

Supplementary Figure 1

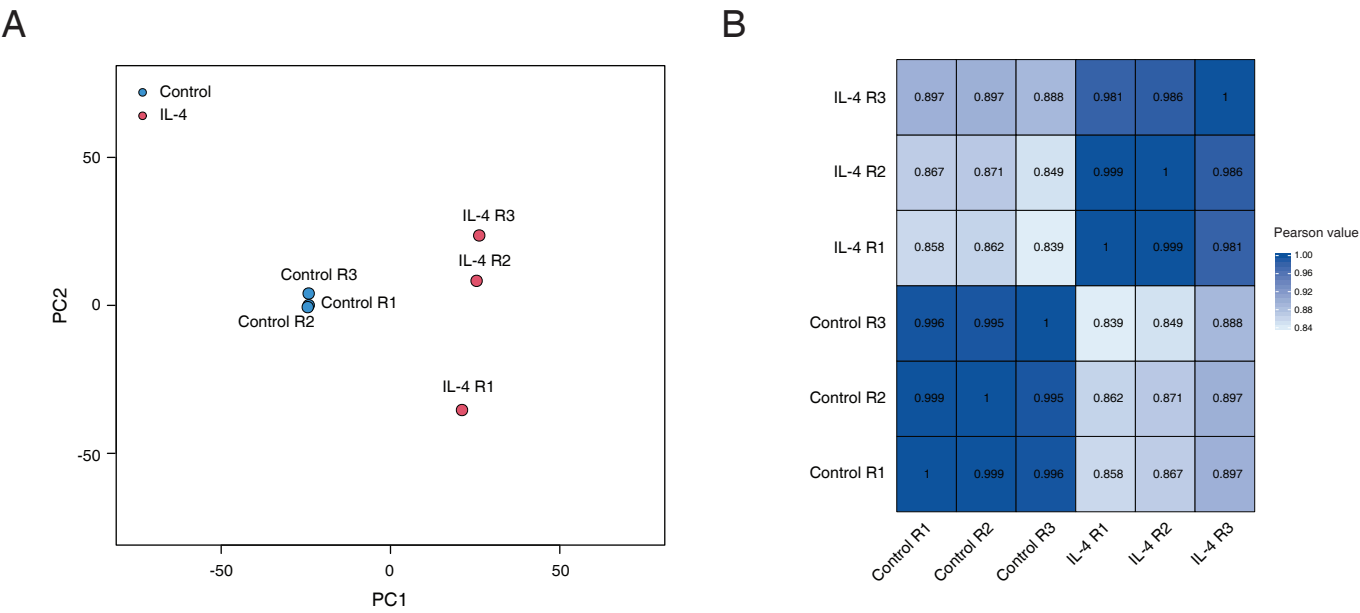


Fig. S1. mRNA sequencing data analysis

(A) Principal component analysis (PCA) of three replicates for control and IL-4–stimulated adipocyte precursors. (B) Correlation matrix of all the samples.

Supplementary Figure 2

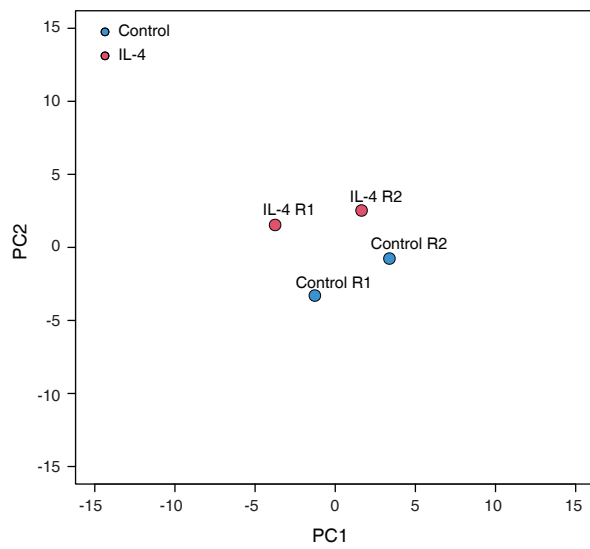


Fig. S2. small RNA sequencing data analysis

Principal component analysis (PCA) of two replicates for control and IL-4-stimulated adipocyte precursors.

Supplementary Figure 3

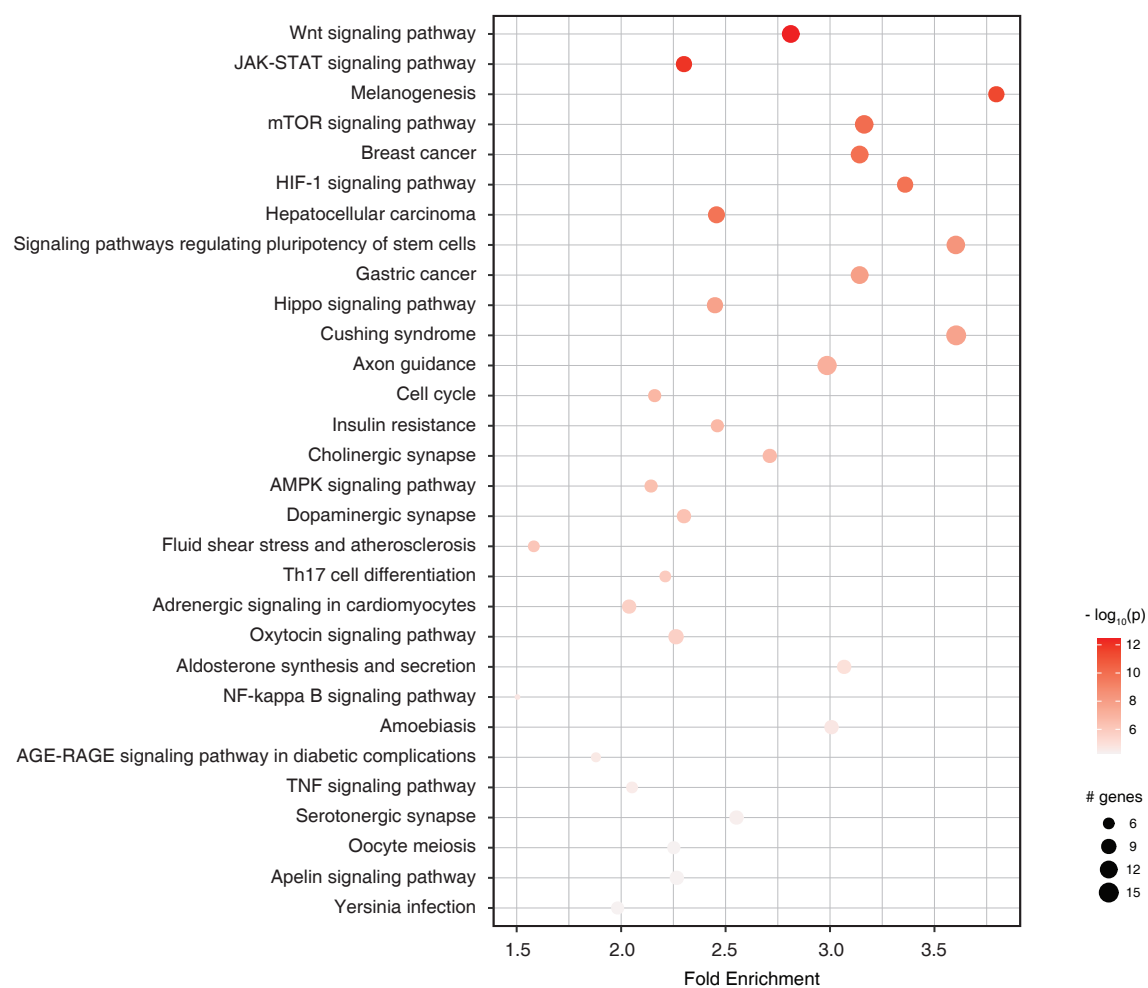


Fig. S3. KEGG pathway analysis in shared target genes of H19X-encoded miRNAs

Supplementary Figure 4

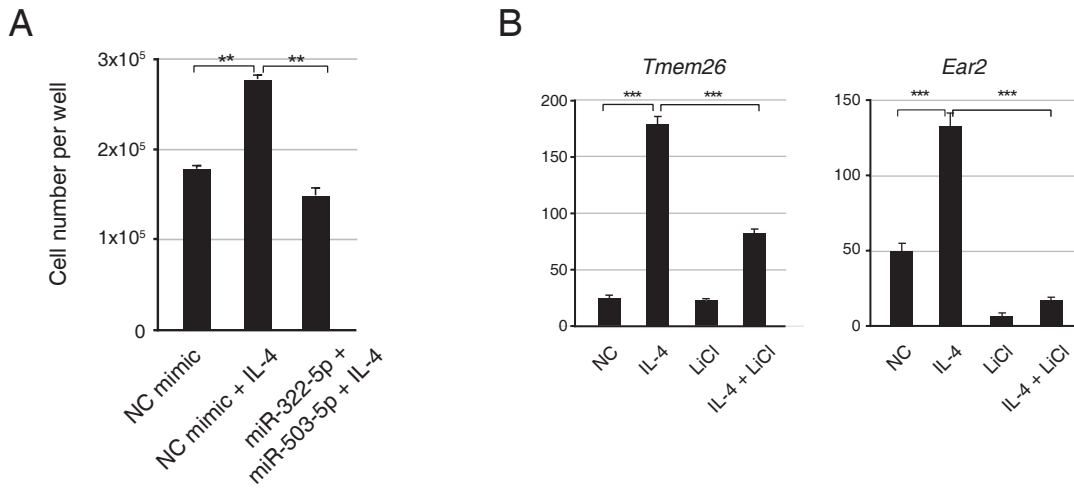


Fig. S4. H19X-encoded miRNAs and Wnt activator, LiCl, affect IL-4 induced proliferation and beige commitment in adipocyte precursors (APs)

(A) Total cell number analysis of adipocyte precursors. Adipocyte precursors were counted for each condition (control, IL-4, IL-4+ miR-322-5p/miR-503-5p) (n=2). (B) The mRNA expression levels of beige adipogenic markers were measured by qPCR (n=3). IL-4-induced upregulation of *Tmem26* and *Ear2* expressions was compromised by LiCl treatment. Data are presented as mean $\pm$ SEM. *** $p < 0.005$, ** $p < 0.01$, * $p < 0.05$.

Supplementary Figure 5

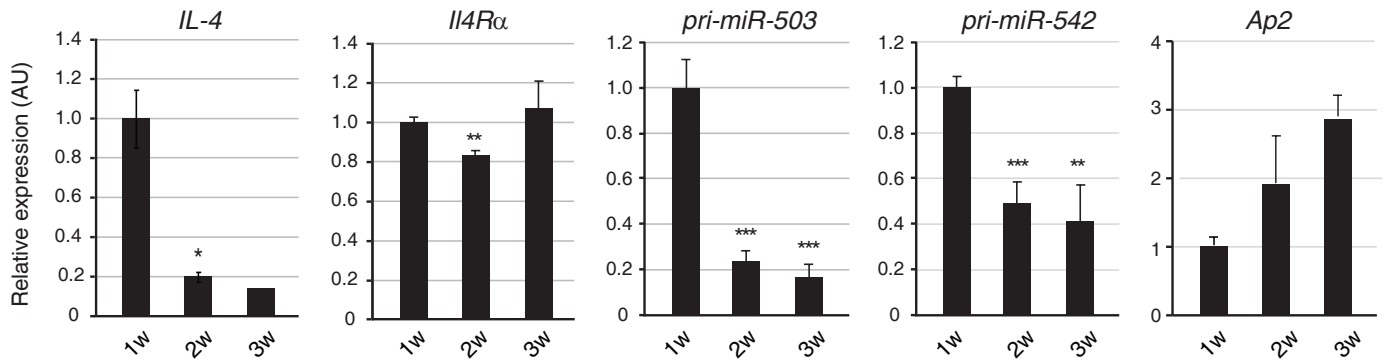


Fig. S5. H19X-encoded miRNAs are highly expressed at birth and gradually downregulated during postnatal development in mice

mRNA expression levels of *IL-4*, *IL-4R α* , and *Ap2* were measured via qPCR in scWAT samples of 1, 2, and 3 week postnatal mice (n=3). *IL-4* mRNA level was below the detection level in two samples of 3-week-old mice and measured in only one sample (n=1). Expression levels of the primary transcripts of H19X-encoded miRNAs decrease, whereas that of the adipogenic marker *Ap2* increases during the course of postnatal development.

Supplementary Figure 6

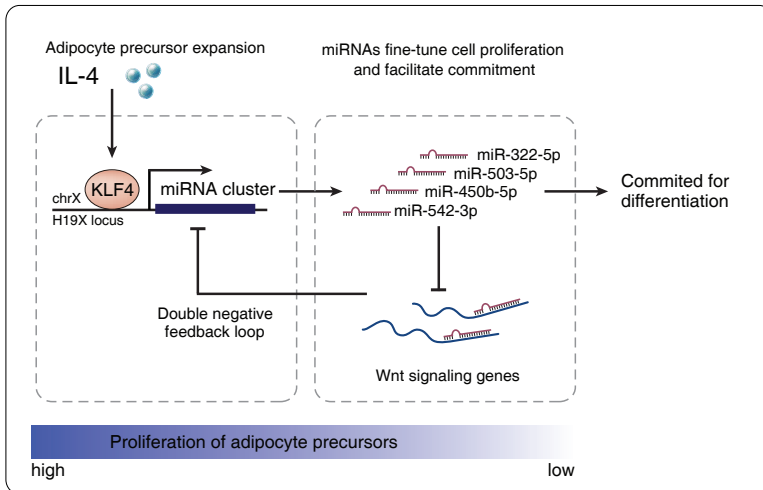


Fig. S6. A proposed model of H19X-encoded miRNAs-mediated regulation of adipocyte precursors under IL-4 stimulation

H19X-encoded miRNAs are upregulated upon IL-4 stimulation in adipocyte precursors through the transcription factor KLF4. H19X-encoded miRNAs that are downregulated by Wnt signaling activation suppress the expression of Wnt signaling pathway genes. The miRNA/Wnt double-negative feedback loop lowers the proliferation of adipocyte precursors induced by IL-4 stimulation and contributes to beige adipocyte commitment.