOS NP_005243.1 HIF3A NP_0719 C20rf63 NP_689598.1 DLX1 NP_835221.2 FOSL1 NP_005243.1 HIF3A NP_6900 ALCOCC1 NP_06599.1 DLX2 NP_004396.1 FOSL2 NP_005243.1 HIF3A NP_6900 CAND1 NP_0060918.2 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_0021 CBFA2T2 NP_001035941.1 DLX4 NP_0612138.1 FOXA3 NP_004488.2 HLX NP_0687 CBFA2T3 NP_00103594.1 DLX6 NP_001213.2 FOXF1 NP_001442.2 HMG20A NP_0687 CBFA2T3 NP_001746.1 DMAP1 NP_001029195.1 FOXI1 NP_001445.2 HMG20A NP_00666 CBK2 NP_11606.1 DMRT1 NP_006870.2 FOXI1 NP_001445.2 HMG82 NP_00563 CBX2 NP_16670.1 DMRT2 NP_001563.1 FOXN1 NP_0013584.2 HMGN4 NP_00563	C1orf129	NP_000324.1		NP_071388.2	FL.144894	NP_001034973 1	HIF1A HIF1A	NP_001321.1
Corifis NP_689598.1 DLX1 NP_835221.2 FOSL1 NP_005429.1 HIF3A NP_6900 CALCOCO1 NP_065949.1 DLX2 NP_004396.1 FOSL2 NP_005244.1 HIF3A NP_6900 CAND1 NP_000135941.1 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_0067 CARHSP1 NP_001035941.1 DLX4 NP_612138.1 FOXA3 NP_004487.2 HLX NP_0687 CBFAZT3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_0687 CBFAZT3 NP_01746.1 DMRP1 NP_006870.2 FOXJ1 NP_001445.2 HMG20A NP_00521 CBX2 NP_116036.1 DMRT1 NP_006848.1 FOXL2 NP_005555.1 HMG20A NP_00633 CCAR1 NP_060707.2 DMRTA1 NP_0104353.1 FOXN1 NP_003584.2 HMIL NP_0633 CCDC17 NP_00108410.1 DMRT61 NP_01035373.1 FOXN4 NP_902149.2 HN1L NP_00448 <t< td=""><td>C20orf20</td><td>NP 060740.1</td><td>DIP2A</td><td>NP 996773.1</td><td>FOS</td><td>NP 005243.1</td><td>HIF3A</td><td>NP 071907.3</td></t<>	C20orf20	NP 060740.1	DIP2A	NP 996773.1	FOS	NP 005243.1	HIF3A	NP 071907.3
CALCOCO1 NP_065949.1 DLX2 NP_004396.1 FOSL2 NP_005244.1 HIF3A NP_6900 CAND1 NP_006918.2 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_0067 CARHSP1 NP_001035941.1 DLX4 NP_612138.1 FOXA3 NP_004487.2 HLK NP_0687 CBFA2T3 NP_005084.1 DLX5 NP_005212.1 FOXD4L1 NP_003316.1 HLX NP_0687 CBFA2T3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_00606 CBFB NP_001746.1 DMAP1 NP_068770.2 FOXJ1 NP_001445.2 HMG20B NP_00521 CBX2 NP_118036.1 DMRT1 NP_068770.2 FOXJ1 NP_001445.2 HMG20B NP_0052 CCAR1 NP_060707.2 DMRTA1 NP_071443.1 FOXN1 NP_003584.2 HMGN4 NP_06837 CCDC17 NP_001108410.1 DMRT2 NP_001035373.1 FOXN4 NP_002149.2 HN1 NP_06934 CC	C2orf63	NP 689598.1	DLX1	NP 835221.2	FOSL1	NP 005429.1	HIF3A	NP 690007.1
CAND1 NP_060918.2 DLX3 NP_005211.1 FOXA1 NP_004487.2 HLF NP_0021 CARHSP1 NP_001035941.1 DLX4 NP_612138.1 FOXA3 NP_004488.2 HLX NP_0687 CBFA2T2 NP_005178.4 DLX6 NP_00521.1 FOXD4L1 NP_006316.1 HLX NP_0667 CBFA2T3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_06667 CBFB NP_001746.1 DMAP1 NP_00129195.1 FOXI1 NP_001445.2 HMG20A NP_00633 CBX2 NP_1605610 DMRT1 NP_0066707.2 FOXI1 NP_001445.2 HMG82 NP_00533 CCAR1 NP_066707.2 DMRTA1 NP_071443.1 FOXN1 NP_003584.2 HMGN4 NP_06531 CCDC17 NP_001108410.1 DMRT62 NP_00133373.1 FOXN4 NP_002149.2 HN1L NP_66311 CCDC72 NP_0570.1 DMRT62 NP_00133373.1 FOXN4 NP_998761.1 HNRNPAB NP_104551	ALCOCO1	NP_065949.1	DLX2	NP_004396.1	FOSL2	NP_005244.1	HIF3A	NP_690008.2
CARHSP1 NP_001035941.1 DLX4 NP_612138.1 FOXA3 NP_004488.2 HLX NP_0687 CBFA2T2 NP_005084.1 DLX5 NP_005212.1 FOXA4L1 NP_036316.1 HLX NP_0687 CBFA2T3 NP_005178.4 DLX6 NP_005212.2 FOXF1 NP_001442.2 HMG20A NP_06067 CBFA2 NP_001746.1 DMAP1 NP_001029195.1 FOXI1 NP_001445.2 HMG20A NP_00633 CBX2 NP_16036.1 DMRT1 NP_0068770.2 FOXI1 NP_001445.2 HMG82 NP_00053 CBX8 NP_066707.2 DMRT1 NP_006548.1 FOXL2 NP_07555.1 HMGN2 NP_00533 CCDC17 NP_001108410.1 DMRT51 NP_149056.1 FOXN3 NP_002149.2 HN1L NP_60531 CCDC17 NP_001048410.1 DMRT62 NP_0053537.3.1 FOXN4 NP_999761.1 HNRNPAB NP_00448.2 CCDC27 NP_0570.1 DMXF1 NP_066968.2 FOX03 NP_001446.1 HNRNPAB NP_11255 <tr< td=""><td>CAND1</td><td>NP_060918.2</td><td>DLX3</td><td>NP_005211.1</td><td>FOXA1</td><td>NP_004487.2</td><td>HLF</td><td>NP_002117.1</td></tr<>	CAND1	NP_060918.2	DLX3	NP_005211.1	FOXA1	NP_004487.2	HLF	NP_002117.1
CBFA2T2 NP_005084.1 DLX5 NP_005212.1 FOXD4L1 NP_036316.1 HLX NP_0687 CBFA2T3 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_0687 CBFB NP_001746.1 DMAP1 NP_001029195.1 FOXI2 NP_001445.2 HMG20B NP_0023 CBX8 NP_06570.1 DMRT1 NP_068770.2 FOXI1 NP_005555.1 HMG82 NP_0023 CCDC17 NP_060707.2 DMRTA1 NP_07443.1 FOXN2 NP_002149.2 HM1L NP_60637 CCDC17 NP_001108410.1 DMRT62 NP_001035373.1 FOXN2 NP_002149.2 HM1L NP_603445 CCDC72 NP_001108410.1 DMRT62 NP_001035373.1 FOXN4 NP_9098761.1 HNRNPAB NP_00444 CCDC72 NP_693071.1 DMTF1 NP_066968.2 FOX03 NP_001446.1 HNRNPAB NP_11257 CCDC66 NP_693027.1 DNAJC1 NP_07760.2 FOXP1 NP_116071.2 HNRNPD NP_11257	CARHSP1	NP_001035941.1	DLX4	NP_612138.1	FOXA3	NP_004488.2	HLX	NP_068777.1
CIBH-A213 NP_005178.4 DLX6 NP_005213.2 FOXF1 NP_001442.2 HMG20A NP_00620B CBFB NP_01746.1 DMAP1 NP_001029195.1 FOXI2 NP_997309.1 HMG20B NP_0063 CBX2 NP_166570.1 DMRT1 NP_068770.2 FOXI1 NP_001445.2 HMG20B NP_0055 CCXA1 NP_066770.1 DMRT2 NP_0071443.1 FOXI1 NP_003584.2 HMGN4 NP_0063 CCDC17 NP_001108410.1 DMRTB1 NP_049565.1 FOXN1 NP_002149.2 HN1L NP_6037 CCDC17 NP_001108410.1 DMRTC2 NP_001035373.1 FOXN4 NP_902149.2 HN1L NP_6034 CCDC72 NP_001108410.1 DMRTC2 NP_001035373.1 FOXN4 NP_902149.2 HN1L NP_60444 CCDC72 NP_001108410.1 DMRTF1 NP_066968.2 FOXO3 NP_001446.1 HNRNPAB NP_11257 CCDC266 NP_69927.1 DNAJC1 NP_07808.31 FOXP1 NP_116071.2 HNRNPD NP_11277 <td>CBFA2T2</td> <td>NP_005084.1</td> <td>DLX5</td> <td>NP_005212.1</td> <td>FOXD4L1</td> <td>NP_036316.1</td> <td>HLX</td> <td>NP_068777.1</td>	CBFA2T2	NP_005084.1	DLX5	NP_005212.1	FOXD4L1	NP_036316.1	HLX	NP_068777.1
CBPB NP_001746.1 DMAP1 NP_00129195.1 FOX12 NP_997309.1 HMG208 NP_0063 CBX2 NP_116036.1 DMRT1 NP_068770.2 FOXJ1 NP_001445.2 HMG82 NP_0055 CEX8 NP_066770.1 DMRT2 NP_006548.1 FOXL2 NP_0075555.1 HMGN2 NP_0055 CCAR1 NP_060707.2 DMRTA1 NP_017443.1 FOXN1 NP_002149.2 HN1L NP_0653 CCDC17 NP_001108410.1 DMRT52 NP_00153573.1 FOXN4 NP_002149.2 HN1L NP_0634 CCDC72 NP_001108410.1 DMRT52 NP_00153573.1 FOXN4 NP_908761.1 HNRNPAB NP_00444 CCDC72 NP_001108410.1 DMRT61 NP_00150573.1 FOXN4 NP_001446.1 HNRNPAB NP_11257 CCDC72 NP_699207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_11277 CCDC81 NP_001229.1 DNMT3L NP_0787083.1 FOXP3 NP_001107849.1 HNRNPD NP_11277 <td>CBFA2T3</td> <td>NP_005178.4</td> <td>DLX6</td> <td>NP_005213.2</td> <td>FOXF1</td> <td>NP_001442.2</td> <td>HMG20A</td> <td>NP_060670.1</td>	CBFA2T3	NP_005178.4	DLX6	NP_005213.2	FOXF1	NP_001442.2	HMG20A	NP_060670.1
GBA2 INP_110030.1 DIMRT1 INP_0067/0.2 FOX.1 INP_001445.2 HMGB2 INP_0057 CBX8 NP_065700.1 DMRT2 NP_006548.1 FOX.12 NP_075555.1 HMGN2 NP_0055 CCAR1 NP_001496.2 DMRTA1 NP_071443.1 FOXN1 NP_003584.2 HMGN4 NP_00653 CCDC17 NP_001108410.1 DMRT61 NP_0133373.1 FOXN4 NP_998761.1 HNRNPAB NP_00446.1 CCDC27 NP_05707.1 DMT71 NP_066968.2 FOX03 NP_001446.1 HNRNPAB NP_11257 CCDC26 NP_06707.1 DMXT1 NP_071760.2 FOX03 NP_01146.1 HNRNPAB NP_11257 CCDC91 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_001107849.1 HNRNPD NP_11277	CBFB	NP_001746.1	DMAP1	NP_001029195.1	FOXI2	NP_997309.1	HMG20B	NP_006330.2
CCAR1 NP_0060707.2 DMRTA1 NP_071443.1 FOXN1 NP_003584.2 HMGN2 NP_0095 CCCAR1 NP_0060707.2 DMRTA1 NP_071443.1 FOXN1 NP_003584.2 HMGN4 NP_0653 CCDC17 NP_001108410.1 DMRTC2 NP_149056.1 FOXN2 NP_002149.2 HN1L NP_6531 CCDC17 NP_001108410.1 DMRTC2 NP_001035373.1 FOXN4 NP_998761.1 HNRNPAB NP_0044 CCDC72 NP_057017.1 DMTF1 NP_066968.2 FOXO3 NP_01446.1 HNRNPAB NP_11255 CCDC96 NP_699207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_11275 CCNE1 NP_001229.1 DNMT3L NP_78063.1 FOXP3 NP_00107849.1 HNRNPD NP_11275	CBX2	NP_116036.1	DMRT1	NP_068770.2	FUXJ1	NP_001445.2	HMGB2	NP_002120.1
CCDC17 NP_001108410.1 DMRTB1 NP_149056.1 FOXN2 NP_002149.2 HNL NP_6531 CCDC17 NP_001108410.1 DMRTC2 NP_001035373.1 FOXN2 NP_002149.2 HN1L NP_6531 CCDC72 NP_057017.1 DMRTF1 NP_066968.2 FOXO3 NP_001446.1 HNRNPAB NP_10445 CCDC96 NP_699207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_11275 CCNE1 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_00107849.1 HNRNPD NP_11275		NP 060707 2		NF_000040.1	FUXLZ FOYN1	NF_0/0000.1	HMGNZ	NP 006344 4
CCDC17 NP_001108410.1 DMRTC2 NP_00103537.1 FOXN4 NP_002410.1 HNRNPAB NP_0044 CCDC72 NP_057017.1 DMTF1 NP_066968.2 FOX03 NP_001446.1 HNRNPAB NP_10126 CCDC96 NP_699207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_11275 CCNE1 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_001017849.1 HNRNPD NP_11275	CCDC17	NP 001108410 1	DMRTR1	NP 149056.1	FOXN2	NP 002149 2	HN1I	NP 653171 1
CCDC72 NP_057017.1 DMTF1 NP_066968.2 FOX03 NP_001446.1 HNRNPAB NP_1125. CCDC96 NP_699207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_1127. CCNE1 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_001107849.1 HNRNPD NP_1127.	CCDC17	NP 001108410.1	DMRTC2	NP 001035373.1	FOXN4	NP 998761.1	HNRNPAB	NP 004490.2
CCDC96 NP_689207.1 DNAJC1 NP_071760.2 FOXP1 NP_116071.2 HNRNPD NP_1127. CCNE1 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_001107849.1 HNRNPD NP_1127.	CCDC72	NP_057017.1	DMTF1	NP_066968.2	FOXO3	NP_001446.1	HNRNPAB	NP_112556.2
CCNE1 NP_001229.1 DNMT3L NP_787063.1 FOXP3 NP_001107849.1 HNRNPD NP_1127	CCDC96	NP_699207.1	DNAJC1	NP_071760.2	FOXP1	NP_116071.2	HNRNPD	NP_112737.1
	CCNE1	NP_001229.1	DNMT3L	NP_787063.1	FOXP3	NP_001107849.1	HNRNPD	NP_112738.1
CCNH NP_001230.1 DPPA2 NP_620170.2 FOXR2 NP_940853.1 HNRNPU NP_11403	CCNH	NP_001230.1	DPPA2	NP_620170.2	FOXR2	NP_940853.1	HNRNPU	NP_114032.2





Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID	Gene Symbol	RefSeq protein ID
HNRPUL1	NP_008971.2	L3MBTL2	NP_113676.2	MLX	NP_937847.1	NR2E1	NP_003260.1
HOXA1	NP_005513.1	L3MBTL4		MLZE		NR2F1	NP_005645.1
HOXA10	NP_714926.1	LASS2	NP_071358.1	MNDA	NP_002423.1	NR2F2	NP_066285.1
HOXA11	NP_005514.1	LASS3	NP_849164.2	MORF4L1	NP_006782.1	NR2F6	NP_005225.2
HOXA3	NP_109377.1	LASS4	NP_078828.1	MORF4L1	NP_996670.1	NR3C1	NP_000167.1
HOXA3	NP_705896.1	LASS5	NP_671723.1	MORF4L2	NP_036418.1	NR4A1	NP_002126.2
HOXA5	NP_061975.2	LASS6	NP_982288.1	MRPL28	NP_006419.2	NR4A2	NP_006177.1
HUXA9 HOXB13	NP_689952.1	LBH	NP_112177.2 ND_115816.1	MSX1 MSX2	NP_002439.2	NR5A1 NR5A2	NP_004950.2
HOXBIS	NP_000332.2	LCOR	NP 710153.2	MTA3	NP_065795.1	NR5A2	NP 995582 1
HOXB3	NP 002137.4	LCORL	NP 710153.2	MTERF	NP 008911.1	NR6A1	NP 001480.3
HOXB5	NP_002138.1	LDB1	NP_003884.1	MTERF	NP_008911.1	NRAS	NP_002515.1
HOXB6	NP_061825.2	LETMD1	NP_056231.3	MTERFD3	NP_001028222.1	NRBF2	NP_110386.2
HOXB7	NP_004493.3	LGALS3	NP_002297.2	MTF1	NP_005946.2	NRG1	NP_039252.2
HOXB8	NP_076921.1	LHX2	NP_004780.3	MTF2	NP_031384.1	NRG1	NP_039253.1
HOXB9	NP_076922.1	LHX4	NP_203129.1	MXD1	NP_002348.1	NRG1	NP_039258.1
HOXC10	NP_059105.2	LHX6	NP_055183.2	MXD3	NP_112590.1	NRIP1	NP_003480.2
HOXC11	NP_055027.1		NP_954629.2	MXD4	NP_006445.1	NRL NCDD1	NP_006168.1
HOXCIS	NP_059106.2		NP 078950 1	MVR	NP_005366.2	INSBP I OASI	NP_110390.1
HOXC6	NP 710160.1	LIN28B	NP 001004317.1	MYBBP1A	NP 055335.2	OLIG1	NP 620450.1
HOXC8	NP 073149.1	LIN9	NP 775106.2	MYBL2	NP 002457.1	OLIG2	NP 005797.1
HOXC9	NP_008828.1	LITAF	NP_004853.2	MYCBP	NP_036465.2	OLIG3	NP_786923.1
HOXC9	NP_008828.1	LMO1	NP_002306.1	MYEF2	NP_057216.2	OPTN	NP_001008212.1
HOXD1	NP_078777.1	LMO2	NP_005565.1	MYF6	NP_002460.1	OSR1	NP_660303.1
HOXD3	NP_008829.3	LMO3	NP_001001395.1	MYNN	NP_061127.1	OSR2	NP_443727.1
HOXD4	NP_055436.2	LMO3	NP_001001395.1	MYOD1	NP_002469.2	OTP	NP_115485.1
HOXD8	NP_062458.1	LMO7	NP_005349.3	MYOG	NP_002470.2	OTX1	NP_055377.1
HSBP1 HSE2	NP_001528.1	LMX1A	NP_/963/2.1	MYSIZ MZE1	NP_008998.1	01/2	NP_758840.1
HSF2RP	NP 008962 1	LOC 152485	NP 0010137131	NAB2	NP 005958 1	0V0L1	NP_004552.2
HSEX1	NP_057237.1	LOC730394	NP 001035955.1	NANOG	NP 079141.2	PARP15	NP 689828.1
HSFY1	NP_149099.2	LOC91431	NP_001093246.1	NAT14	NP_065111.1	PAX9	NP_006185.1
HTATIP	NP_006379.2	LUZP4		NCOA4	NP_005428.1	PBX4	
HTATIP2	NP_001091991.1	LYAR	NP_060286.1	NCOA7	NP_001116314.1	PBXIP1	NP_065385.2
ID1	NP_002156.2	LYL1	NP_005574.2	NEIL3	NP_060718.2	PCAF	NP_003875.3
ID2	NP_002157.2	LZTR1	NP_006758.2	NEURL	NP_004201.2	PCBD1	NP_000272.1
ID3	NP_002158.3	LZTR1	NP_006758.2	NEUROD1	NP_002491.2	PCGF2	NP_009075.1
ID4	NP_001537.1	MAF1 MAER	NP_115648.2	NEUROD4	NP_067014.2	PCGF6	NP_001011663.1
IGHMBP2	NP 002171 2	MAFE	NP_036455.1	NEUROD0	NP_006152.2	PDCD6	NP_071367.1
IKZF4	NP 071910.3	MAFG	NP_002350.1	NEUROG2	NP 076924.1	PDRG1	NP 110442.1
IKZF4	NP 071910.3	MAFK	NP 002351.1	NEUROG3	NP 066279.2	PELP1	NP 055204.2
IKZF5	NP_071911.3	MAML3	NP_061187.2	NFATC1	NP_006153.2	PEX14	NP_004556.1
ILF2	NP_004506.2	MAX	NP_002373.3	NFATC3	NP_775188.1	PEX14	NP_004556.1
ING1	NP_937860.1	MAX	NP_660092.1	NFATC4	NP_004545.2	PFDN1	NP_002613.2
ING2	NP_001555.1	MBD1	NP_056671.2	NFE2	NP_006154.1	PFDN5	NP_002615.2
ING3	NP_061944.2	MBD3L1	NP_660209.1	NFE2L2	NP_006155.2	PHB	NP_002625.1
ING4	NP_001121055.1	MBD6	NP_443129.3	NFEZLZ	NP_006155.2	PHB2 PHE10	NP_009204.1
INTS12	NP_065128.2	MDFI	NP_005577.1	NFIG	NP_005387.2	PHF10 PHF13	NP 722519.2
IRF1	NP 002189.1	MED1	NP 004765.2	NFIL3	NP 005375.2	PHF13	NP 722519.2
IRF2	NP_002190.2	MED15	NP_056973.2	NFKB1	NP_003989.2	PHF15	NP_056103.4
IRF2BP1	NP_056464.1	MED17	NP_004259.3	NFKBIA	NP_065390.1	PHF17	NP_079176.2
IRF3	NP_001562.1	MED18	NP_001120822.1	NFKBIB	NP_002494.2	PHF17	NP_955352.1
IRF6	NP_006138.1	MED20	NP_004266.2	NFKBIB	NP_001001716.1	PHF17	NP_955352.1
IRF8	NP_002154.1	MED21	NP_004255.2	NFKBIZ	NP_001005474.1	PHF19	NP_056466.1
IRX6	NP_077311.2	MED24	NP_001072986.1	NFRKB	NP_006156.2	PHF20	NP_057520.2
ISL'I	NP_002193.2	MED25	NP_112235.2	NFXL1	NP_694540.3	PHF21A	NP_057705.3
ITGB3BP	NP 055103 3	MED20	NF_004822.2	NEYB	NP_006157.1	PHF54	NP_077273.2
JARID1C	NP 004178.2	MED29	NP_060062.1	NEYC	NP 055038.2	PHF6	NP 115711.2
JARID2	NP 004964.2	MED29	NP 060062.1	NHLH1	NP 005589.1	PHF7	NP 057567.3
JAZF1	NP_778231.2	MED30	NP_542382.1	NHLH2	NP_001104531.1	PHOX2A	NP_005160.2
JDP2	NP_569736.1	MED31	NP_057144.1	NIF3L1	NP_068596.2	PIAS1	NP_057250.1
JMJD2A	NP_055478.2	MED4	NP_054885.1	NKRF	NP_060014.2	PIAS1	NP_057250.1
JMY	NP_689618.2	MED6	NP_005457.2	NKX2-5	NP_004378.1	PIAS3	NP_006090.2
JRKL	NP_003763.2	MED8	NP_443109.2	NKX2-8	NP_055175.2	PIAS4	NP_056981.2
JUN	NP_002219.1	MED8	NP_963836.2	NKX6-3	NP_689781.1	PIBF1	NP_006337.2
JUNB	NP_002220.1	MED9	NP_060489.1	NMEZ	NP_001018147.1		NP_001018119.1
KCMF1	NP_064507.3	MEF2C MEIS1	NP_002388.2	NMRAI 1	NP_065728.1	PIWII 2	NP_060538.2
KCMF1	NP 064507.3	MEIS2	NP 733776.1	NOTO	XP 001719406.1	PKNOX2	NP 071345.2
KCNIP3	NP 038462.1	MEIS2	NP 758526.1	NPAS4	NP 849195.1	PLAG1	NP 001108106.1
KCTD7	NP_694578.1	MEIS2		NPM1	NP_002511.1	PLAG1	
	NP_006550.1	MEIS3	NP_064545.1	NPM1	NP_002511.1	PLAGL1	NP_001074420.1
KHDRBS1		MEN1	NP_570711.1	NR0B1	NP_000466.2	PLAGL1	NP_001074420.1
KHDRBS1 KLF1	NP_006554.1			NR0B2	NP 068804 1	PLAGL1	NP 001074424.1
KHDRBS1 KLF1 KLF10	NP_006554.1 NP_005646.1	MEOX2	NP_005915.2				
KHDRBS1 KLF1 KLF10 KLF11	NP_006554.1 NP_005646.1 NP_003588.1	MEOX2 MESP1	NP_005915.2 NP_061140.1	NR1D1	NP_068370.1	PLRG1	NP_002660.1
KHDRBS1 KLF1 KLF10 KLF11 KLF12	NP_006554.1 NP_005646.1 NP_003588.1 NP_009180.3	MEOX2 MESP1 MGC21874	NP_005915.2 NP_061140.1 NP_689506.2	NR1D1 NR1D2	NP_068370.1 NP_005117.2	PLRG1 PMFBP1	NP_002660.1 NP_112583.1
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF13	NP_006554.1 NP_005646.1 NP_003588.1 NP_009180.3 NP_054798.1 NP_776755.2	MEOX2 MESP1 MGC21874 MGC46336	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1	NR1D1 NR1D2 NR1D2 NR1D2	NP_068370.1 NP_005117.2 NP_005117.2	PLRG1 PMFBP1 PMFBP1 POC7	NP_002660.1 NP_112583.1 NP_112583.1 NP_665720.2
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF17 KLF3	NP_006554.1 NP_005646.1 NP_003588.1 NP_009180.3 NP_054798.1 NP_75755.3 NP_057615.3	MEOX2 MESP1 MGC21874 MGC46336 MID1 MIEP2	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_000372.1 NP_060020_1	NR1D1 NR1D2 NR1D2 NR1H2 มศาหา	NP_068370.1 NP_005117.2 NP_005117.2 NP_009052.3 NP_005684.1	PLRG1 PMFBP1 PMFBP1 POGZ POLE3	NP_002660.1 NP_112583.1 NP_112583.1 NP_665739.2 NP_059139.2
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF17 KLF3 KLF3	NP_006554.1 NP_005646.1 NP_003588.1 NP_009180.3 NP_054798.1 NP_775755.3 NP_057615.3 NP_001721.2	MEOX2 MESP1 MGC21874 MGC48336 MID1 MIER2 MIZF	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_000372.1 NP_060020.1 NP_056332.2	NR1D1 NR1D2 NR1D2 NR1H2 NR1H3 NR1H4	NP_068370.1 NP_005117.2 NP_005117.2 NP_009052.3 NP_005684.1 NP_005114.1	PLRG1 PMFBP1 PMFBP1 POGZ POLE3 POLE3	NP_002660.1 NP_112583.1 NP_112583.1 NP_665739.2 NP_059139.2 NP_071935.1
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF3 KLF5 KLF6	NP_006554.1 NP_005646.1 NP_003588.1 NP_009180.3 NP_054798.1 NP_075755.3 NP_057615.3 NP_001721.2 NP_001291.3	MEOX2 MESP1 MGC21874 MGC48386 MID1 MIER2 MIZF MKRN1	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_000372.1 NP_060020.1 NP_056332.2 NP_038474.1	NR1D1 NR1D2 NR1D2 NR1H2 NR1H3 NR1H4 NR1H4	NP_068370.1 NP_005117.2 NP_005117.2 NP_00952.3 NP_005684.1 NP_005114.1	PLRG1 PMFBP1 POGZ POLE3 POLR1E POL R2C	NP_002660.1 NP_112583.1 NP_112583.1 NP_665739.2 NP_059139.2 NP_071935.1 NP_116558.1
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF17 KLF3 KLF5 KLF6 KLF7	NP_006554.1 NP_005646.1 NP_003588.1 NP_054798.1 NP_054798.1 NP_057615.3 NP_057615.3 NP_001721.2 NP_001291.3 NP_003700.1	MEOX2 MESP1 MGC21874 MGC46336 MID1 MIER2 MIZF MKRN1 MKRN1	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_060020.1 NP_056332.2 NP_038474.1	NR1D1 NR1D2 NR1D2 NR1H2 NR1H3 NR1H4 NR1H4 NR1H4	NP_068370.1 NP_005117.2 NP_005117.2 NP_009052.3 NP_005684.1 NP_005114.1 NP_005114.1 NP_0031880.3	PLRG1 PMFBP1 POGZ POLE3 POLR1E POLR1E POLR2C POLR2K	NP_002660.1 NP_112583.1 NP_112583.1 NP_665739.2 NP_059139.2 NP_071935.1 NP_116558.1 NP_005025.1
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KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF17 KLF3 KLF5 KLF6 KLF7 KLF7 KLF9	NP_006554.1 NP_005646.1 NP_003588.1 NP_003708.3 NP_054798.1 NP_057575.3 NP_0077615.3 NP_001721.2 NP_001721.3 NP_003700.1 NP_003700.1 NP_003109.1	MEOX2 MESP1 MGC248346 MID1 MIER2 MIZF MKRN1 MKRN1 MKRN2 MKX	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_060020.1 NP_056332.2 NP_038474.1 NP_054879.3 NP_775847.1	NR1D1 NR1D2 NR1D2 NR1H2 NR1H3 NR1H4 NR1H4 NR112 NR113	NP_068370.1 NP_068370.1 NP_005117.2 NP_009052.3 NP_005684.1 NP_005114.1 NP_005114.1 NP_003180.3 NP_005113.1 NP_001070945.1	PLRG1 PMFBP1 PMFBP1 POGZ POLE3 POLR2C POLR2C POLR2K POU2AF1 POU2F1	NP_002660.1 NP_112583.1 NP_1583.1 NP_65739.2 NP_059139.2 NP_071935.1 NP_116558.1 NP_005225.1 NP_006226.2 NP_002688.2
KHDRBS1 KLF1 KLF10 KLF11 KLF12 KLF15 KLF3 KLF5 KLF6 KLF6 KLF7 KLF9 KLHDC2	NP_006554.1 NP_005646.1 NP_003588.1 NP_09180.3 NP_057015.3 NP_001721.2 NP_001721.2 NP_001721.3 NP_003700.1 NP_003700.1 NP_001197.1 NP_0055130.1	MEOX2 MESP1 MGC21874 MGC48336 MID1 MIER2 MIZF MKRN1 MKRN1 MKRN2 MKX MLX	NP_005915.2 NP_061140.1 NP_689506.2 XP_001720872.1 NP_060020.1 NP_066332.2 NP_038474.1 NP_054879.3 NP_775847.1 NP_75847.1 NP_733752.1	NR1D1 NR1D2 NR1D2 NR1H3 NR1H4 NR1H4 NR112 NR113 NR113 NR113 NR113	NP_068370.1 NP_068370.1 NP_005117.2 NP_009052.3 NP_005684.1 NP_005114.1 NP_005114.1 NP_005114.1 NP_003880.3 NP_005113.1 NP_001070945.1 NP_003288.2	PLRG1 PMFBP1 PMFBP1 POGZ POLE3 POLR2C POLR2K POU2AF1 POU2F1 POU3F2	NP_002660.1 NP_112583.1 NP_112583.1 NP_665739.2 NP_059139.2 NP_071935.1 NP_116558.1 NP_00526.2 NP_002626.2 NP_002688.2 NP_002595.2





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PRICKLE3	NP 006141.2	SAV1	NP_068590.1	TADA2L	NP_001479.3	TOX2	NP 001092268.1
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PRPF6	NP_036601.2	SCAND1	NP_057642.1	TAF10	NP_006275.1	TP73	NP_001119712.1
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RCOR2	NP_775858.1	SOHLH1	NP_001012415.2	TCF4	NP_003190.1	VAX1	NP_954582.1
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RFXDC1	NP_775831.1	SP3	NP_003102.1	TFAP2C	NP_003213.1	WHSC1L1	NP_060248.2
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KSBN1	NP_000834.2	5573	NP_/03042.1		NP_955306.1	ZB1B3	NP_079060.1
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ZB157 PI_159111 ZNF189 PI_0002442 ZNF483 PI_074221 ZNF484 PI_074221 ZNF484 PI_074221 ZNF484 PI_074211 ZNF484 PI_0742111 ZNF484 PI_0742111 ZNF484 PI_0742111 ZNF486 ZNF484 PI_0742111 ZNF486 ZNF486 ZNF484 PI_0742111 ZNF486	NP_689533.1 NP_689790.1 NP_075662.2 NP_001009958.1 NP_07562.2 NP_001009958.1 NP_07100960.1 NP_075929.1 NP_97287.2 NP_689650.1 NP_079309.3 NP_071386.2 NP_078982.2 NP_078982.2 NP_079090.1 NP_079190.1 NP_079190.1 NP_079190.1 NP_079109.1 NP_079112.1 NP_612203.2 NP_848653.1 NP_612143.2 NP_848653.1 NP_612143.2 NP_848653.1 NP_612143.2 NP_64014.1 NP_0108231.1 NP_0108231.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056995.1 NP_056935.1 NP_05637.1 NP_06373.1 NP_06373.1
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Linton N=065116.2 ZNF281 Disto N=065763.1 ZNF740 ZFP3 N=064563.1 ZNF286A NP_006703.1 ZNF545 NP_997723.1 ZNF704 ZFP36 NP_003981.1 ZNF286A NP_00191872.1 ZNF545 NP_979723.1 ZNF707 ZFP36L1 NP_004917.2 ZNF3 NP_116313.3 ZNF549 NP_969995.1 ZNF707 ZFP376L2 NP_00399.1 ZNF30 NP_116313.3 ZNF550 NP_00103743.1 ZNF707 ZFP37 NP_00399.1 ZNF300 NP_01012320.1 ZNF553 NP_0690865.1 ZNF714 ZFP41 NP_076193.1 ZNF300 NP_070105368.1 ZNF554 NP_001037652.1 ZNF744 ZFP64 NP_0056459.2 ZNF324 NP_076915.2 ZNF567 NP_001037653.1 ZNF740 ZFF94 NP_965459.2 ZNF324 NP_065161.1 ZNF560 NP_689869.2 ZNF740 ZFF94 NP_001010879.2 ZNF324 NP_076896.3 ZNF560 NP_606031.1 ZNF764 ZKSCAN	NP_060730.1
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ZFP64 NP_956459.2 ZNR322A NP_07815.2 ZNR557 NP_001037853.1 ZNR75A ZFP91 NP_444251.1 ZNR532 NP_665916.1 ZNF556 NP_663984.1 ZNR753 ZIC4 NP_115529.2 ZNR324B NP_997278.1 ZNR560 NP_669689.2 ZNR763 ZIC4 NP_0010879.2 ZNR5329 NP_078896.3 ZNF562 NP_600126.1 ZNR764 ZKSCAN1 NP_001012999.3 ZNR533 NP_115809.1 ZNF564 NP_660319.1 ZNF768 ZKSCAN3 NP_077819.2 ZNR334 NP_060572.3 ZNF565 NP_010135939.1 ZNF777 ZKSCAN4 NP_061983.2 ZNF334 NP_060573.3 ZNF567 NP_689816.2 ZNF774 ZMAT1 NP_116817.1 ZNF34 NP_06057.3 ZNF57 NP_689697.2 ZNF780 ZMYDD11 NP_006615.1 ZNF343 NP_065057.3 ZNF57 NP_689657.3 ZNF780 ZMYND11 NP_006615.1 ZNF343 NP_077301.4 ZNF574 NP_689853.2 ZNF780 <	NP_003417.2
ZIC4 NP_115520.2 ZNF324 NP_000310.1 ZNF350 NP_000310.1 ZNF350 NP_0689689.2 ZNF763 ZIC4 NP_115529.2 ZNF324 NP_077896.3 ZNF562 NP_689689.2 ZNF763 ZIC4 NP_0010879.2 ZNF324 NP_078896.3 ZNF562 NP_060126.1 ZNF764 ZKSCAN1 NP_001012999.3 ZNF333 NP_001073375.1 ZNF564 NP_669413.1 ZNF766 ZKSCAN2 NP_001012999.3 ZNF334 NP_060572.3 ZNF565 NP_001035939.1 ZNF777 ZKSCAN3 NP_06584.1 ZNF334 NP_06057.3 ZNF566 NP_689816.2 ZNF774 ZMAT1 NP_015834.1 ZNF34 NP_085057.3 ZNF57 NP_689867.2 ZNF776 ZMYND11 NP_006615.1 ZNF341 NP_085057.3 ZNF57 NP_689625.1 ZNF786 ZMYND11 NP_006615.1 ZNF34 NP_060331.1 ZNF573 NP_689673.2 ZNF786 ZMYND8 NP_988868.1 ZNF34 NP_0030410.1 ZNF576 NP_777655.1	NP_001004304.1
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ZKSCAN5 NP_055384.1 ZNF334 NP_955473.1 ZNF567 NP_689816.2 ZNF773 ZMAT1 NP_115817.1 ZNF33A NP_008905.1 ZNF569 NP_689697.2 ZNF774 ZMAT5 NP_00103692.1 ZNF34 NP_008005.1 ZNF57 NP_775751.1 ZNF776 ZMYD11 NP_006615.1 ZNF34 NP_0116208.3 ZNF57 NP_689625.1 ZNF780 ZMYND11 NP_006615.1 ZNF343 NP_077301.4 ZNF574 NP_689573.2 ZNF782 ZMYND8 NP_898868.1 ZNF345 NP_00310.1 ZNF575 NP_77303.1 ZNF782 ZMYND8 NP_898869.1 ZNF347 NP_115973.1 ZNF576 NP_07303.1 ZNF782 ZNF10 NP_988869.1 ZNF347 NP_115973.1 ZNF579 NP_689813.2 ZNF790 ZNF10 NP_988869.1 ZNF347 NP_115973.1 ZNF579 NP_689813.2 ZNF790 ZNF101 NP_1698041.2 ZNF35 NP_003411.3 ZNF580 NP_057286.1 ZNF790 ZNF110 <td>NP_057727.1</td>	NP_057727.1
ZMAT1 NP_115817.1 ZNF33A NP_008905.1 ZNF569 NP_689697.2 ZNF774 ZMAT5 NP_00103692.1 ZNF34 NP_085057.3 ZNF57 NP_775751.1 ZNF780 ZMYDD11 NP_006615.1 ZNF34 NP_16208.3 ZNF57 NP_689625.1 ZNF780 ZMYND11 NP_006615.1 ZNF343 NP_07301.4 ZNF573 NP_689573.2 ZNF782 ZMYND8 NP_898868.1 ZNF343 NP_077301.4 ZNF575 NP_073589.4 ZNF782 ZMYND8 NP_898868.1 ZNF345 NP_003410.1 ZNF575 NP_07303.1 ZNF782 ZMYND8 NP_898869.1 ZNF347 NP_115973.1 ZNF579 NP_689813.2 ZNF790 ZNF101 NP_056209.2 ZNF347 NP_003411.3 ZNF580 NP_057266.1 ZNF790 ZNF101 NP_19981.2 ZNF355 NP_003411.3 ZNF580 NP_057266.1 ZNF790 ZNF114 NP_005836.1 ZNF3550 NP_005640.2 ZNF581 NP_057619.1 ZNF790 ZNF121 </td <td>NP_940944.1</td>	NP_940944.1
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ZMYND8 NP_898869.1 ZNF347 NP_115973.1 ZNF576 NP_077303.1 ZNF785 ZNF10 NP_056209.2 ZNF347 NP_115973.1 ZNF579 NP_689813.2 ZNF79 ZNF101 NP_149981.2 ZNF35 NP_003411.3 ZNF580 NP_057286.1 ZNF79 ZNF114 NP_105986.1 ZNF350 NP_067645.3 ZNF581 NP_057619.1 ZNF79 ZNF121 NP_001008727.1 ZNF354A NP_0067645.2 ZNF581 NP_057619.1 ZNF793 ZNF131 NP_003423.1 ZNF354B NP_478137.1 ZNF582 NP_653291.1 ZNF793 ZNF132 NP_003424.3 ZNF354C NP_055409.1 ZNF583 NP_689691.1 ZNF799 ZNF133 NP_001076799.1 ZNF354 NP_06553.4 ZNF585 NP_689492.2 ZNF82 ZNF134 NP_001076799.1 ZNF366 NP_6689838.1 ZNF586 NP_608492.2 ZNF82 ZNF134 NP_003427.2 ZNF376 NP_00107095.1 ZNF587 NP_16217.1 ZNF82	NP_689671.2
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ZNF131 NP_003423.1 ZNF354B NP_478137.1 ZNF582 NP_653291.1 ZNF793 ZNF132 NP_003424.3 ZNF354C NP_055409.1 ZNF583 NP_689691.1 ZNF799 ZNF133 NP_001076799.1 ZNF368 NP_060553.4 ZNF585B NP_689492.2 ZNF82 ZNF134 NP_003426.3 ZNF366 NP_689838.1 ZNF586 NP_060122.2 ZNF82 ZNF135 NP_003427.2 ZNF37A NP_00107095.1 ZNF587 NP_16217.1 ZNF38	NP 699189 1
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ZNEI3D NE UU3427.2 ZNE37A NE UU1UU709D.1 ZNED07 NE LIOZI7.1 ZNED0	0
ZNE136 NP 003428.1 ZNE382 NP 116214.2 ZNE593 NP 056955.2 ZNE83	NP_060000.1
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ZNF140 NP_003431.2 ZNF384 NP_001035005.1 ZNF597 NP_689670.1 ZNF92	NP_060000.1 NP_001099019.1 NP_001099023.1 NP_001120844.1
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ZNF148 NP_068799.2 ZNF394 NP_115540.2 ZNF605 NP_899061.1 ZSCAN1	NP_060000.1 NP_001099019.1 NP_001099023.1 NP_001120844.1 NP_689839.1 NP_055411.1
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2117-10 117-03201.2 2117410 NP_U0U823.2 2NF621 NP_UU1U91884.1 2SCAN2 ZNF180 NP_037388.1 ZNF415 NP_060825.2 ZNF632 NP_210482.1 ZSCAN2	NP_06000.1 NP_001099019.1 NP_001099023.1 NP_00120844.1 NP_658339.1 NP_055411.1 NP_872378.3 NP_16194.1 NP_076507.1 NP_076415.2 NP_060564.3 NP_870992.2 NP_660281.2 NP_60280.2
ZNF180 NP_037388.1 ZNF418 NP 597717.1 ZNF623 NP 001075949.1 ZSCAN4	NP_06000.1 NP_001099019.1 NP_001099023.1 NP_00120844.1 NP_689839.1 NP_055411.1 NP_872378.3 NP_116194.1 NP_079507.1 NP_076415.2 NP_060864.3 NP_660281.2 NP_660281.2 NP_862829.1 NP_862829.1
ZNF182 NP_008893.1 ZNF419 NP_001091964.1 ZNF626 NP_001070143.1 ZSCANE	NP_06000.1 NP_001090019.1 NP_001090023.1 NP_00120844.1 NP_689839.1 NP_055411.1 NP_872378.3 NP_116194.1 NP_075607.1 NP_076415.2 NP_060864.3 NP_660281.2 NP_660281.2 NP_660863.3 NP_689869.1
ZNF184 NP_009080.1 ZNF425 NP_001001661.1 ZNF627 NP_660338.1	NP_06000.1 NP_001090019.1 NP_001090023.1 NP_001120844.1 NP_055411.1 NP_872378.3 NP_116194.1 NP_076415.2 NP_076415.2 NP_06084.3 NP_660281.2 NP_660281.2 NP_68980.1 NP_68980.1 NP_68980.1 NP_68980.1 NP_68989.1
ZNF187 NP_689949.3 ZNF426 NP_077011.1 ZNF630 NP_001032824.2	NP_06000.1 NP_001099019.1 NP_001099023.1 NP_001120844.1 NP_055411.1 NP_872378.3 NP_116194.1 NP_079507.1 NP_076415.2 NP_076415.2 NP_076415.2 NP_076415.2 NP_600364.3 NP_870992.2 NP_660281.2 NP_660281.2 NP_660281.2 NP_660280.1 NP_68980.1 NP_68980.1
<u>ZNF187</u> NP_001018854.2 ZNF433 NP_001073880.1 ZNF639 NP_057415.1	NP_06000.1 NP_001090019.1 NP_001090023.1 NP_00120844.1 NP_60839.1 NP_055411.1 NP_075671.1 NP_076415.2 NP_076415.2 NP_076415.2 NP_060868.3 NP_870992.2 NP_660820.1 NP_689890.1 NP_077279.1



Supplementary Table S2. List of 18 human transcription factors from the second screening.

Supplement	Supplementary Table 02. List of To human transcription factors from the second screening.						
Gene	RefSeq	Gene	RefSeq	Gene	RefSeq	Gene	RefSeq
Symbol	protein ID	Symbol	protein ID	Symbol	protein ID	Symbol	protein ID
GLIS1	NP_671726.1	ZBTB8	NP_001035531.1	ZSCAN4	NP_689890.1	OTX2	NP_758840.1
DMRTB1	NP_149056.1	ZBTB43	NP_054726.1	ZNF768	NP_078947.3	PRRX2	NP_057391.1
PITX2	NP_700475.1	ZNF202	NP_003446.2	PRPF4B	NP_003904.3	OTP	NP_115485.1
IRX6	NP_077311.2	ZNF383	NP_689817.1	NHLH1	NP_005589.1		
OVOL2	NP_067043.2	NR5A1	NP_004950.2	GRHL1	NP_055367.2		



Supplementary Table S3. Summary of blastocyst injection.

combination of genes	iPSC derived	number of	number of	number of chimeras
		born mice	chimeras	mated for F1 offspring
			(male)	(germline contribution)
OS+Glis1 #1	skin fibroblasts	33	20 (8)	4(0)
OS+Glis1 #2	MEF	40	10 (6)	3(0)
OSM+Glis1 #1	skin fibroblasts	21	13 (9)	3(0)
OSM+Glis1 #2	MEF	80	32 (19)	8(1)
OSM+Glis1 #3	MEF	58	31 (19)	5(0)
OSK+Glis1 #1	skin fibroblasts	40	15 (10)	9(0)
OSK+Glis1 #2	MEF	51	31 (15)	14(1)
OSK+Glis1 #3	MEF	37	30 (16)	17(0)
OSKM #1	skin fibroblasts	27	10 (4)	0
OSKM #2	skin fibroblasts	42	27 (17)	5(1)



Supplementary Table S4. List of the 90(a) and 32(b) probes from microarray analysis.

a OSK<OSKG (20-fold) 90

a OSK <oskg (2<="" th=""><th>20–fold) 90</th><th>b ES-enriched -</th><th>→ OSK<oskg (3–fold)="" 32<="" th=""></oskg></th></oskg>	20–fold) 90	b ES-enriched -	→ OSK <oskg (3–fold)="" 32<="" th=""></oskg>		
ProbeName	GeneSymbol	ProbeName	GeneSymbol	ProbeName	GeneSymbol
A_51_P105480	Nanos3	A_51_P419047	Esrrb	A_51_P146149	Napsa
A_51_P108581	Adrbk2	A_51_P439311	1810041L15Rik	A_51_P195044	Dppa3
A_51_P112932	Entpd2	A_51_P449824		A_51_P202340	Pou5f1
A_51_P127695	Greb1	A_51_P452714	Kcnmb4	A_51_P246345	MyI7
A_51_P143162	Myh7	A_51_P457989	Rragd	A_51_P270997	Igfbpl1
A_51_P170725	1300002K09Rik	A_51_P462533	Syt7	A_51_P274223	Fgf17
A_51_P171616	Wnt10a	A_51_P477121	Pmaip1	A_51_P282538	Gad1
A_51_P171832	Nrgn	A_51_P480136	Cryba2	A_51_P294233	Nanog
A_51_P175988	Htr3a	A_51_P481221	Bace2	A_51_P300657	Nefh
A_51_P204153	Igfbp5	A_51_P488819	4933400F03Rik	A_51_P306287	
A_51_P210510	Sparcl1	A_51_P490337	Tmem190	A_51_P333253	Myo1g
A_51_P222467	Abcg1	A_51_P494037	Dgkg	A_51_P338278	Trh
A_51_P222773	Foxa2	A_51_P495986	Gmpr	A_51_P377557	Cpsf4l
A_51_P230175	Bcan	A_51_P503149	Tns4	A_51_P389885	Spic
A_51_P236483	Dcpp1	A_52_P1037027		A_51_P402617	Nkx6-2
A_51_P236486	Dcpp1	A_52_P145415	Ptch2	A_51_P404193	Sp5
A_51_P239601	Trpv5	A_52_P18299	Chd5	A_51_P407028	Car4
A_51_P240811	Wnt8a	A_52_P187058	Nptx2	A_51_P418820	Tcfap2c
A_51_P241319	Cilp	A_52_P203560	Fzd10	A_51_P419047	Esrrb
A_51_P262238	Tub	A_52_P257502	Igfbp4	A_51_P433194	Bcas1
A_51_P267783	II11	A_52_P258116	Wnt3	A_51_P450248	Esx1
A_51_P270997	Igfbpl1	A_52_P274496	Tspan18	A_51_P489935	
A_51_P274223	Fgf17	A_52_P307860	Krt9	A_51_P497332	Mycn
A_51_P296815	Gpr68	A_52_P361534	Wnt3	A_52_P1004880	-
A_51_P297069	Tmod1	A_52_P373694	Jph4	A_52_P196161	Sh3gl2
A_51_P303217	Ucma	A_52_P403398	Ihh	A_52_P260659	Kcnj10
A_51_P305003	Ntrk1	A_52_P415155	Wnt6	A_52_P294305	Lin28a
A_51_P306287		A_52_P416575	Trim61	A_52_P488623	Fam169a
A_51_P309754	LOC100046808	A_52_P419678	Serpina3f	A_52_P536494	Mycn
A_51_P333253	Myo1g	A_52_P435561	Prr15l	A_52_P571780	Calb2
A_51_P355427	Timp4	A_52_P448045		A_52_P617512	Camta1
A_51_P359173	Syt7	A_52_P469502	Cda	A_52_P618417	
A_51_P359822	Sftpd	A_52_P490032	Rragd		
A_51_P361150	Pcp4I1	A_52_P497392	Dcpp3		
A_51_P367100	Itih3	A_52_P520037	Rimbp2		
A_51_P367880	Krt84	A_52_P535962	Dcpp2		
A_51_P372743	Frmpd3	A_52_P545132	Kcnc2		
A 51 P377557	Cpsf4l	A 52 P54770	Fam19a4		
A 51 P398971	Igfbp4	A 52 P577136			
A_51_P399305	Tnfrsf19	A_52_P633353	Igfbpl1		
A_51_P401504	Col9a2	A_52_P64356	Sparcl1		
A_51_P404193	Sp5	A_52_P70856	Frmpd1		
A_51_P407984	Grifin	A_52_P71756	Prb1		
A_51_P417720	Itga11	A_52_P88033	Myh7		
A_51_P418820	Tcfap2c	A_52_P964651	Fam65c		

Supplementary Table S5. Primers list.

Primers for RT-PCR analysis

Gene	Forward primer	Reverse primer
mNanog	AGGGTCTGCTACTGAGATGCT	CAACACCTGGTTTTTCTGCCACCG
hNanog	CAGCCCCGATTCTTCCACCAGTCCC	CGGAAGATTCCCAGTCGGGTTCACC
mOct3/4(endo)	TCTTTCCACCAGGCCCCCGGCTC	TGCGGGCGGACATGGGGAGATCC
hOct3/4(endo)	GACAGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG	CTTCCCTCCAACCAGTTGCCCCAAAC
Oct3/4(Tg)	CCCCAGGGCCCCATTTTGGTACC	CCCTTTTTCTGGAGACTAAATAAA
mSox2(endo)	TAGAGCTAGACTCCGGGCGATGA	TTGCCTTAAACAAGACCACGAAA
hSox2(endo)	GGG AAA TGG GAG GGG TGC AAA AGA GG	TTGCGTGAGTGTGGATGGGATTGGTG
Sox2(Tg)	GGCACCCCTGGCATGGCTCTTGGCTC	TTATCGTCGACCACTGTGCTGCTG
hRex1	CAGATCCTAAACAGCTCGCAGAAT	GCGTACGCAAATTAAAGTCCAGA
mEcat1	TGTGGGGCCCTGAAAGGCGAGCTGAGAT	ATGGGCCGCCATACGACGACGCTCAACT
Nat1	ATTCTTCGTTGTCAAGCCGCCAAAGTGGAG	AGTTGTTTGCTGCGGAGTTGTCATCTCGTC

Primers for qPCR analysis

Gene	Forward primer	Reverse primer
Glis1	CTCCAAGCATCCACACTGTT	GACAGGATGCCTGAAGCAAG
Nanog	AGGGTCTGCTACTGAGATGCT	CAACACCTGGTTTTTCTGCCACCG
Nrgn	TCCAAGCCAGACGACGATATT	CACACTCTCCGCTCTTTATCTTC
Tspan18	CAAGGAGCTTACCAAGCACTAC	GGCAGAGAAAACATCCGTATCG
N-Myc	CCTCACTCCTAATCCGGTCAT	GTGCTGTAGTTTTTCGTTCACTG
с−Мус	TCTCCATCCTATGTTGCGGTC	TCCAAGTAACTCGGTCATCATCT
G3PDH	ACC ACA GTC CAT GCC ATC AC	TCC ACC ACC CTG TTG CTG TA
Nat1	ATTCTTCGTTGTCAAGCCGCCAAAGTGGAG	AGTTGTTTGCTGCGGAGTTGTCATCTCGTC

Primers for ChIP analysis

Gene	Forward primer	Reverse primer
N-Myc	ACCTCCAGCGGCATCCAGGA	TCCAAACCGAGACCTCCCGCT
L-Myc	GGGAGGGGGGGGGGCTTGTC	CGCGATCTGCAGGCGCATTG
с−Мус	GAAACCCTGCAGCCCTGCCC	TGGCCACAGAGACCACAGCG
Nanog	TACTGAGTATAAGCTACTCAAGGCAACAG	CTTTTTAACGCAAGTCTGAAGAAAGAG
Esrrb	AGGCGCCTGGGGAGGAATGT	CCTGGCCATATGCAGGGTGGC
Lin28a	GGGAGGCAGCCAGGACAGGT	TCGCAGGCCCTCTCAGGGAC
Foxa2	GCAGTGCAGCCCACAGGCTT	GCGCACGCACACAACAAGG
Gata4	CCCCGTAGATCTGAGGCTAGCAAGG	CCTACTCTCAGTGGTCCACGTCCAG
Nkx2-5	CACCACTCTCTGCTACCCACCTGG	GCTGCTGCTCCAGGTTCAGGATGTC



Supplementary Table S6. Sequence of hairpin of shRNAs

shRNA2	CCGGGGCCTCACCAACCCTGCACCTCTCGAGAGGTGCAGGGTTGGTGAGGCCTTTTTG
Scramble shRNA2	CCGGGCGGCACACACACTCTCCCCCTCGAGGGGAGAGAGTGTGTGT
shRNA6	CCGGGCCCTTCAATGCCCGCTACAACTCGAGTTGTAGCGGGCATTGAAGGGCTTTTTG
Scramble shRNA6	CCGGGCGCGCACACACACACTTTTCCTCGAGGAAAAGTGTGTGT