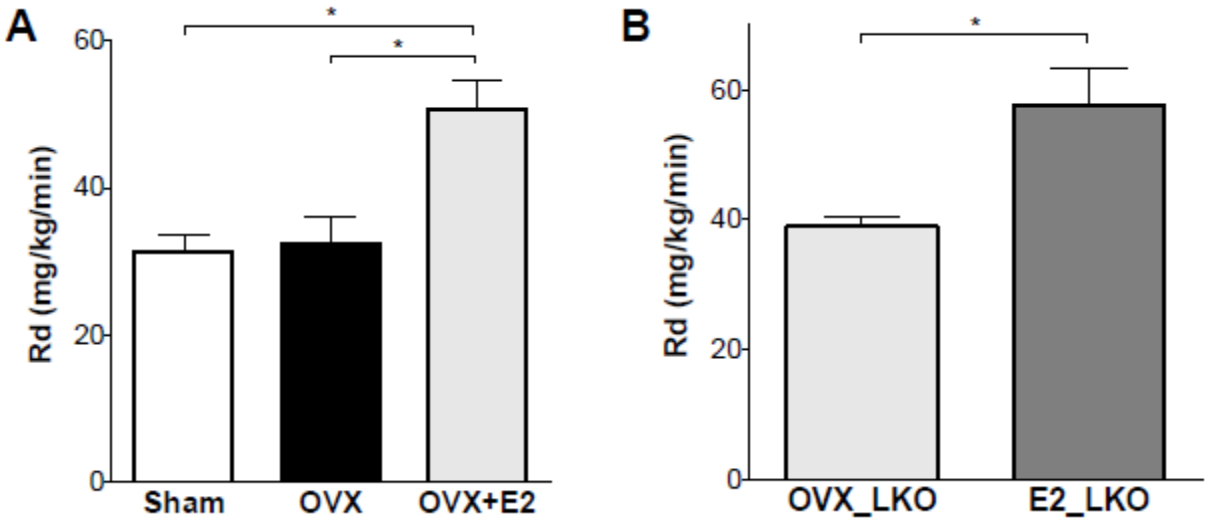
SUPPLEMENTARY DATA

Supplementary Table 1.
Physiological characteristics of LKO female mice and the littermates
Mice were fed on chow diet for 15 weeks. Body samples were collected after 5 hours fasting (n=5)

	Body Weight (gram)	Adiposity*	Insulin (μU/ml)	Glucose (mg/dl)	Plasma TG (mg/dl)	Plasma Cholesterol (mg/dl)
Littermates	21.8±1.8	12.3±1.6	9.7±2.0	82±15	62±5.5	94±11
LKO	22.5±2.5	12.7±1.6	9.1±0.7	80±16	53±4.4	88±4

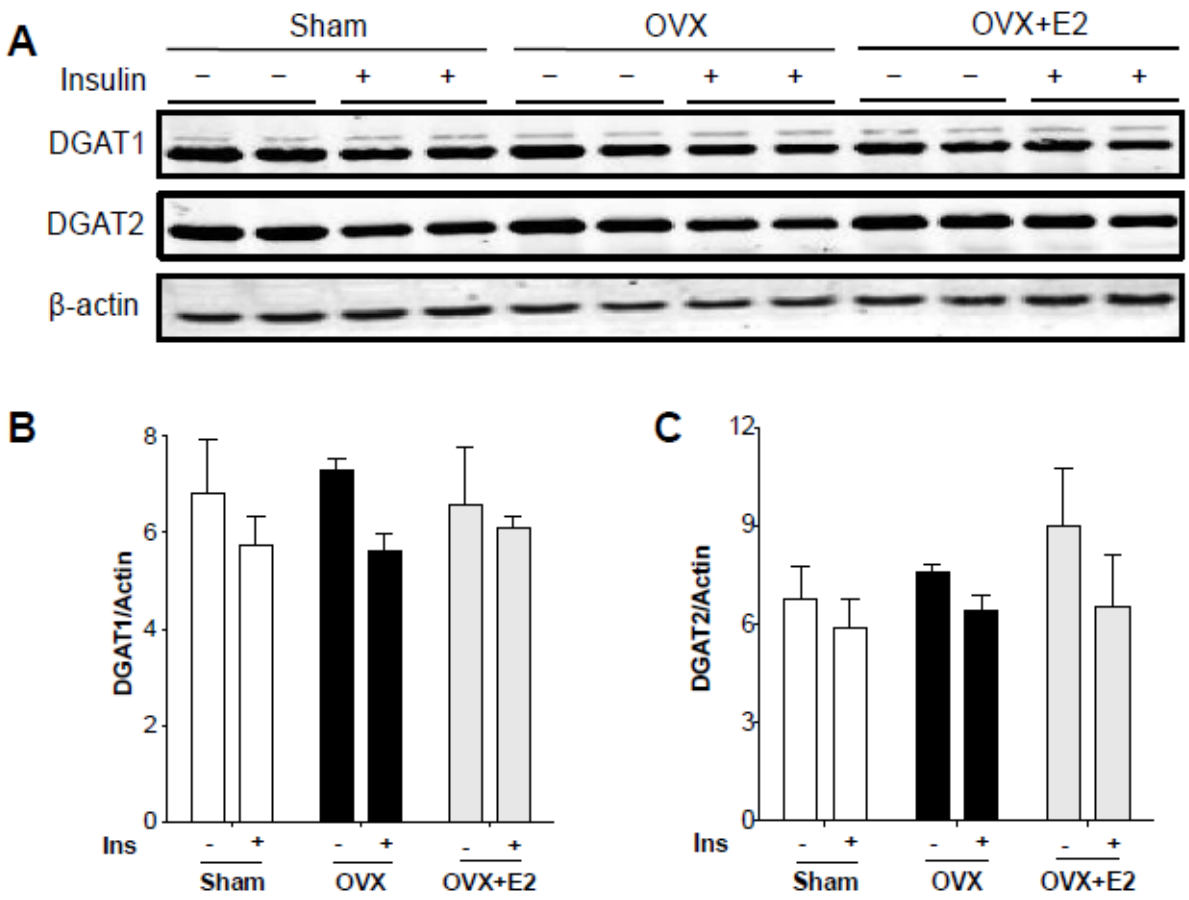
* Adiposity was presented as the percentage of body weight.

Supplementary Figure 1. Glucose disappearance rate (Rd) during clamp: Rd was determined using non-steady state equation for wild-type C57Bl/6J mice (**A**) and liver ERα knock out LKO mice (**B**). * $p < 0.05$. Differences between groups were determined by ANOVA followed by Tukey's post hoc tests.



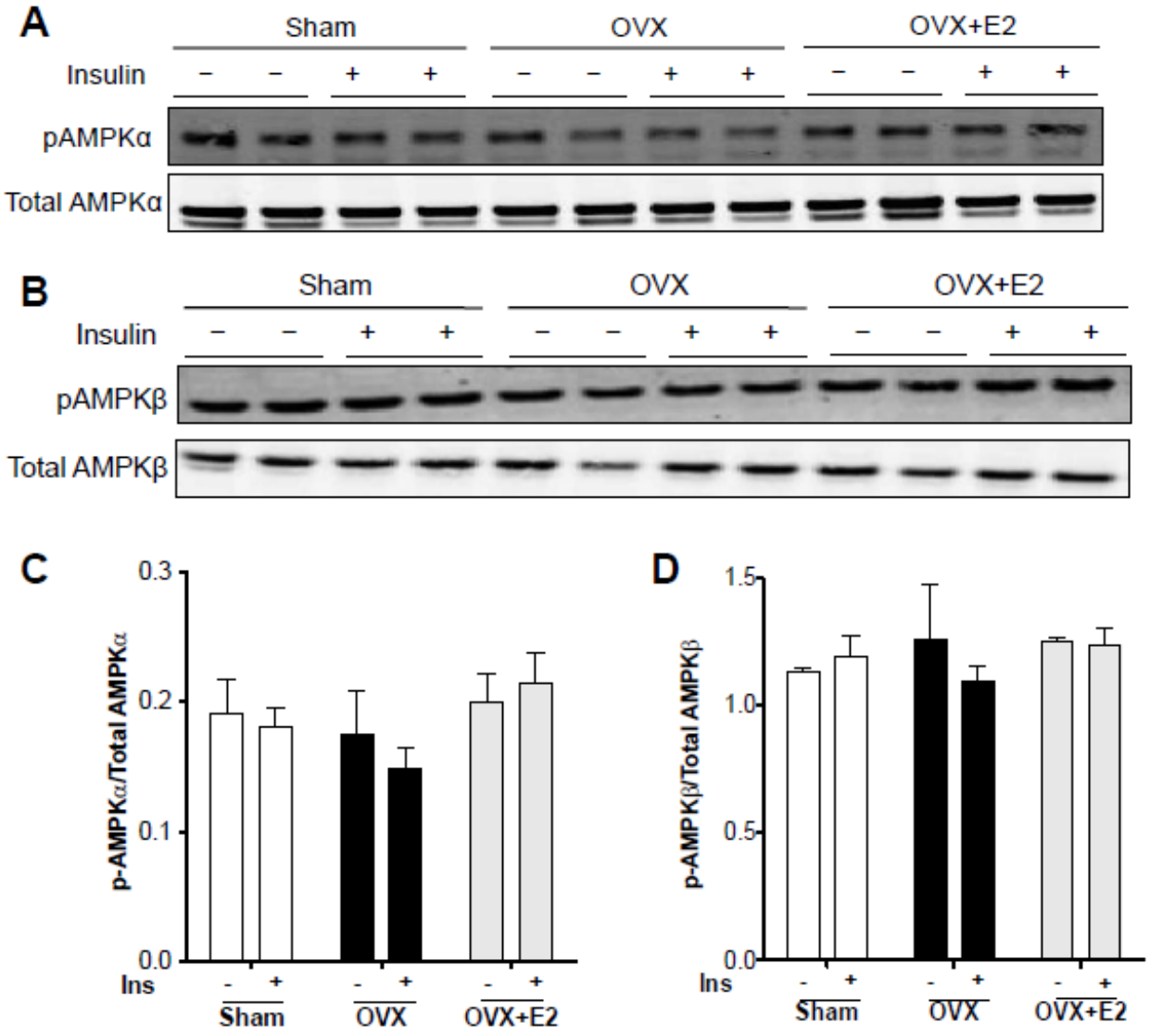
SUPPLEMENTARY DATA

Supplementary Figure 2. Liver DGAT1/2 expression: Livers from mice excised at after fasting (Ins -) or after hyperinsulinemia clamp study (Ins +) were used for protein extraction. Western blotting for DGAT1/2 is shown in panel **A**; expression of β-actin and Panseau S staining were used as loading control; the ratio of DGAT1/acin and DGAT2/actin was quantified in **B** and **C**, respectively.



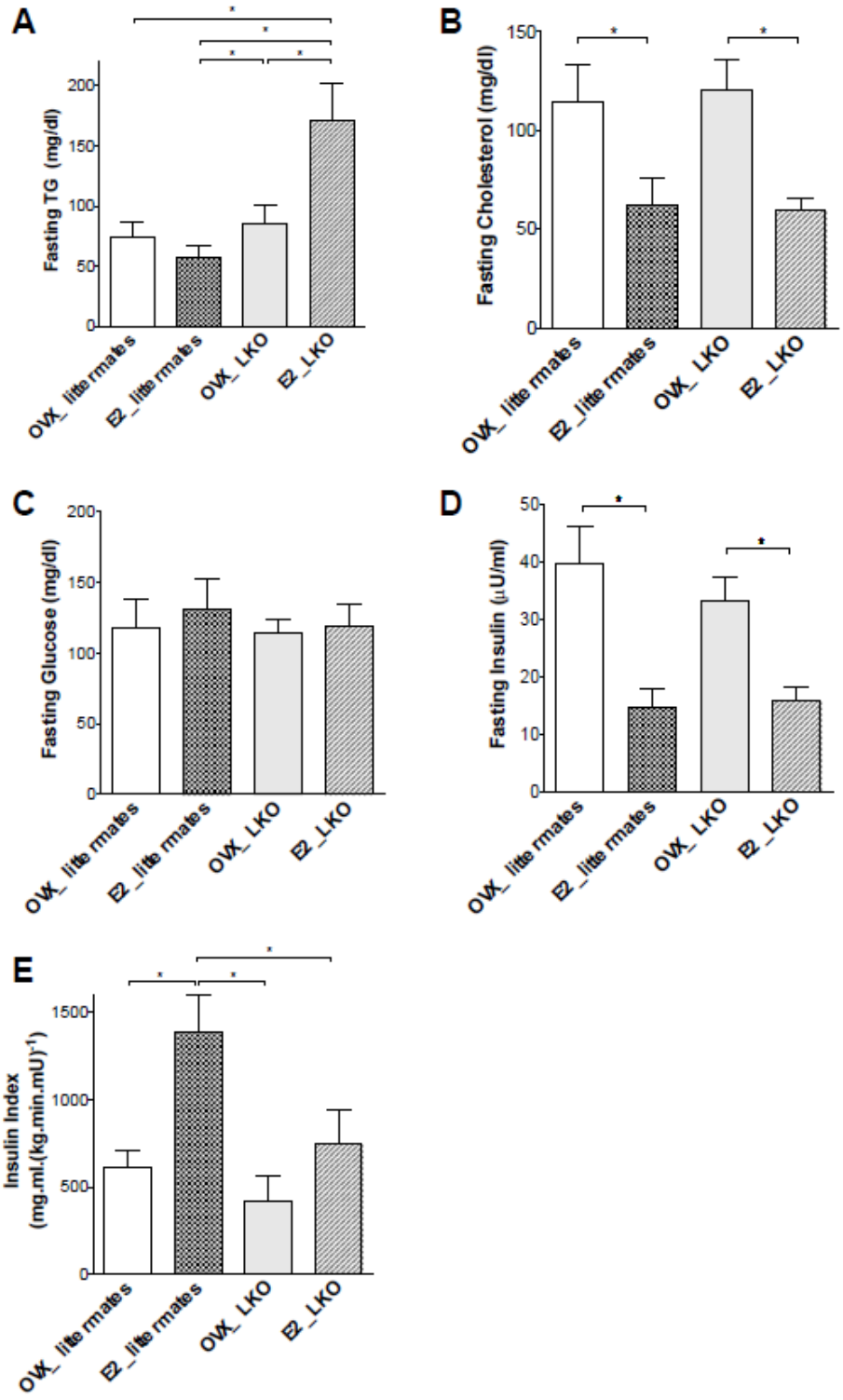
SUPPLEMENTARY DATA

Supplementary Figure 3. Liver APMKα/β expression and phosphorylation: Livers from mice excised at after fasting (Ins -) or after hyperinsulinemia clamp study (Ins +) were used for protein extraction. **A:** Western blotting for phosphorylation of AMPKα (pAMPKα) and total AMPKα. **B:** blots for p-AMPKβ and total AMPKβ. Expression of β-actin and Ponceau S staining were used as loading control. **C:** The ratio of pAMPKα/AMPKα. **D:** The ratio of pAMPKβ/AMPKβ.



SUPPLEMENTARY DATA

Supplementary Figure 4. Fasting serum chemistry and insulin index for LKO mice and their littermates: **A:** Estrogen treatment did not reduce hypertriglyceridemia in LKO mice. **B:** Estrogen treatment decreased fasting cholesterol levels independent of liver ERα. **C:** Fasting glucose did not change between groups. **D:** Estrogen treatment decreased fasting insulin in wild-type littermates and LKO mice. **E:** Estrogen treatment improved insulin index in wild-type littermates but not in LKO mice. *, $p < 0.05$, differences between groups were determined by ANOVA followed by Tukey's post hoc tests.



SUPPLEMENTARY DATA

Supplementary Figure 5. Quantification of the Western blots in Figure 6E: *, $p < 0.05$. Differences (+) or (-) insulin were defined by student's t-test.