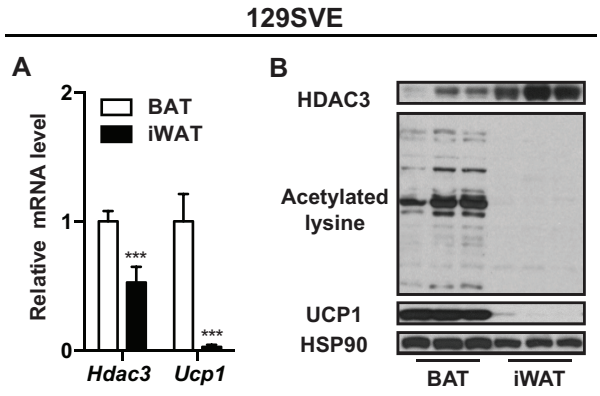
Supplemental Table 1. Characteristics of human donors

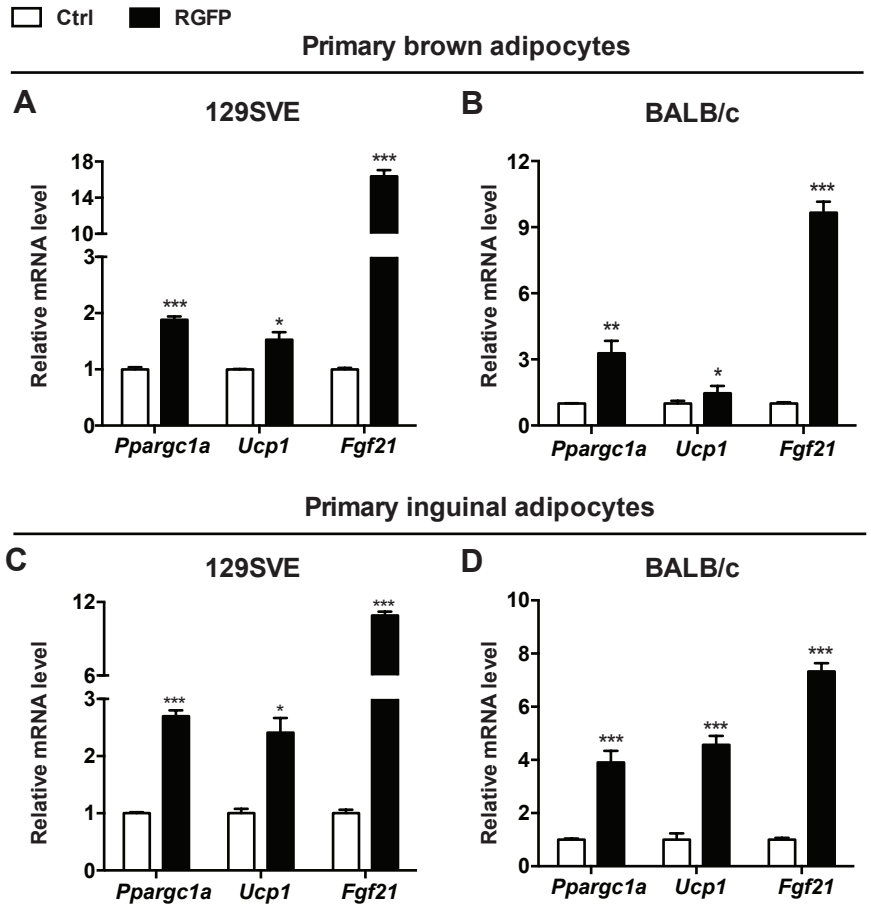
Subject	Gender	Age	Ethnicity	BMI	Tissue location
7	F	21	African American	25	Hips
13	F	31	African American	37.16	Abdomen, flanks

Supplemental Table 2. Primer sequences for real-time qPCR analysis

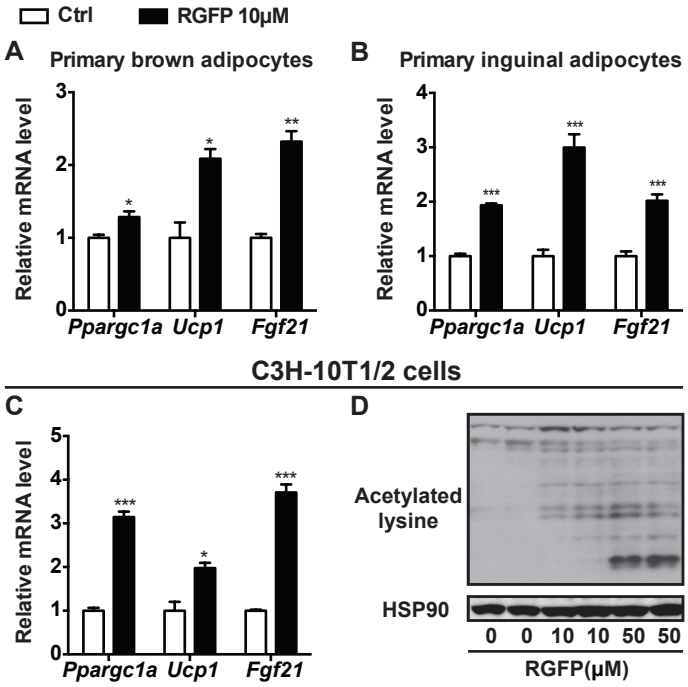
Gene	Forward primers (5'- 3')	Reverse primers (5'- 3')
m36B4 (Rplp0)	GAGACTGAGTACACCTTCCCAC	ATGCAGATGGATCAGCCAGG
mFgf21	GTGTCAAAGCCTCTAGGTTTCTT	GGTACACATTGTAACCGTCCTC
mHdac3	GCCAAGACCGTGGCGTATT	GTCCAGCTCCATAGTGGAAGT
mPpargc1a	TATGGAGTGACATAGAGTGTGCT	CCACTTCAATCCACCCAGAAAG
mPrdm16	GCACGGTGAAGCCATTCATATG	TCGGCGTGCATCCGCTTGTG
mUcp1	CTTTGCCTCACTCAGGATTGG	ACTGCCACACCTCCAGTCATT
hRPLP0	GCAGCATCTACAACCCTGAAG	CACTGGCAACATTGCGGAC
hFGF21	ATGGATCGCTCCACTTTGACC	GGGCTTCGGACTGGTAAACAT
hPPARGC1A	TCTGAGTCTGTATGGAGTGACAT	CCAAGTCGTTCACATCTAGTTCA
hUCP1	AGGTCCAAGGTGAATGCCC	GCGGTGATTGTTCCCAGGA



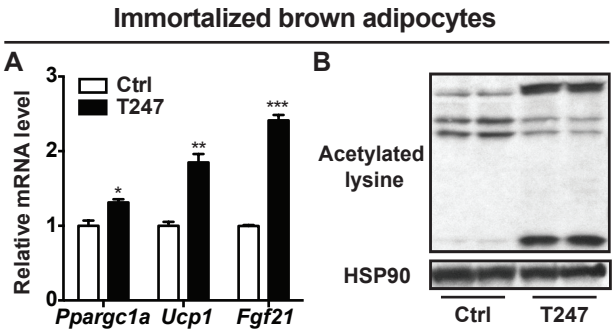
Supplemental Figure 1. HDAC3 protein levels are lower in BAT compared to iWAT in 129SVE mice. (A, B) Real-time qPCR analyses of *Hdac3* and *Ucp1* (A**,** n=6) and representative immunoblots of HDAC3, acetylated lysine, UCP1 and HSP90 as a loading control (B) in BAT and iWAT isolated from 129SVE mice housed at room temperature. Data are presented as mean ± SEM; ****P*<0.001.



Supplemental Figure 2: Pharmacological inhibition of HDAC3 promotes thermogenesis in primary adipocytes of multiple inbred wild type mouse strains. (A-D) Real-time qPCR analyses of thermogenic markers after treatment with vehicle control or 50 μM RGFP for 6 h in differentiated primary brown adipocytes isolated from 129SVE mice (A) or from BALB/c mice (B), and in differentiated primary inguinal adipocytes isolated from 129SVE mice (C) or from BALB/c mice (D). Data are presented as mean ± SEM; n=3, **P*<0.05, ***P*<0.01, ****P*<0.001.



Supplemental Figure 3: Pharmacological inhibition of HDAC3 increases thermogenic gene expression and acetylated lysine in adipocytes. (A-C) Real-time qPCR analyses of thermogenic markers after treatment with vehicle control or 10 μM RGFP for 6 h in differentiated primary brown adipocytes (A) and primary inguinal adipocytes (B) isolated from 129SVE mice, and in differentiated C3H-10T1/2 cells (C). (A-C, n=3). (D) Representative immunoblots of acetylated lysine and HSP90 as a loading control in differentiated C3H-10T1/2 cells treated with vehicle control, 10 or 50 μM RGFP for 24 h. Data are presented as mean ± SEM; **P*<0.05, ***P*<0.01, ****P*<0.001.



Supplemental Figure 4: Selective HDAC3 inhibitor T247 increases thermogenic gene expression and acetylated lysine in adipocytes. Real-time qPCR analyses of thermogenic genes after treatment with vehicle (Ctrl) or 10 μM T247 for 6 h (A, n=3), representative immunoblots of acetylated lysine and HSP90 as a loading control after treatment with Ctrl or 10 μM T247 for 24 h (B) in immortalized brown adipocytes. Data are presented as mean ± SEM; **P*<0.05, ***P*<0.01, ****P*<0.001.