

Figure S1. Increasing insulin signaling in osteoblasts weakens glucose intolerance in mice fed a HFD.

(A) Histomorphometric analysis of vertebrae of WT and $\alpha 1(I)Col-InsR$ mice fed a ND (n=8), (B) Serum Ctx levels in WT and $\alpha 1(I)Col-InsR$ mice fed a ND, (C) Serum osteocalcin levels in WT and $\alpha 1(I)Col-InsR$ mice fed a ND (n=8), (D) qPCR analysis of the expression of *Glut1*, *Glut3* and *Glut4* in bones of WT and $\alpha 1(I)Col-InsR$ fed a ND or HFD (n=5). (E) Western blot analysis of the phosphorylation levels of the INSR and AKT in liver and WAT of WT and $\alpha 1(I)Col-InsR$ mice fed a ND or a HFD. All Western blot experiments were repeated at least three times.*P<0.05.

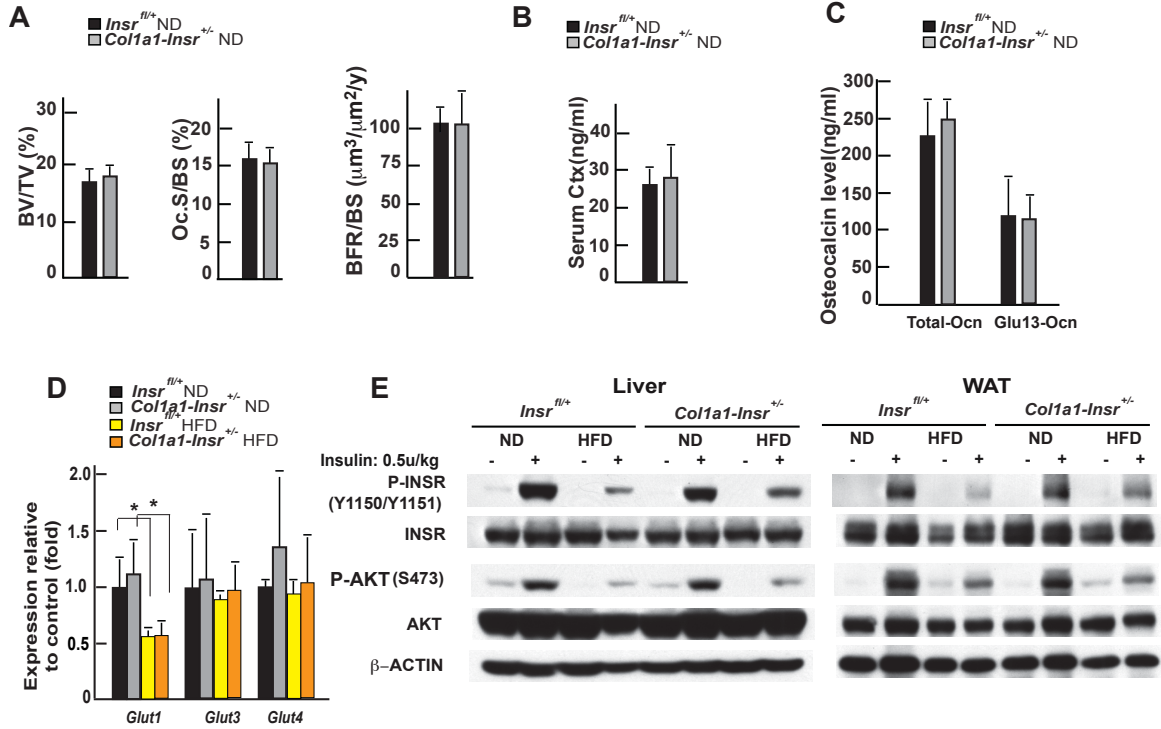


Figure S2. Compromising insulin signaling in osteoblasts worsens glucose intolerance in mice fed a HFD

(A) Histomorphometric analysis of vertebrae of *InsR*_{osb}^{+/-} mice fed a ND (n=8), (B) Serum Ctx levels in *InsR* fl/+ and *InsR*_{osb}^{+/-} mice fed a ND, (C) Serum osteocalcin levels in *InsR* fl/+ and *InsR*_{osb}^{+/-} mice fed a ND (n=8), (D) qPCR analysis of the expression of *Glut1*, *Glut3* and *Glut4* in bones of *InsR* fl/+ and *InsR*_{osb}^{+/-} mice fed a ND or HFD (n=5). (E) Western blot analysis of the phosphorylation levels of the INSR and AKT in liver and WAT of *InsR* fl/+ and *InsR*_{osb}^{+/-} mice fed a ND or a HFD. All Western blot experiments were repeated at least three times. *P<0.05.

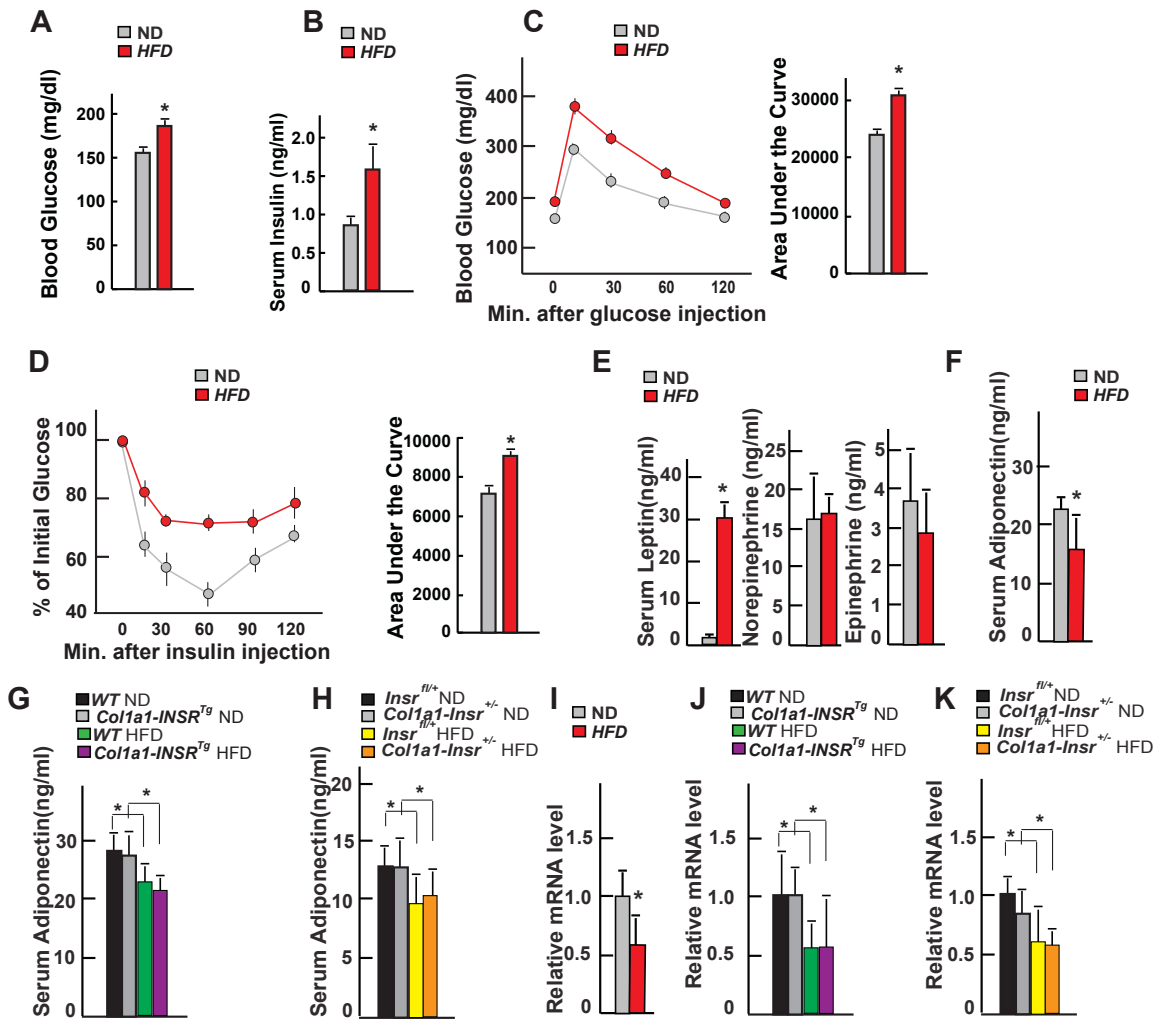


Figure S3. Insulin resistance develops in bone of mice fed a HFD

(A-B) Random glucose (A) and insulin (B) levels of WT mice fed a ND or HFD (n=8). (C-D) GTT (C) and ITT (D) of WT mice fed a ND or HFD (n=7). (E) ELISA analyses of serum levels of leptin, norepinephrine and epinephrine in mice fed a ND or a HFD (n=5). (F-H) ELISA analysis of serum levels of adiponectin in WT (F), *α1(I)Col-InsR* (G) and *InsR_{osb}+/-* mice(H) fed a fed a ND or a HFD (n=6). (I-K) qPCR analysis of the expression of *Adiponectin* in WAT of WT (I), *α1(I)Col-InsR* (J) and *InsR_{osb}+/-* mice (K) fed a fed a ND or a HFD (n=5). *P<0.05.

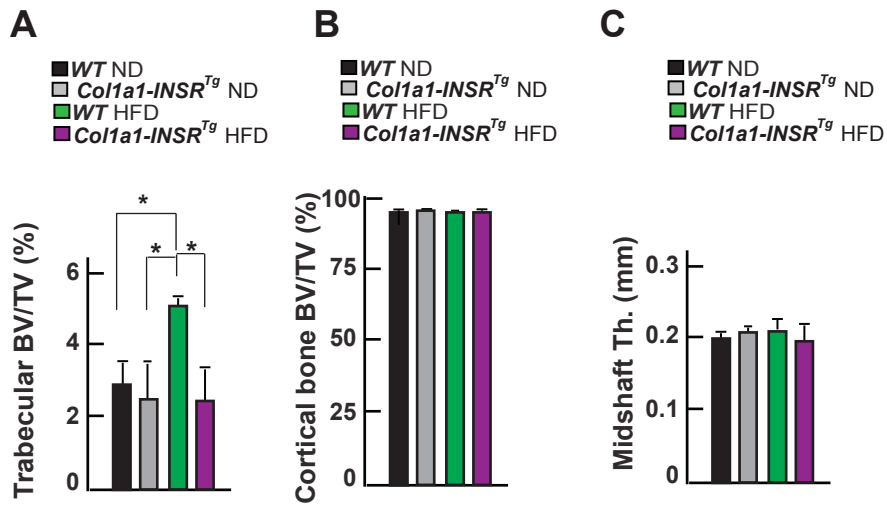


Figure S4. HFD decreases bone resorption in an insulin dependent manner.

(A-C) microCT analysis of proximal femur of WT and $\alpha 1(I)Col-InsR$ mice fed a ND or HFD (n=4). Trabecular bone volume over total tissue volume (A), Cortical bone volume over total tissue volume (B) and mid-shaft cortical bone thickness (C) were measured. *P<0.05.

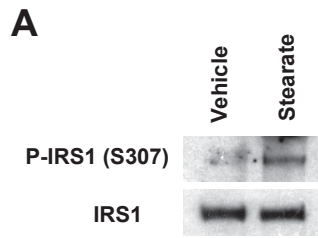


Figure S5. Lipotoxicity caused insulin resistance in osteoblasts

(A). Western blot analysis of levels of P-IRS1 at Serine 307 in primary osteoblasts treated with 200 μ M stearate or vehicle.