Supplementary Data-Figure Legends

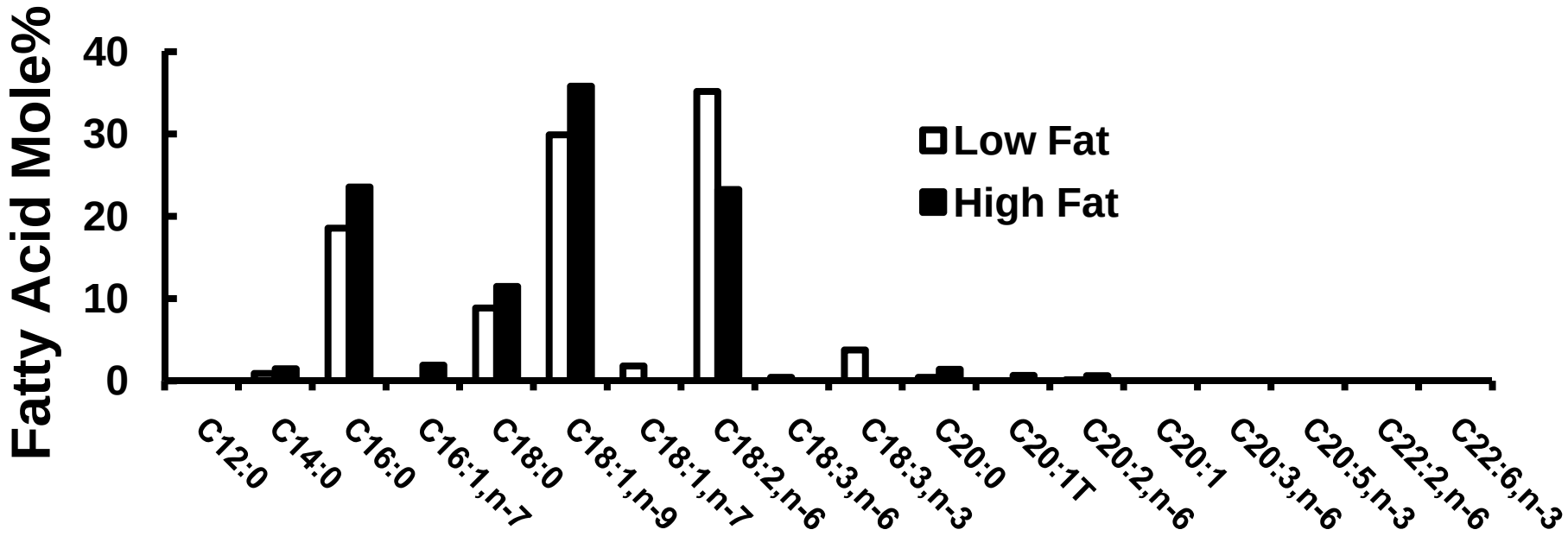
Figure 1S: Fatty acid composition of low and high fat diets. Fat in the low fat [(10% calories as fat, D12450B] and high fat [60% calories as fat, D12492] diets [Research Diets, Inc.] was saponified, converted to fatty acid methyl esters and quantified by gas chromatography. Results are expressed as Fatty Acid Mole %, mean of two separate determinations.

Figure 2S: Effect of diet and Elovl5 activity on the phosphorylation status of Gsk3b, **IRS2 and PDK1.** Mouse liver extracts were prepared from fasted (white bars) and refed mice (black bars) maintained on the low and high fat diets and infected with either Ad-Luc or Ad-Elovl5 (see Table 2). **Panel A.** Phospho-Gsk3β and total Gsk3β was measured by immunoblotting and quantified using a LiCor Odyssey. The phosphorylation status is the amount of phosphorylated protein divided by the total protein (p Gsk3β/Gsk3β). Results are expressed the ratio of phospho-Gsk3β to total Gsk3β. **Panel B.** Phospho-IRS2 (pIRS2) was quantified using an ELISA assay (Methods). **Panel C.** Phospho- and total PDK1 was measured by immunoblotting and quantified using a LiCor Odyssey. The phosphorylation status is the amount of phosphorylated protein divided by the total protein (pPDK1/PDK1). Results are expressed as mean $\pm$ SD, 4-8 mice/group. *, $p<0.05$ fasted versus refed; #, $p<0.05$ low fat versus high fat, ANOVA.

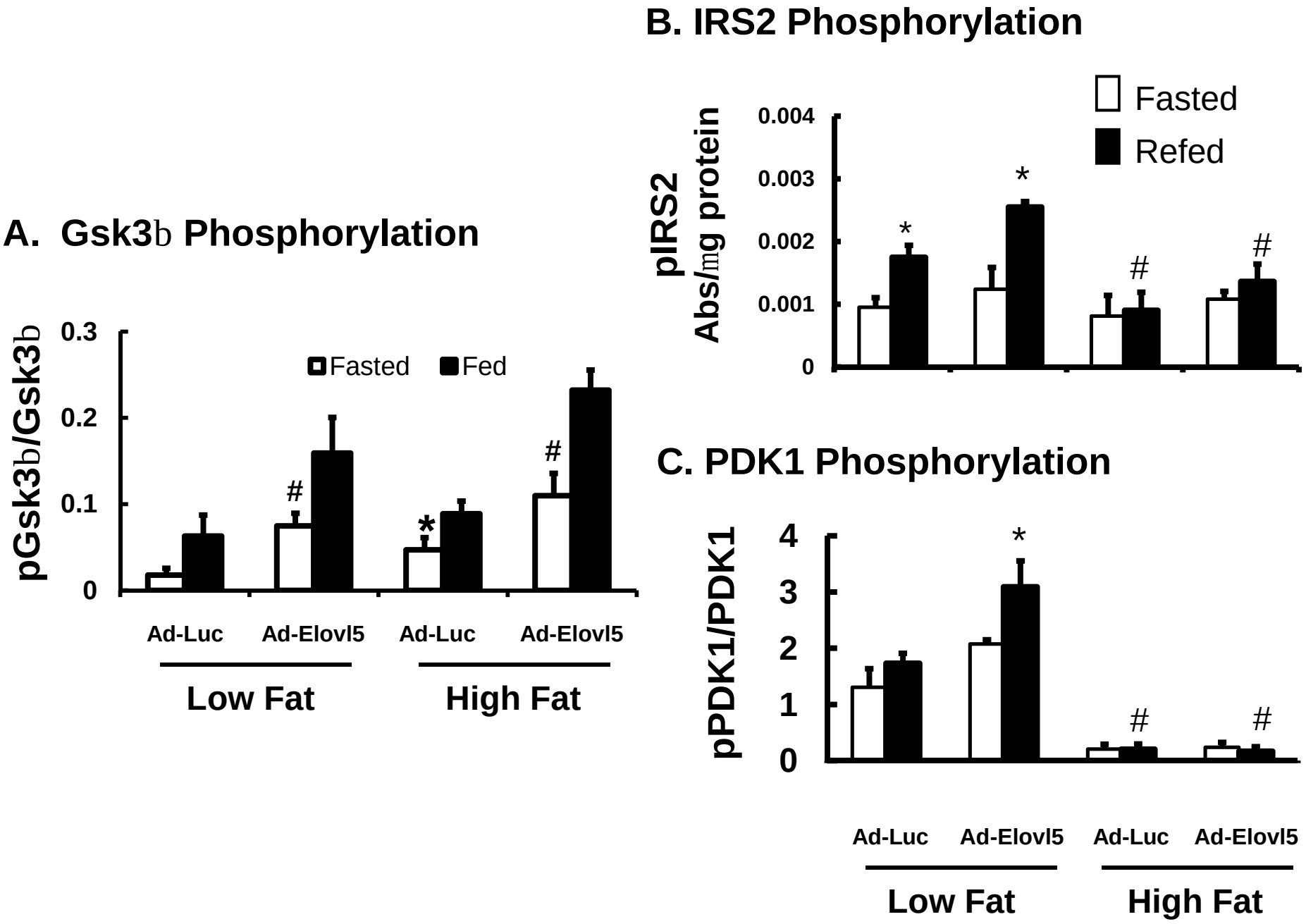
Figure 3S: Effect of diet and Elovl5 activity on hepatic stearoyl CoA desaturase (SCD1) mRNA and the nuclear content of SREBP1, ChREBP and MLX. Panel A. RNA was extracted from livers of fasted and refed mice fed the low or high fat diet and infected with either Ad-Luc or Ad-Elovl5, as described Table 2. Transcript abundance for SCD1 was assayed by qRT-PCR; primers are listed in Table 1. Results are normalized to the transcript abundance of cyclophilin. Results are presented as mRNA abundance, SCD1/cyclophilin. **Panels B-D.** The nuclear abundance of SREBP-1 (nSREBP1), ChREBP (nChREBP) and MLX (nMLX) was measured by immunoblotting and quantified using a LiCor Odyssey. The nuclear extracts were derived from fasted and refed mice maintained on the low and high fat diets and infected with Ad-Luc and Ad-Elovl5 as described in Table 2. Nuclear levels of SREBP1, ChREBP and MLX were normalized to the loading control, TBP. All results are the mean $\pm$ SD, 4 mice/group. White bars, fasted mice; Black bars, refed mice. *, $p<0.05$ fasted versus refed; #, $p<0.05$ low fat versus high fat, ANOVA.

Figure 4S: Comparison of fatty acid composition of total liver and the endoplasmic reticulum (microsomes). Fatty acid composition of mouse liver (**A**) and endoplasmic reticulum (**B**) from fasted mice maintained on the low and high fat diets was measured (Methods). Results for liver lipids are copied from Fig. 4. Microsomes were prepared as described and lipids were extracted, saponified, converted to fatty acid methyl esters & quantified by gas chromatography (Methods). Results are expressed as Fatty Acid Mole%, mean $\pm$ SD, 4 mice/group.

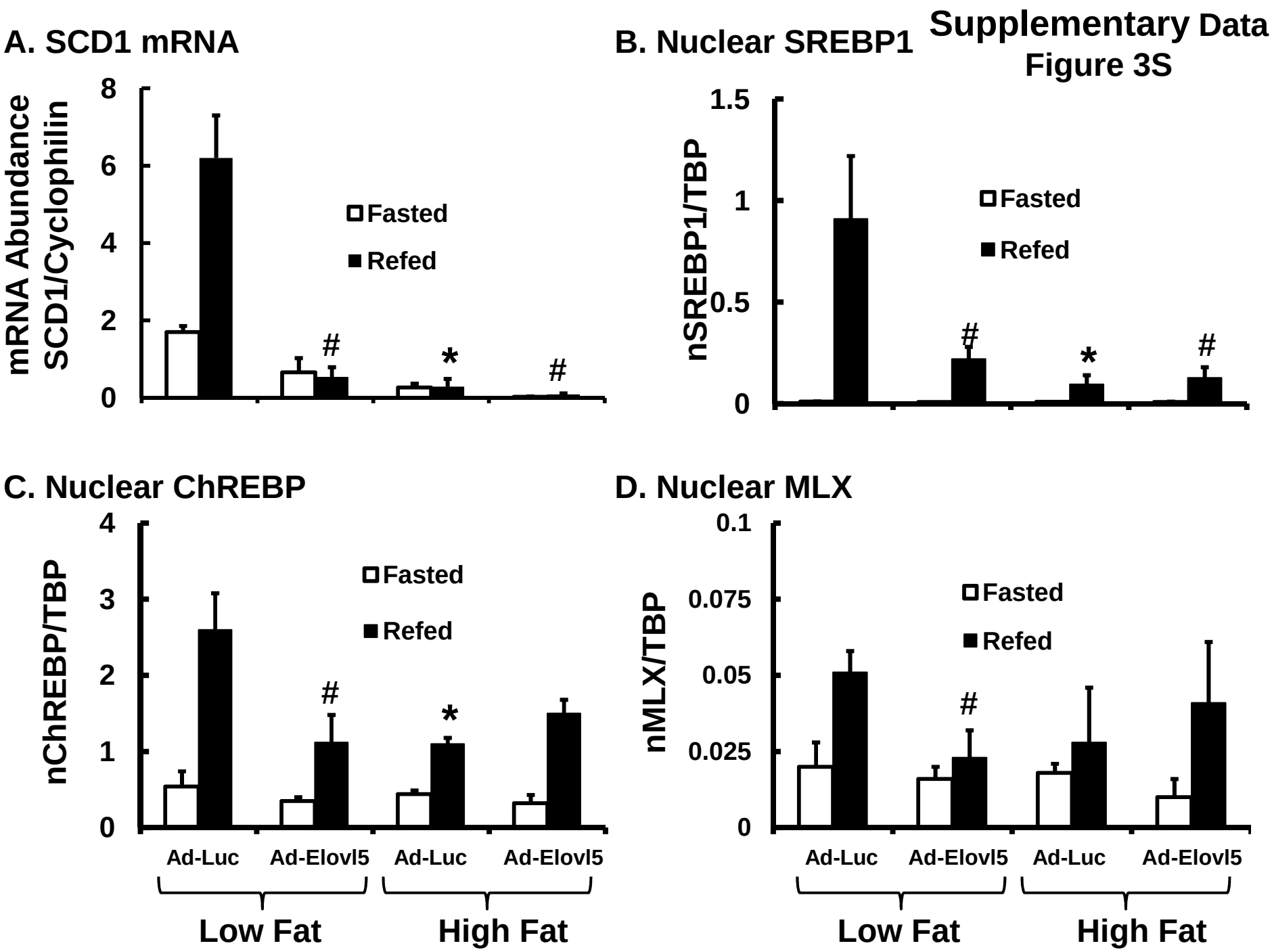
Supplementary Data: Figure 1S



Supplementary Data: Figure 2S



Supplementary Data
Figure 3S



Supplementary Data
Figure 4S