SUPPLEMENTARY DATA

Mitochondrial targeted catalase protects against high fat diet-induced muscle insulin resistance by decreasing intramuscular lipid accumulation

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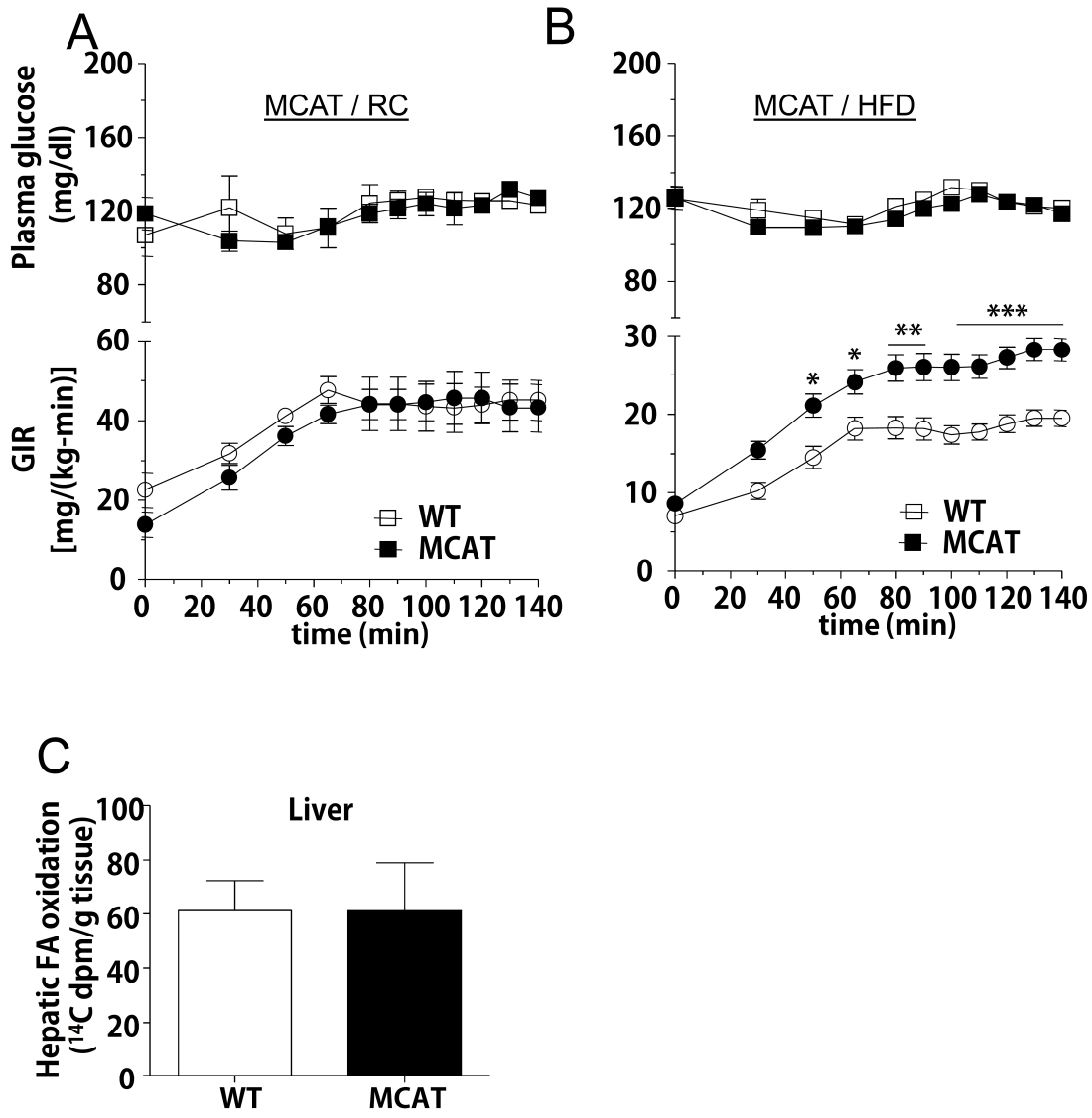
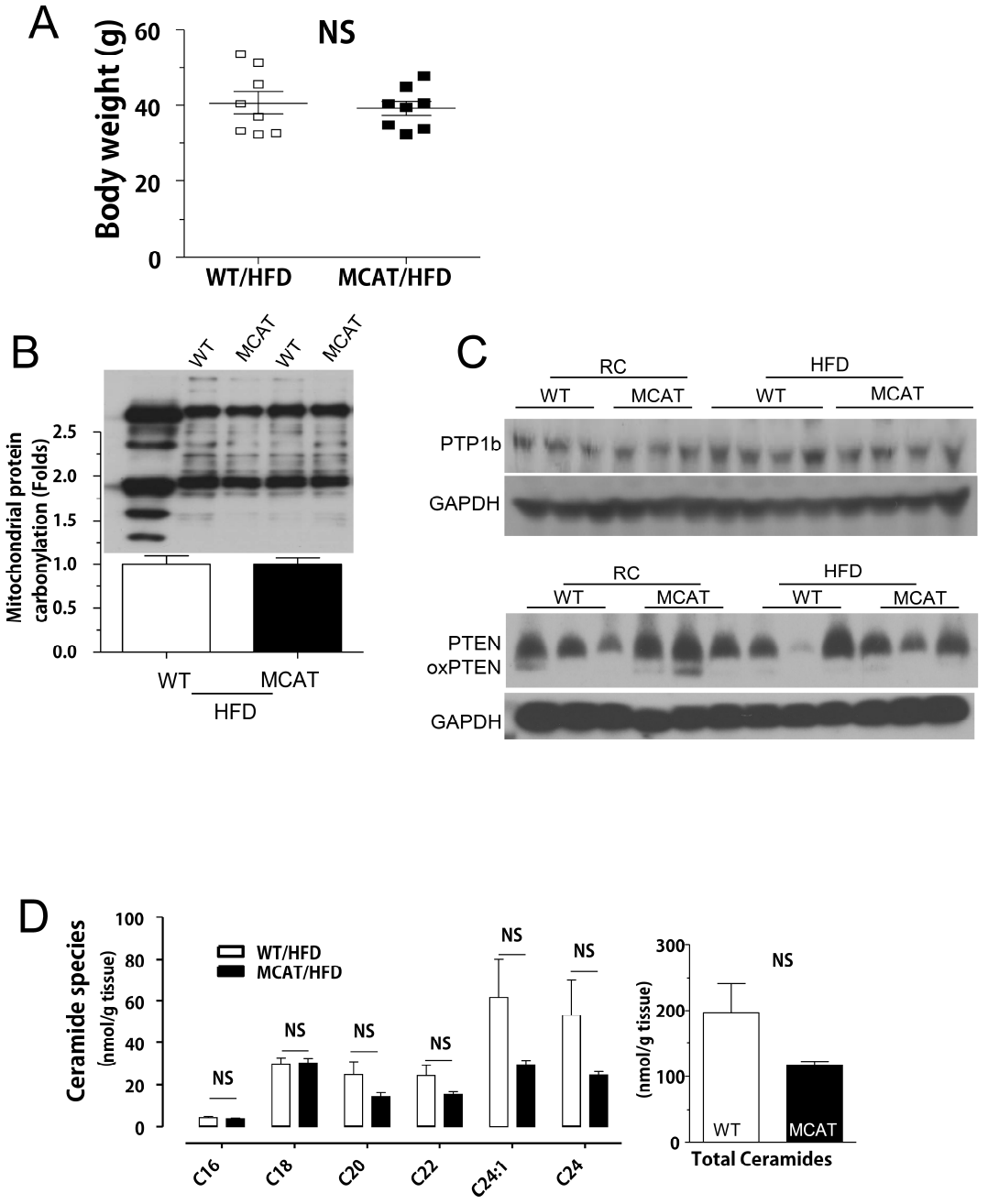
SUPPLEMENTARY DATA

Supplementary Figure S1. Body weight and Hyperinsulinemic-euglycemic clamp study in MCAT and WT mice. Body weight and age-matched animals fed regular chow or HFD and fasted overnight prior to hyperinsulinemic-euglycemic (HE) clamp study. Time-course plots of plasma glucose concentration and glucose infusion rate (GIR) in MCAT and WT mice during the HE clamp study on RC (A) and HFD (B). (C) Hepatic fatty acid oxidation measured by $^{14}CO_2$ production from [1- ^{14}C] oleic acid in MCAT and WT mice fed HFD for 6 weeks. Data are expressed as mean ± SEM. *P < 0.05, **P<0.01 and ***P < 0.001 by Two-Way ANOVA. NS, not significant.



SUPPLEMENTARY DATA

Supplementary Figure S2. Oxidative protein carbonylation in skeletal muscle mitochondria and protein expression of Ptp1b and Pten in quadriceps skelectal muscle of MCAT and WT mice. Animals fed high-fat diet (HFD) for 6 weeks and fasted 6 hours prior to take samples. (A) Body weight of MCT and WT mice after 6 weeks of HFD feeding. (B) Oxidative protein carbonylation in the isolated mitochondria from quadriceps skeletal muscle of MCAT and WT mice on HFD. (B) Protein expression of Ptp1b and Pten in quadriceps skeletal muscle of MCAT and WT mice on RC and HFD. (C) Individual and total ceramide species in gastrocnemius skeletal muscle of MCAT and WT mice on HFD. Data are expressed as mean ± SEM. NS, not significant.



SUPPLEMENTARY DATA

Supplementary Figure S3. Body composition and basal energy balance in MCAT and WT mice. Animals fed high-fat diet (HFD) for 5 weeks. (A) Body composition measured by ^{1}H-NMR in MCAT and WT mice on RC (left) and HFD (right) at the day start CLAMS monitoring. (B) Whole body oxygen consumption rate (VO_2), (C) whole body CO_2 production rate, (D) respiratory quotients (RQ), (E) energy expenditure and (F) food intake in MCAT and WT mice on RC (left) and HFD (right) measured by a comprehensive animal metabolic monitoring system. Data are expressed as mean ± SEM. *P < 0.05, **P<0.01 and ***P < 0.001 by Two-Way ANOVA.

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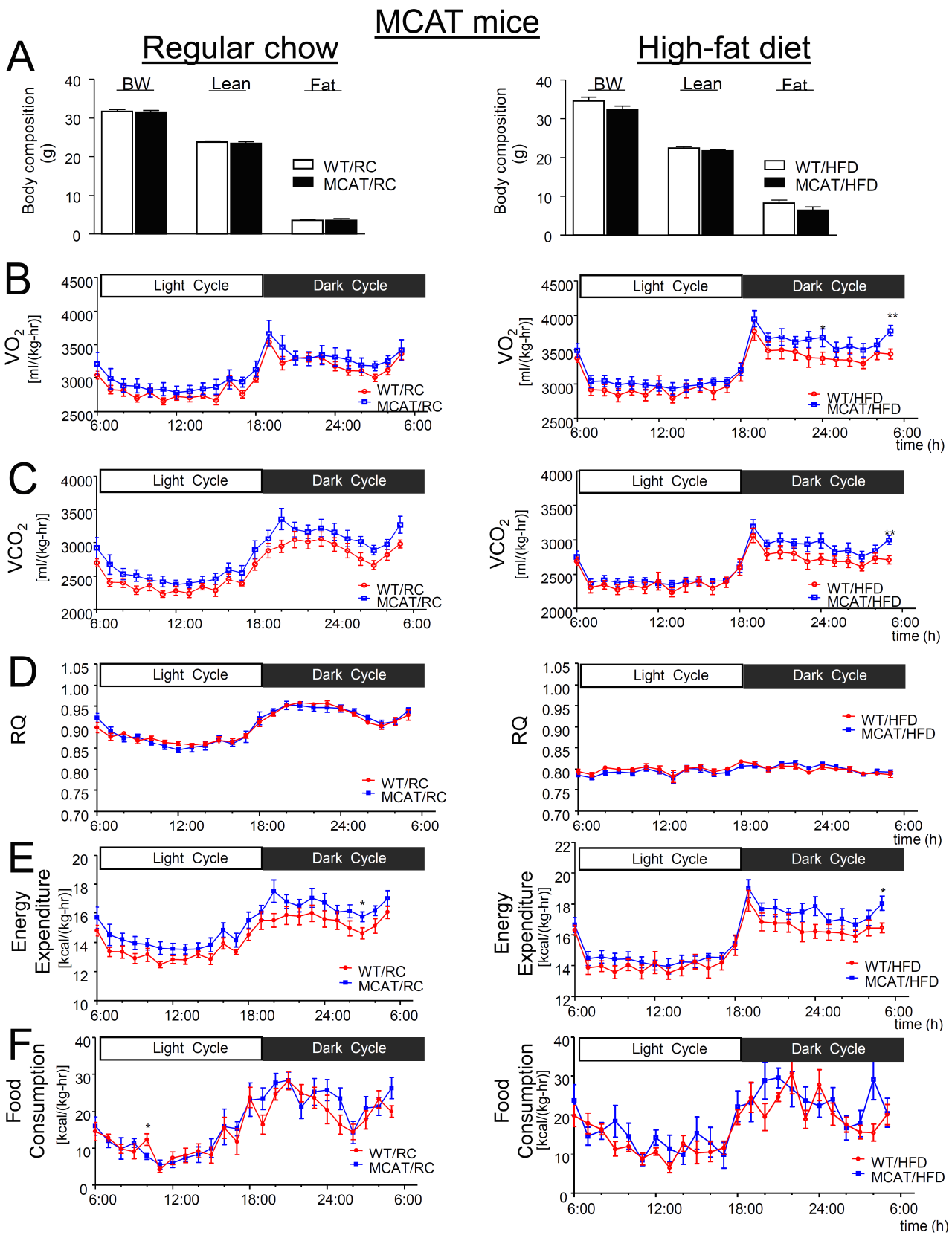
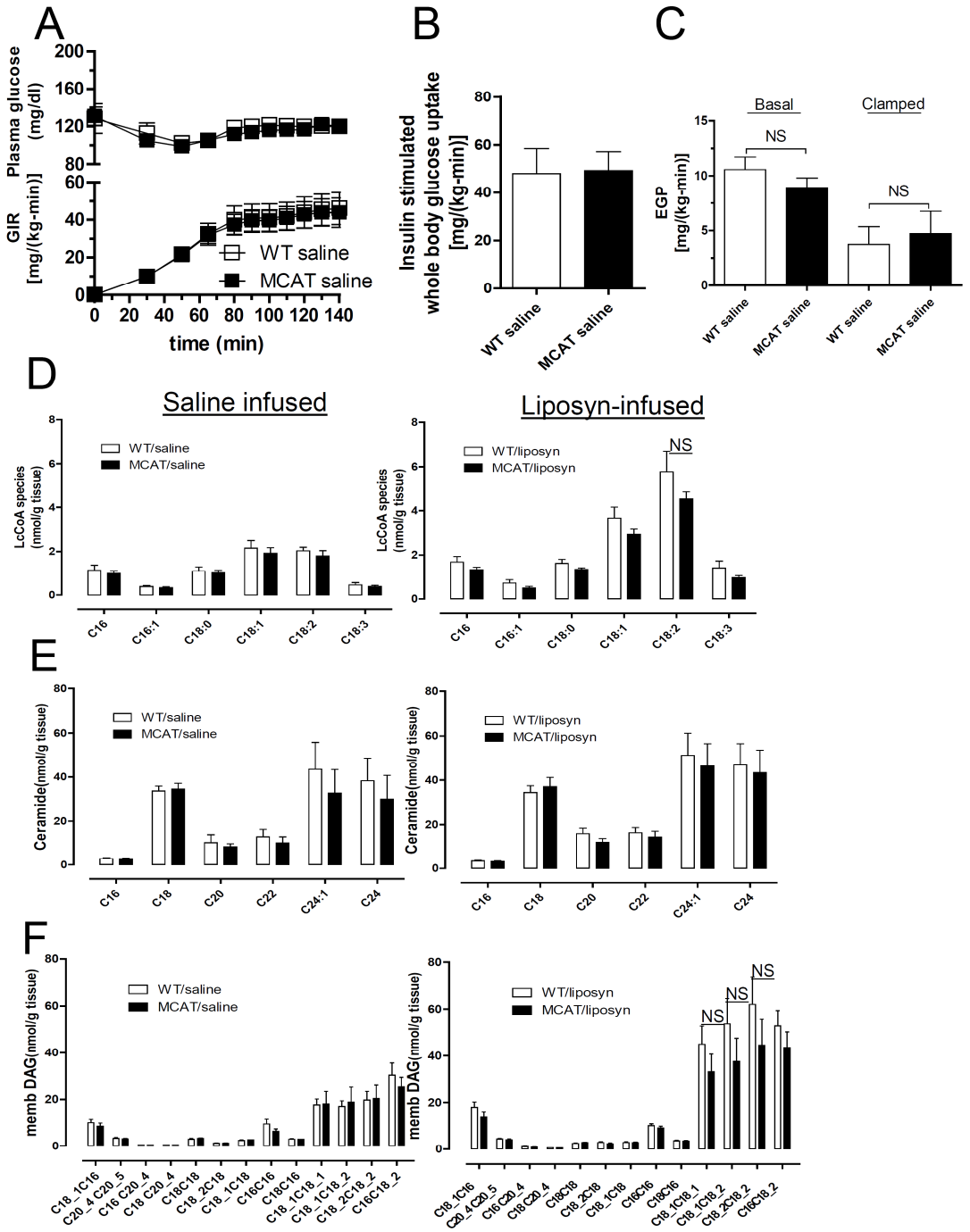


SUPPLEMENTARY DATA

Supplementary Figure S4. Saline infused hyperinsulinemic-euglycemic clamp study and individual intramuscular lipid species content in MCAT and WT mice.

Body weight and age-matched animals fed regular chow and fasted overnight prior to 4hr saline infusion, and then performed hyperinsulinemic-euglycemic (HE) clamp study. (A) Plasma glucose concentration and glucose infusion rate in MCAT and WT mice to maintain the euglycemia during the HE clamp study with [3mU/(kg-min)] insulin infusion. (B) Insulin stimulated whole body glucose uptake rate and (C) endogenous glucose production rate (EGP) in MCAT and WT mice (n=4) during the clamp study. (D-F) Individual intramuscular lipid species content in WT and MCAT mice after saline and liposyn infusion. (D) Intramuscular LcCoAs, (E) membrane diacylglyceride (DAG), (F) ceramides in gastrocnemius skeletal muscle after saline (n=4) and liposyn infusion (n=8 per group). Data are expressed as mean ± SEM. NS, not significant.



SUPPLEMENTARY DATA

Supplementary Table S1. Basal parameters of animals during hyperinsulinemic-euglycemic clamp studies.

Groups / Parameters	RC		HFD	
	WT (n=4)	MCAT (n=4)	WT (n=8)	MCAT (n=10)
Body weight (g)	33.02±0.66	32.68±0.67	36.83±0.93*	35.32±1.26
Body fat (%)	9.18±1.01	9.58±1.27	22.35±1.38***	21.50±1.71
Lean body mass (%)	73.63±1.00	73.33±1.18	61.92±1.85***	63.31±1.44
Fasting plasma glucose (mg/dl)	105.0±9.54	118.8±8.83	135.7±6.84	132.8±7.5
Fasting plasma insulin (μU/ml)	11.56±0.80	9.14±0.83	19.06±3.64	20.43±2.02
Fasting plasma NEFA (mg/dl)	1.24±0.05	1.04±0.06	1.62±0.32	1.43±0.27
Clamped plasma insulin (μU/ml)	82.3±5.87	76.1±10.13	105.0±8.68	112.7±8.85
Clamped plasma NEFA (mg/dl)	0.34±0.10	0.37±0.09	0.50±0.05	0.56±0.12

6 month-old male SOD2+/- and MCAT mice and each littermate control mice fed regular chow or high-fat diet for 6-week. Animals fasted overnight before the clamp studies. Data are expressed as mean values ± SEM. All parameters were not significantly different between genotypes under each diet condition. *P<0.05, **P<0.01, ***P<0.001 by unpaired Student's t-test compared to regular chow versus HFD. nd, not determined. RC, regular chow; HFD, high-fat diet; NEFA, nonesterified fatty acid.