Supplemental Table 1. Western blot antibodies and their source and dilutions.

Antibody	Species	Dilution	Source	Catalog No.
β-actin-HRP	mouse	1:25,000	Sigma Aldrich	A3854
KEAP1	rabbit	1:2,000	Protein Tech	10503-2-AP
LC3	rabbit	1:500	Cell Signaling	2775S
P62	rabbit	1:10,000	Abcam	Ab109012
PPAR α	mouse	1:100	Santa Cruz	Sc-398394
HRP	rabbit	1:80,000	Sigma Aldrich	A0545
HRP	mouse	1:10,000	Sigma Aldrich	A-9044

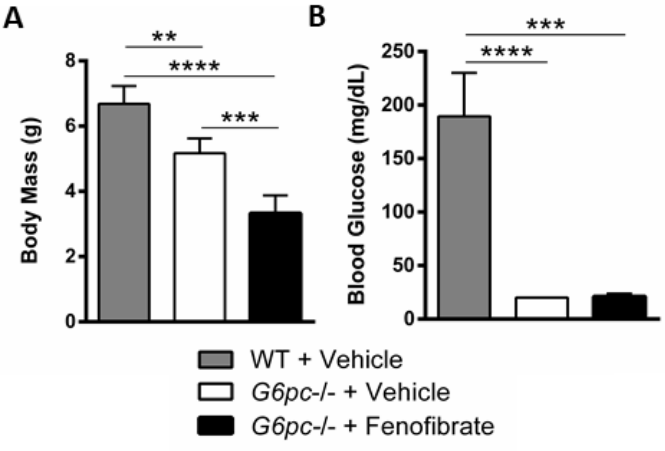
Supplemental Table 2. qPCR primers sequences.

Gene	FWD Primer	REV Primer
Acadl	GGGAATGAAAGCTCAGGACA	AGAATCCGCATTAGCTGCAT
Acadvl	CTACTGTGCTTCAGGGACAAC	CAAAGGACTTCGATTCTGCCC
Acadm	AGGTTTCAAGATCGCAATGG	CATTGTCCAAAAGCCAAACC
Acox1	TCGAAGCCAGCGTTACGAG	ATCTCCGTCTGGGCGTAGG
Actin	AGAGGGAAATCGTGCGTGAC	CAATAGTGATGACCTGGCCGT
Bax	AGCAAACTGGTGCTCAAGGC	CCACAAAGATGGTCACTGT
Bcl-2	GTGGTGGAGGAACTCTCA	GTTCCACAAAGGCATCCCA
Beclin1	GGCCAATAAGATGGGTCTGA	GCTGCACACAGTCCAGAAAA
Cas3	TGGTGATGAAGGGGTCATTTATG	TTCGGCTTTCCAGTCAGACTC
Cas8	GGAAACAAGCTGGTAGCTGACA	CCTGGGTCAACACAAGATGCT
Cpt2	CAGCACAGCATCGTACCCA	TCCCAATGCCGTTCTCAAAAT
Dpp3	TGAAGAAGAGTACCAGGCAT	GACTCTCAGAACCTCAGTGC
Fas	ATCCTGGAACGAGAACACGATCT	AGAGACGTGTCACTCCTGGACTT
Hadha	AGCAACACGAATATCACAGGAAG	AGGCACACCCACCATTTTGG
Hadhb	TGAATATGCACTGCGTTCTCAT	CCTTTCCTGGTACTTTGAAGGG
Keap-1	GGCAGGACCAGTTGAACAGT	GGGTCACCTCACTCCAGGTA
Lc3-b	CAGTGATTATAGAGCGATACAA	GCCGTCTGATTATCTTGATG
Nqo1	GGAGGTACTCGAATCTGACCT	CCACAGAGAGGCCAAACTTG
Nrf2	CTCGCTGGAAAAAGAAGTG	CCGTCCAGGAGTTCAGAGG
p21	GACAAGAGGCCCAGTACTTC	GCTTGGAGTGATAGAAATCTGTC
p53	GAGCTGAATGAGGCCTTGGA	CTGAGTCAGGCCCTTCTGTCTT
p62	AAGATAGCCTTGGAGTCG	TGGAGTTCACCTGTAGATG
Pcca	TTCATACCAATGCCTAGTGGTGT	GACAGCCTCATCCGCCATTTT
Pccb	GCGGCGATTAGGATTCGGG	TGCGCTCTTTAACTGAAACCG
Ppar-b/d	TTGAGCCCAAGTTCGAGTTTG	CGGTCTCCACACAGAATGATG
Ppar-g	TGTGGGGATAAAGCATCAGGC	CCGGCAGTTAAGATCACACCTAT
Ppar-α	TCGGCGAACTATTCGGCTG	GCACTTGTGAAAACGGCAGT
Ptma	GCTGAGGATGATGAGGATGAC	GGAAGTGGAGGGTGAATAGG
Scd1	AGTTCCGCCACTCGCCTAC	GATAGTCAGTTGCTCGCCTCAC
Shp	CAGGTCGTCCGACTATTCTG	ACTTCACACAGTGCCCAGTG
Slc25a20	GACGAGCCGAAACCCATCAG	AGTCGGACCTTGACCGTGT

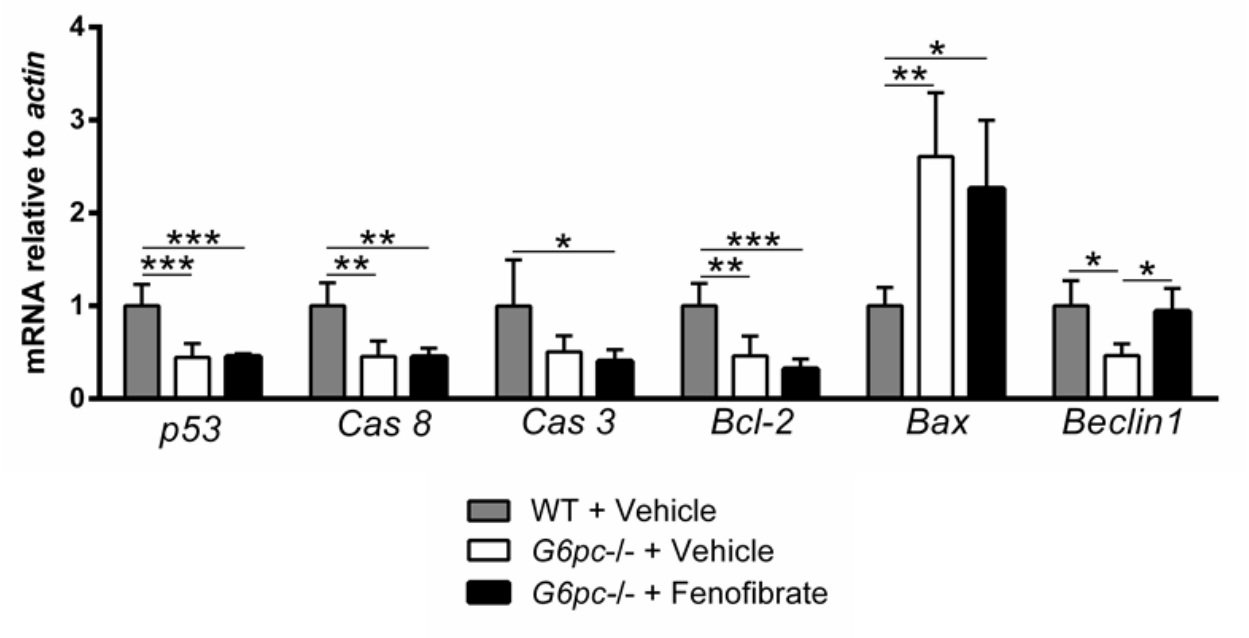
Supplemental Table 3. Plasma acylcarnitines in wild-type and GSD Ia mice treated with vehicle or fenofibrate. Data shows acylcarnitines concentrations in the plasma ± SEM. Wild-type vehicle n=5. GSD Ia vehicle n=4. GSD Ia fenofibrate n=5. Statistics and direction on change shown in columns 5 and 6. Affect WT vs. GSD Ia compares WT vehicle and GSD Ia vehicle groups. Affect fenofibrate compares GSD Ia vehicle and fenofibrate groups. *p < 0.05, ** p < 0.01, *** p < 0.001, **** p < 0.0001 from one-way ANOVA and Tukey's multiple comparison test.

	WT, Vehicle	GSD Ia, Vehicle	GSD Ia, Fenofibrate	Effect WT vs. GSD Ia	Effect fenofibrate
Total Acyl	17.174 ± 0.559	25.08 ± 3.241	26.374 ± 6.882	↑ ***	↑ ***
C2	13.96 ± 0.50	13.5 ± 0.775	17.458 ± 5.258	NS	NS
C3:1	0 ± 0	0.02 ± 0.005	0.004 ± 0.004	NS	NS
C3	0.314 ± 0.042	0.52 ± 0.028	0.322 ± 0.022	↑ **	↓ **
C4	0.422 ± 0.051	0.3 ± 0.034	0.266 ± 0.079	NS	NS
C5:1	0.002 ± 0.002	0 ± 0.003	0.002 ± 0.002	NS	NS
C5	0.25 ± 0.029	0.26 ± 0.073	0.168 ± 0.015	NS	NS
C4-OH	0.106 ± 0.006	0.12 ± 0.013	0.206 ± 0.134	NS	NS
C6	0.046 ± 0.019	0.08 ± 0.011	0.042 ± 0.015	NS	NS
C5-OH/ C3-DC	0.178 ± 0.025	0.08 ± 0.005	0.29 ± 0.056	NS	↑*
BZL	0 ± 0	0 ± 0	0 ± 0	NS	NS
C4-DC	0.112 ± 0.023	0.04 ± 0.003	0.262 ± 0.042	NS	↑ ***
C8:1	0.012 ± 0.002	0.02 ± 0.003	0.006 ± 0.004	NS	NS
C8	0.038 ± 0.002	0.02 ± 0.006	0.078 ± 0.051	NS	NS
C5-DC	0.066 ± 0.013	0.08 ± 0.006	1.02 ± 0.532	NS	NS
C6:1-DC	0.036 ± 0.002	0.04 ± 0.003	0.064 ± 0.024	NS	NS
C6-DC	0.076 ± 0.004	0.1 ± 0.011	0.136 ± 0.029	NS	NS
C10:3	0 ± 0	0 ± 0	0 ± 0	NS	NS
C10:2	0 ± 0	0 ± 0.003	0.004 ± 0.004	NS	NS
C10:1	0.014 ± 0.002	0.02 ± 0.003	0.01 ± 0.004	NS	NS
C10	0.056 ± 0.014	0.04 ± 0.011	0.11 ± 0.038	NS	NS
C7-DC	0.08 ± 0.021	0.16 ± 0.007	0.248 ± 0.110	NS	NS
C8:1- DC	0.024 ± 0.004	0.02 ± 0.003	0.024 ± 0.004	NS	NS
C8-DC	0.022 ± 0.002	0.04 ± 0.003	0.042 ± 0.015	NS	NS
C12:1	0.012 ± 0.002	0.02 ± 0.004	0.01 ± 0.004	↑ *	↓**
C12	0.076 ± 0.007	0.22 ± 0.095	0.076 ± 0.007	↑ ***	↓ ***
C12-OH/C10-DC	0.012 ± 0.002	0.04 ± 0.003	0.04 ± 0.013	NS	NS
C14:2	0.018 ± 0.002	0.04 ± 0.012	0.022 ± 0.005	↑ **	↓ **
C14:1	0.048 ± 0.004	0.2 ± 0.044	0.082 ± 0.016	↑ ****	↓ ****
C14	0.208 ± 0.006	0.94 ± 0.312	0.42 ± 0.050	↑ ****	↓ ***
OH-C14:1	0.006 ± 0.002	0.04 ± 0.008	0.02 ± 0.000	↑ ****	↓ ***
C14-OH/ C12-DC	0.012 ± 0.002	0.02 ± 0.004	0.016 ± 0.004	↑ *	↓ *
C16:2	0.016 ± 0.002	0.12 ± 0.019	0.052 ± 0.010	↑ ****	↓ ****
C16:1	0.048 ± 0.006	0.32 ± 0.085	0.232 ± 0.038	↑ ****	↓ **
C16	0.344 ± 0.012	2.74 ± 0.597	1.64 ± 0.166	↑ ****	↓ **
C16-OH	0.046 ± 0.005	0.22 ± 0.048	0.088 ± 0.005	↑ ****	↓ ****
C18:2	0.12 ± 0.016	0.8 ± 0.174	0.496 ± 0.059	↑ ****	↓ ***
C18:1	0.186 ± 0.021	1.84 ± 0.433	1.274 ± 0.196	↑ ****	↓ **

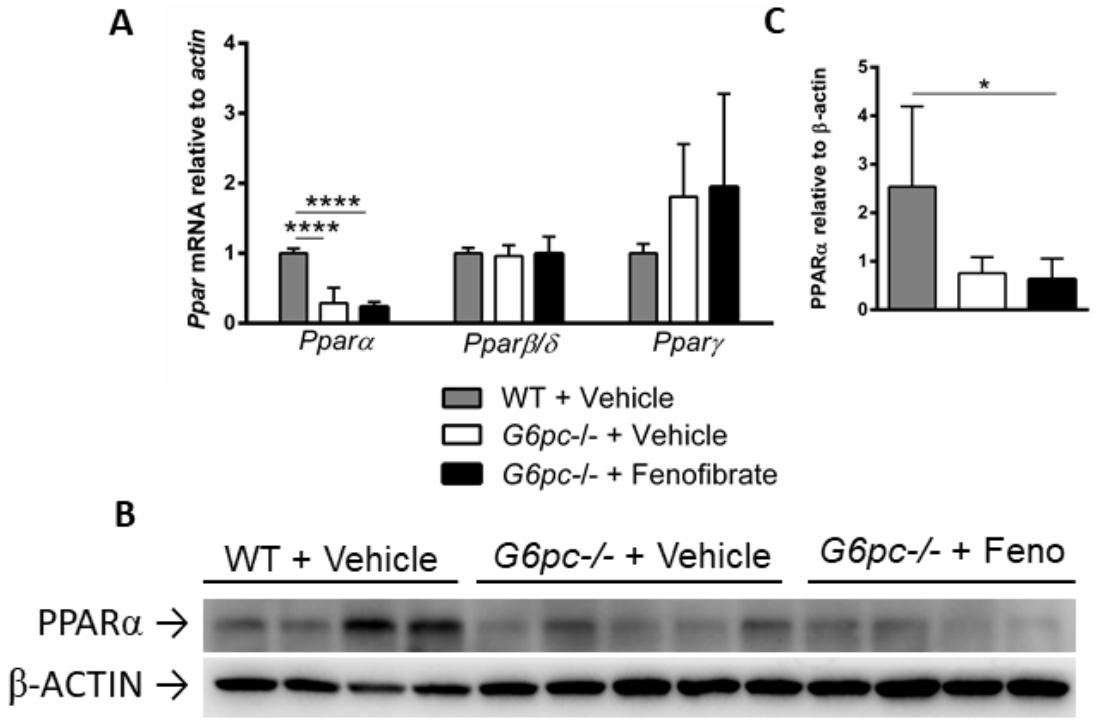
C18	0.084 ± 0.005	1.38 ± 0.462	0.804 ± 0.062	↑ ****	↓ ***
C18:2-OH	0.01 ± 0.003	0.02 ± 0.011	0.016 ± 0.004	↑ ****	↓ ***
C18:1-OH	0.012 ± 0.004	0.06 ± 0.013	0.032 ± 0.005	↑ ****	↓ ***
C18-OH	0.01 ± 0.003	0.16 ± 0.037	0.066 ± 0.014	↑ ****	↓ ***
C16-DC	0.01 ± 0.003	0.16 ± 0.037	0.066 ± 0.014	↑ ****	↓ ***
C20:4	0.062 ± 0.016	0.22 ± 0.023	0.09 ± 0.018	↑ ****	↓ ****
C20	0.008 ± 0.004	0.02 ± 0.018	0.034 ± 0.006	↑ **	↓ *
C18:1-DC	0.004 ± 0.002	0.02 ± 0.000	0.014 ± 0.004	↑ **	NS
C18-DC/ C20-OH	0.008 ± 0.004	0.02 ± 0.003	0.022 ± 0.008	NS	NS
C22	0 ± 0	0 ± 0.006	0 ± 0	NS	NS



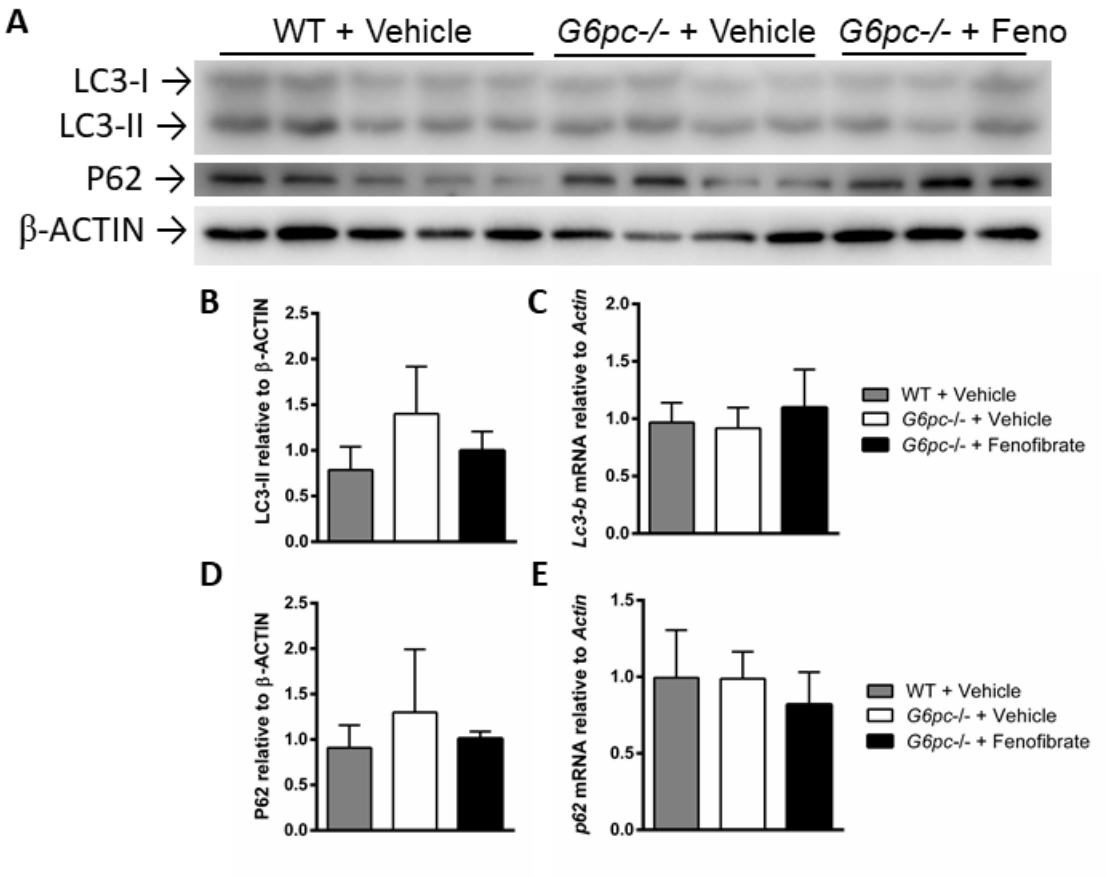
Supplemental Figure 1. A) Body mass (g) (n=4-5). B) Blood glucose measured by glucometer. Low threshold is reported at 25 mg/dL. (n=4-5). One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.



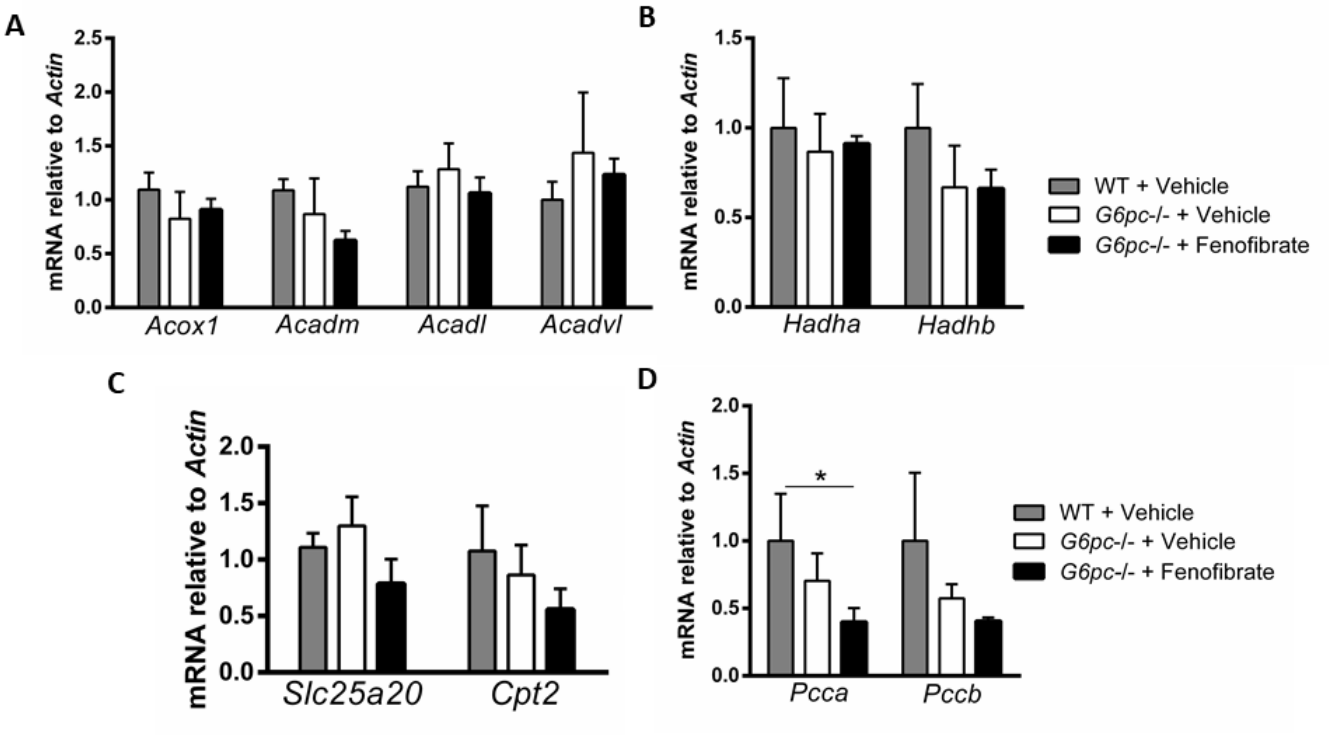
Supplemental Figure 2. Most apoptosis associated transcripts are not significantly affected by fenofibrate. A) Apoptosis associated transcripts. One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.



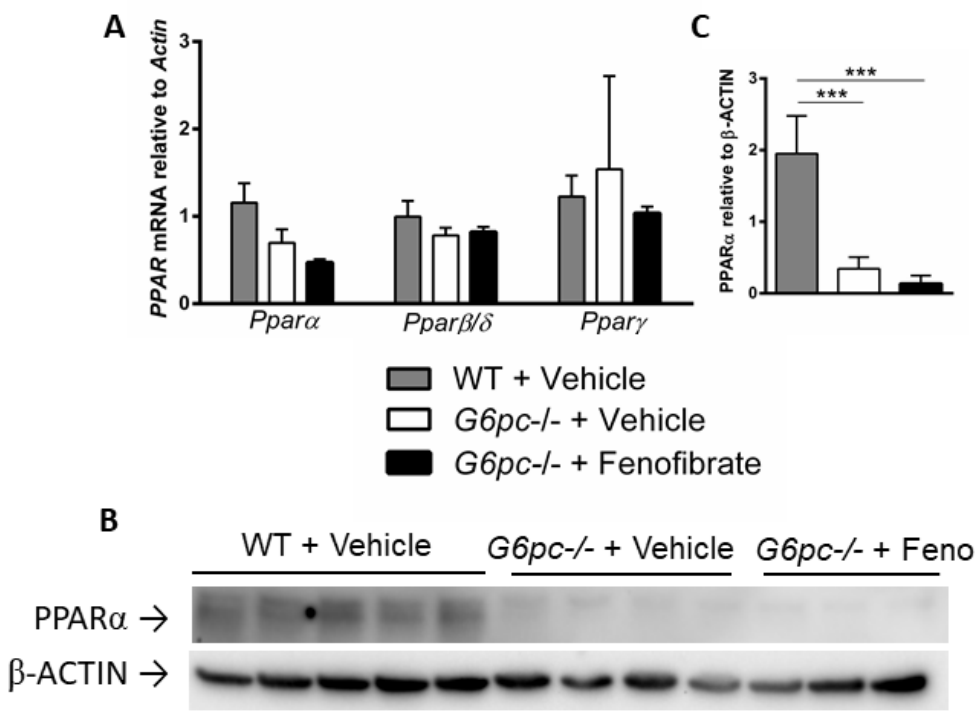
Supplemental Figure 3. Hepatic PPAR transcripts and protein. A) All *Ppar* subunit transcripts (n=4-5). B) Western blot of PPARα with β-ACTIN loading control (n=4-5). C) Quantification of western blot in B normalized to loading control. One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.



Supplemental Figure 4. Fenofibrate did not significantly affect renal autophagy. A) Western blot of LC3 and P62 with β-ACTIN loading control. Each lane represents a biological replicate (n=3-5). B) Quantification of renal LC3-II protein from A relative to β-ACTIN. C) Renal *LC3* transcripts relative to *actin*. D) Renal P62 protein from A relative to β-ACTIN. E) Renal *p62* transcripts relative to *actin*. One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.



Supplemental Figure 5. Transcripts implicated in β-oxidation are not significantly changed in the kidney by fenofibrate. A) Acyl-CoA dehydrogenase transcripts (n=3-5). B) MTFP subunit transcripts, *Hadha* and *Hadhb* (n=3-5). C) Transcripts of *Cpt2* and *Slc25a20* implicated in CPTII/CACT deficiencies (n=3-5). D) Succionate metabolism transcripts, *Pcca* and *Pccb* (n=3-5). One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.



Supplemental Figure 6. Renal PPAR transcripts and protein. A) All *Ppar* subunit transcripts (n=4-5). B) Western blot of PPARα with β-ACTIN loading control (n=3-5). C) Quantification of western blot in B normalized to loading control. One-way ANOVA with Tukey's multiple comparison test was performed. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$.