

## **Description of Additional Supplementary Files**

File Name: Supplementary Data 1

Description: RNAseq-based gene expression predictions for RBFs and RPs in mouse samples.

File Name: Supplementary Data 2

Description: Mass spectrometry analysis of total extracts from si-CTL and si-Rsl24d1 treated CGR8 cells.

File Name: Supplementary Data 3

Description: Gene ontology enrichment analysis of up- and downregulated proteins in RSL24D1 depleted ESCs.

File Name: Supplementary Data 4

Description: DEseq2 analysis of si-CTL, si-Rsl24d1 no rescue, siCTL with rescue and si-Rsl24d1 with rescue at day 0 and day 4 of differentiation.

File Name: Supplementary Data 5

Description: GO annotation enrichment analysis of genes differentially expressed in Rsl24d1-depleted undifferentiated ESCs (day 0).

File Name: Supplementary Data 6

Description: Stemchecker analysis of differentially expressed genes in Rsl24d1-depleted ESCs.

File Name: Supplementary Data 7

Description: Analysis of transcription and chromatin factor binding sites.

File Name: Supplementary Data 8

Description: GO annotation enrichment analysis of genes upregulated upon ESC differentiation.

File Name: Supplementary Data 9

Description: Supplementary method information (primers, shRNAs, siRNAs and antibodies).