**Supplementary Figure S1. Metabolic phenotypes of F2 offspring born to F1 males depending on diets to founders**. F0 males fed with control diet (CD) or high fat diet (HFD) were mated with CD-fed females (n = 7). F1 progenies were mated with outbred control mice to generate F2 mice. All F1 and F2 offspring mice were maintained on CD. **A-C**: Bodyweight (A) and glucose levels after intraperitoneal glucose tolerance tests (IPGTT) treatment at 9 weeks of age (B) and 20 weeks of age (C) were measured in F2 male born to F1 males. **D-F**: Bodyweight (D) and glucose levels after IPGTT treatment at 9 weeks of age (E) and 20 weeks of age (F) were measured in F2 female born to F1 males. **G-J**: Serum insulin and hepatic TG content were measured after being sacrificed at 27 weeks of age of F2 male born to F1 males (G, H) and in F2 female born to F1 males (I, J). Blood glucose, serum insulin and hepatic TG levels were replicated twice per sample. Black circles and bars indicate F2 offspring of F0 CD male; white circles and bars indicate F2 offspring of F0 HFD male, n = 5 – 11 per group). Data presented as mean ± standard error. Student’s t-test indications \*\**P* < 0.01 \**P* < 0.05, †*P* < 0.1.

**Supplementary Figure S2. DNA methylation of repetitive elements and the imprinting *H19* and *Igf2* *DMRs* in germ cells of founder and livers of F2 female born to F1 females.** DNA methylation levels at IAP, SINE, LINE, and microsatellite elements were measured in sperm (A) and testis (B) of founder. DNA methylation levels at *H19* and *Igf2 DMR* regions were measured in testis of founder (C, D) and in liver of F2 female (E, F). (Black bars indicate F0 CD founder and F2 female of F0 CD founder; white bars indicate F0 HFD founder and F2 female of F0 HFD founder, n = 6 – 8 per group) Data presented as mean ± standard error. Student’s t-test indications \*\**P* < 0.01 \**P* < 0.05, †*P* < 0.1.

**Supplementary Figure S3. Information for the location of CpG units at the *Nr1h3* locus, used for DNA methylation analysis.**