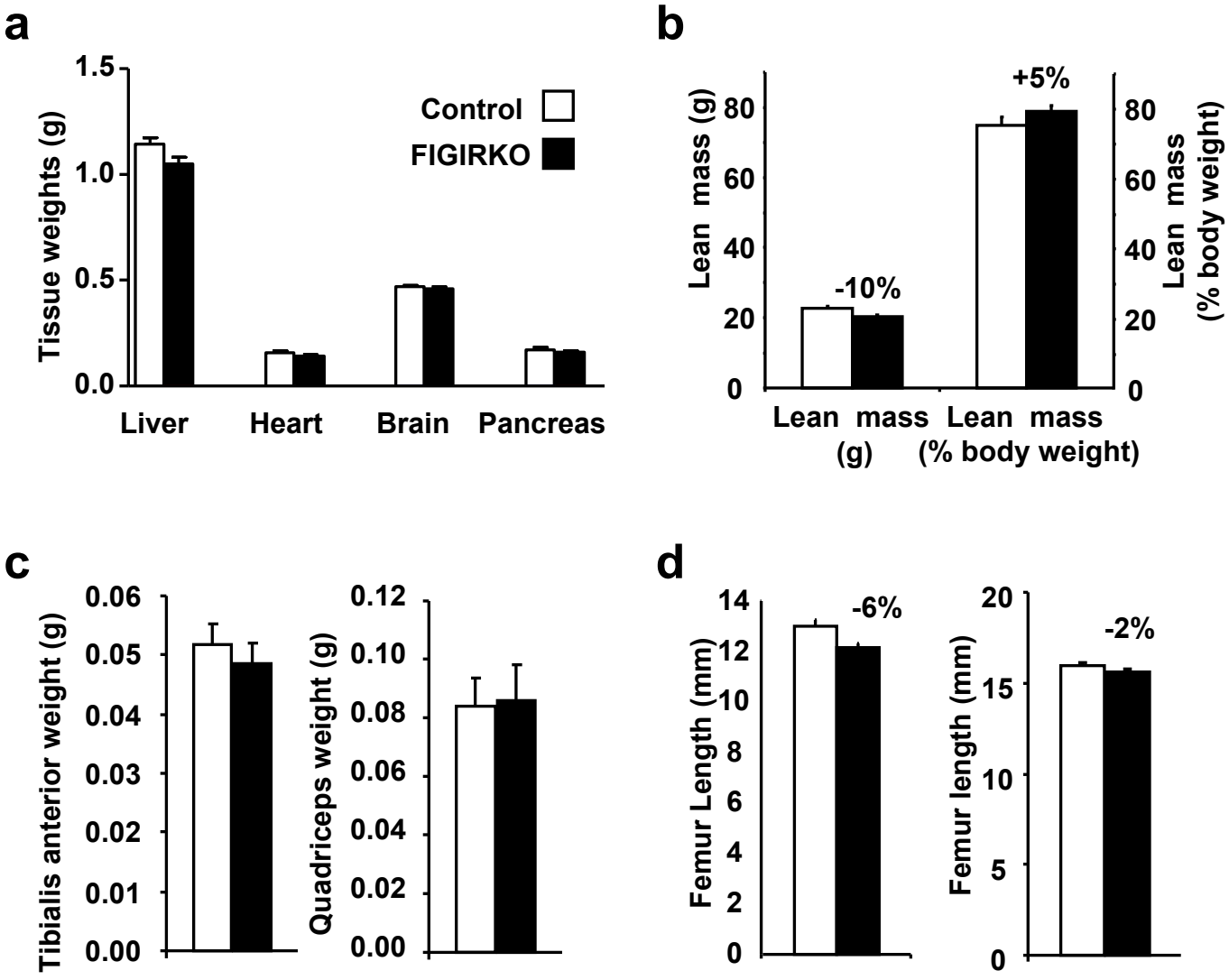
Supplementary Figure S1



Supplementary Figure S1: Tissue weights and bone length of 4 month old control and FIGIRKO male mice

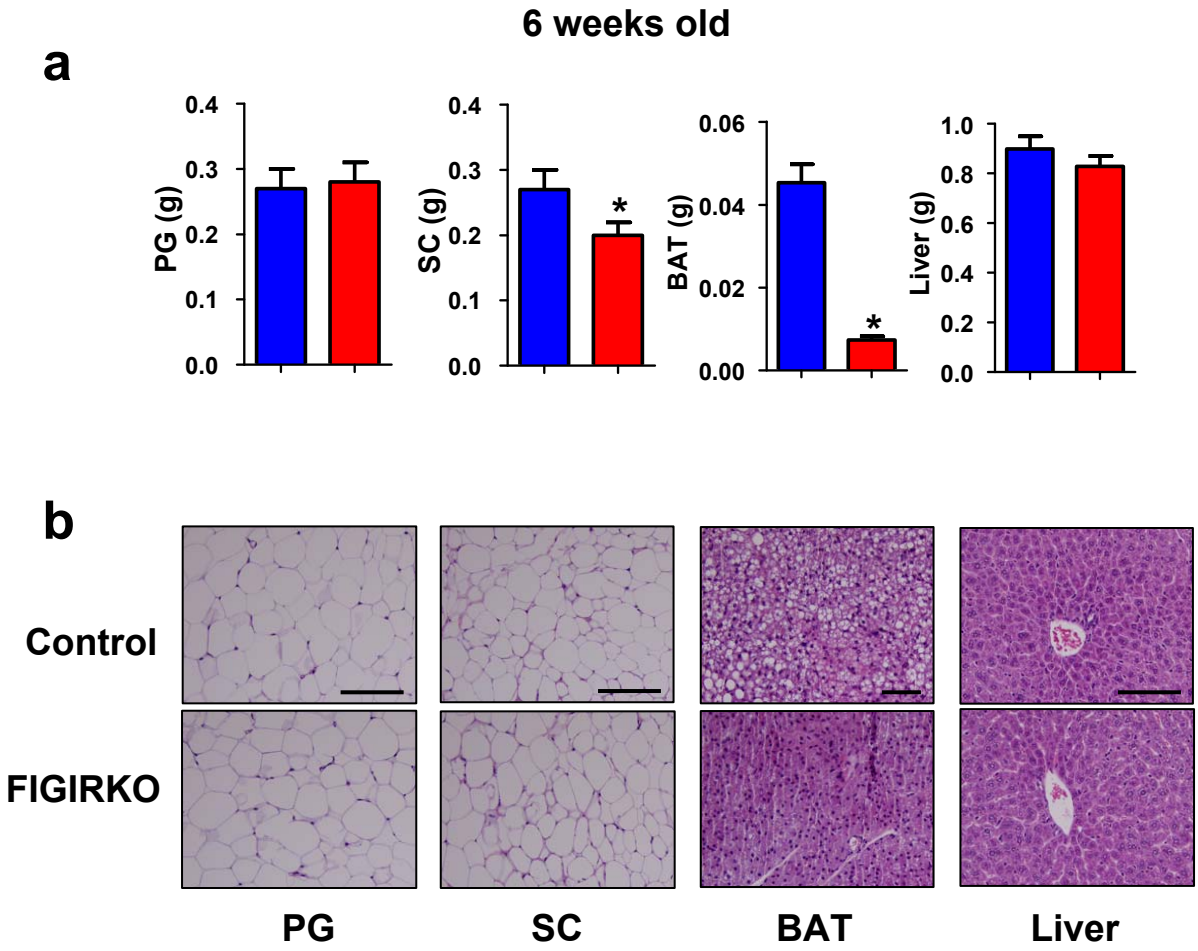
(**a**) Liver, heart, brain and pancreas weight from 4 months old control and FIGIRKO male mice. Results are mean ± SEM of 15 animals/group for liver and 6 animals/group for heart, brain and pancreas.

(**b**) Lean mass measured by DEXA scans from 4 months old control and FIGIRKO male mice. Results are mean ± SEM of 6 animals/group.

(**c**) Skeletal muscle weights from 4 months old control and FIGIRKO male mice. Results are mean ± SEM of 10 animals/group.

(**d**) Femur length measured by DEXA scans (left, n=6) or by dissection (right, n=10) from 4 months old control and FIGIRKO male mice.

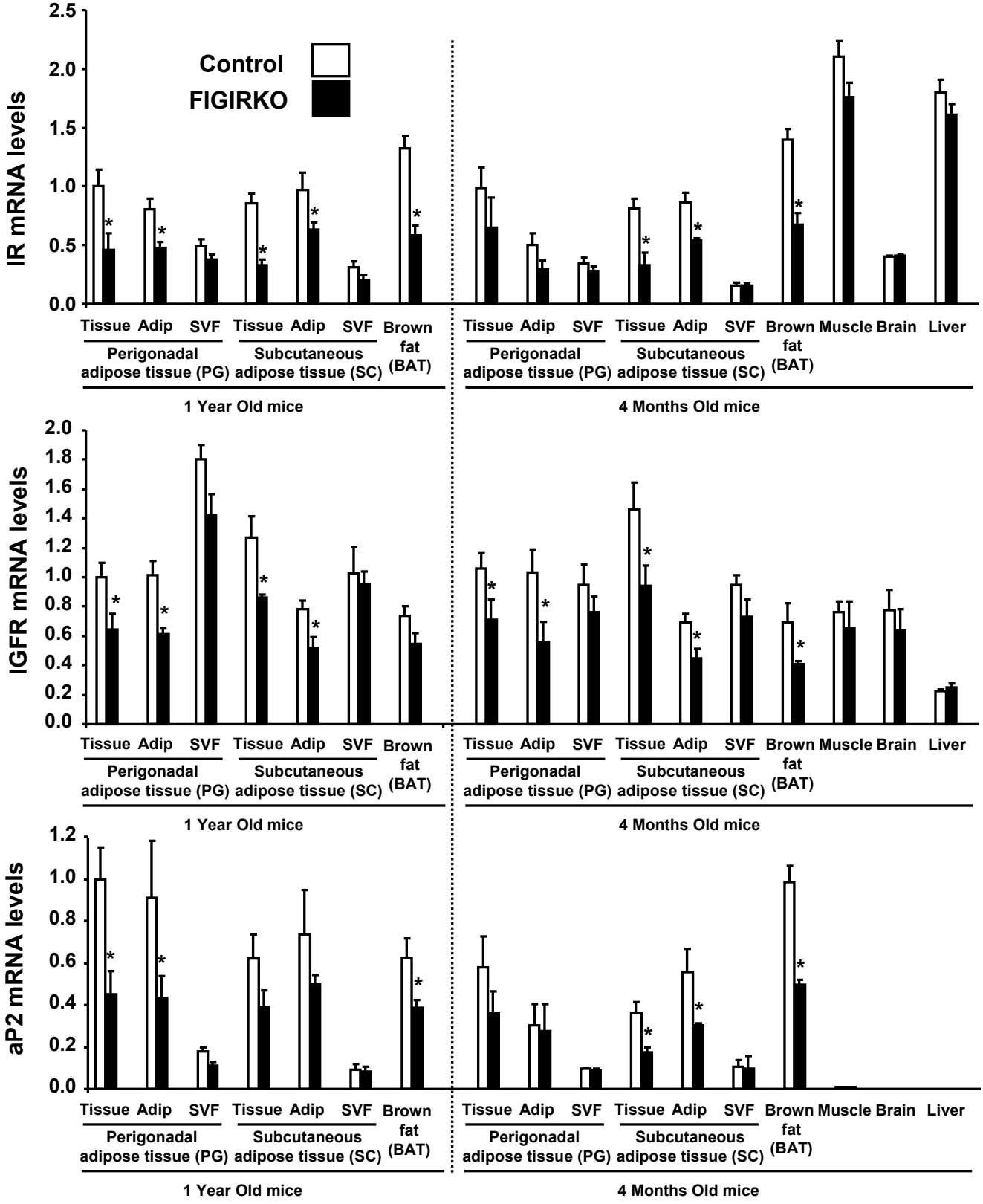
Supplementary Figure S2



Supplementary Figure S2: Body weight, tissue weights and histology of 6 week-old control and FIGIRKO male mice

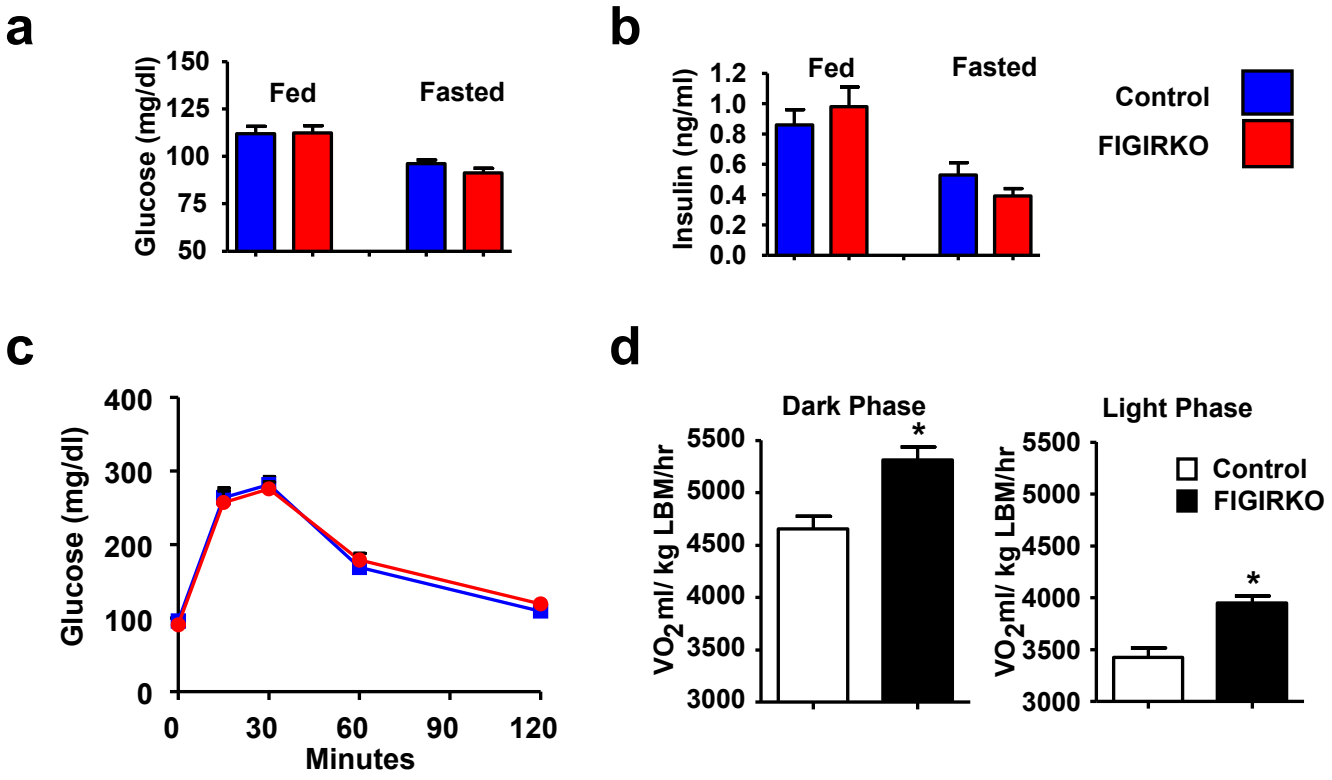
(**a**) Perigonadal (PG), inguinal subcutaneous (SC), brown adipose tissue (BAT) and liver weights in 6 weeks old control and FIGIRKO male mice. Results are mean ± SEM of 6 animals/group.
(**b**) Hematoxylin and eosin stained sections of adipose tissues and liver from 6 weeks old control and FIGIRKO male mice. Scale bar = 100μm.
Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice.

Supplementary Figure S3



Supplementary Figure S3: IR and IGF1R expression in control and FIGIRKO tissues
IR, IGF1R and aP2 mRNA abundance was measured by real time PCR in intact adipose tissues, isolated adipocytes and stroma vascular fraction as well as skeletal muscle (gastrocnemius), brain and liver from 4 months old or 1 year old male control and FIGIRKO mice on a standard chow diet. Results are mean ± SEM of 5-6 animals/group. Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice.

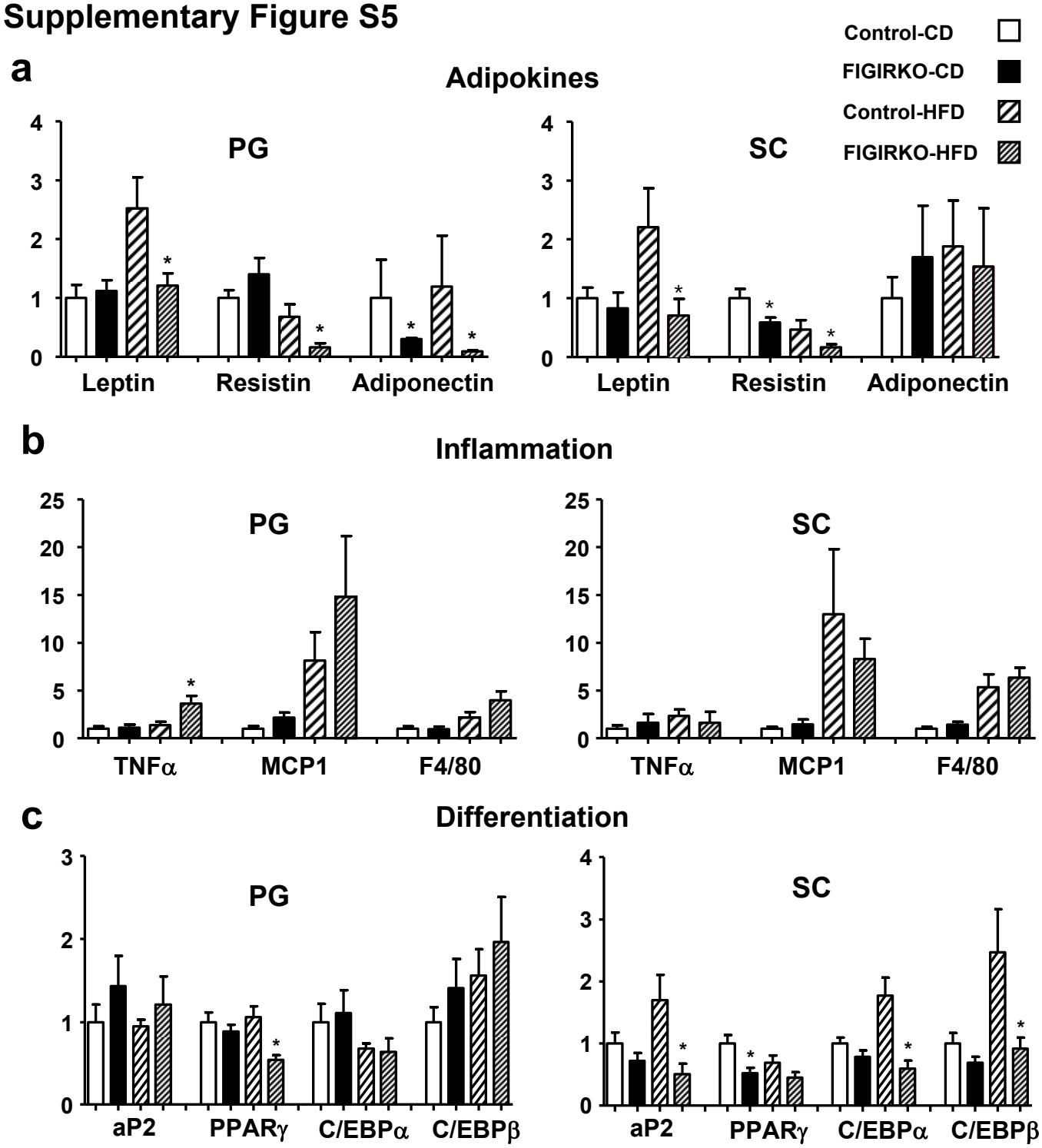
Supplementary Figure S4



Supplementary Figure S4: Glucose and insulin levels, glucose tolerance test and oxygen consumption in control and FIGIRKO mice

(**a**) Fed and fasted plasma glucose and (**b**) Insulin levels in 4 months old control and FIGIRKO male mice. Results are mean ± SEM of 7-8 animals/group. (**c**) Intraperitoneal glucose tolerance test in 4 months old control and FIGIRKO male mice. Results are mean ± SEM of 7-8 animals/group. (**d**) Oxygen consumption (VO_2) was measured by indirect calorimetry in 6 months old control and FIGIRKO male mice. Results are expressed per kg of lean body mass per hour and are mean ± SEM of 10 animals/group. Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice.

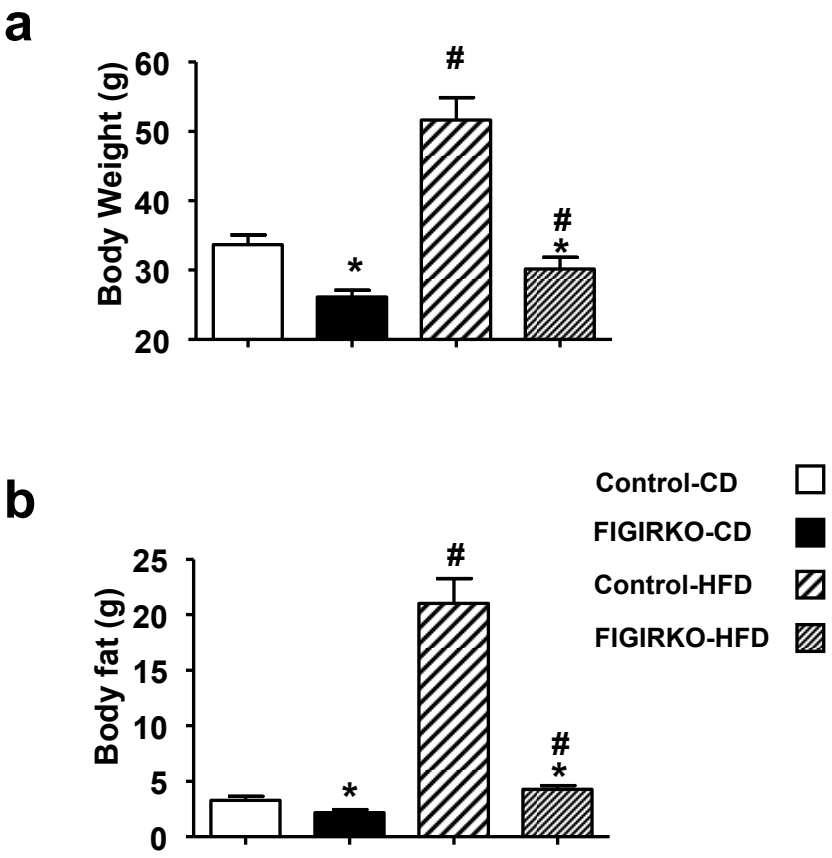
Supplementary Figure S5



Supplementary Figure S5: Expression of adipokines, inflammation and differentiation markers in white adipose tissues of control and FIGIRKO mice

(**a**) *Leptin, resistin* and *adiponectin* mRNA abundance was measured by real time PCR in PG and SC WAT from control and FIGIRKO male mice fed either a chow or a high fat diet.
(**b**) *TNFα, MCP1* and *F4/80* mRNA abundance was measured by real time PCR in PG and SC WAT from control and FIGIRKO male mice fed either a chow or a high fat diet.
(**c**) *aP2, PPARγ, C/EBPα* and *β* mRNA abundance was measured by real time PCR in PG and SC WAT from control and FIGIRKO male mice fed either a chow or a high fat diet. Results are mean ± SEM of 6 animals/group. Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice.

Supplementary Figure S6



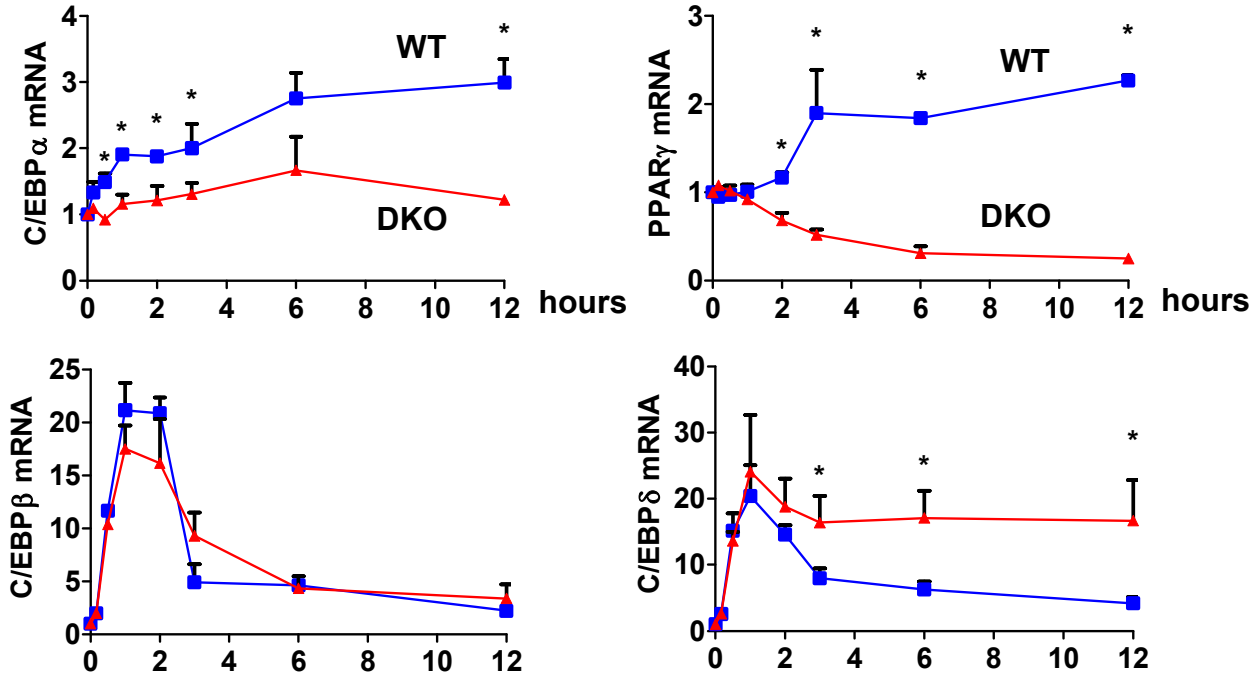
Supplementary Figure S6: Body weight and percent body fat in chow diet or high fat diet fed 1 year old control and FIGIRKO male mice

(**a**) Body weight assessed in 10 months old control and FIGIRKO male mice fed a chow diet or high fat diet for 4 months. Results are mean ± SEM of 6 animals/group.

(**b**) Body fat content assessed by nuclear magnetic resonance in 10 months old control and FIGIRKO male mice fed a chow diet or high fat diet for 4 months. Results are mean ± SEM of 6 animals/group.

Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice, # $p<0.05$ between CD and HFD.

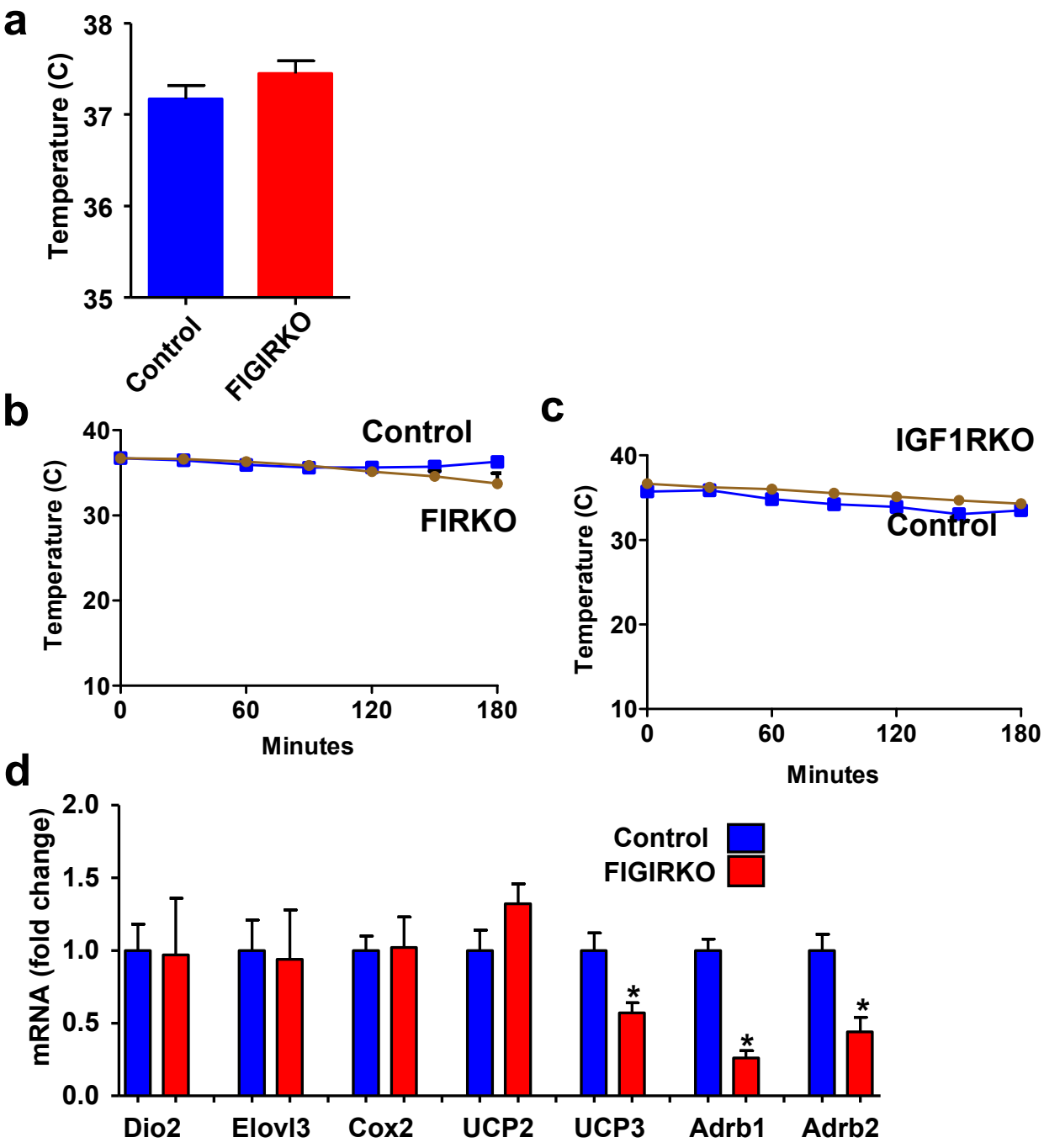
Supplementary Figure S7



Supplementary Figure S7: Expression pattern of transcription factors during the first 12 hours of adipocyte differentiation

mRNA abundance was measured by real time PCR in WT and DKO cells during the first 12 hours of induction of the differentiation. Results are mean ± SEM of 3 independent experiments. Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between WT and DKO cells.

Supplementary Figure S8



Supplementary Figure S8: Cold exposure in fat specific IR or IGF1R KO mice and body temperature and mRNA abundance in BAT of control and FIGIRKO mice

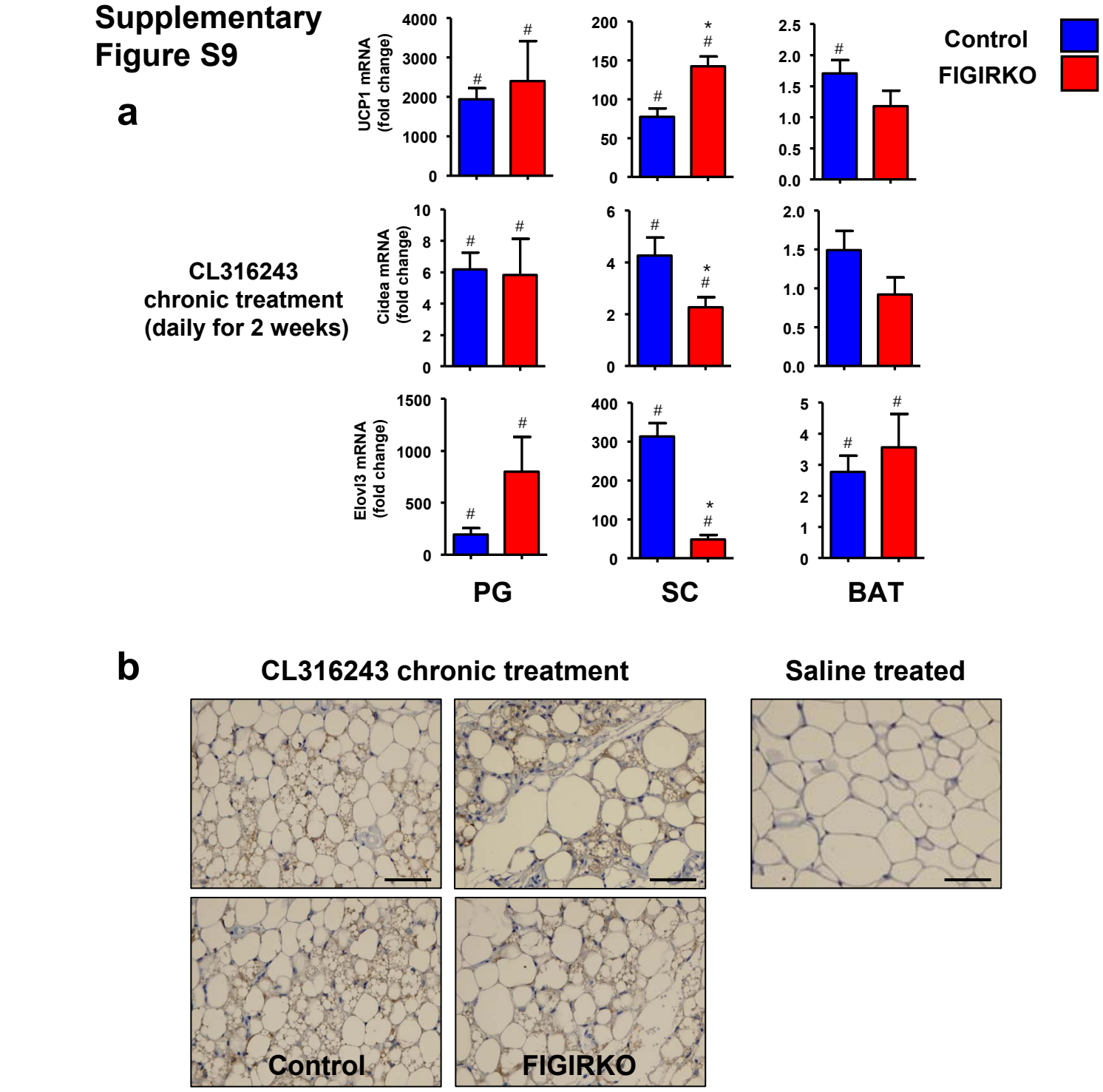
(**a**) Rectal temperature was measured in 4 months old control and FIGIRKO male mice maintained at room temperature (n=10 per group).

(**b**) Rectal temperature was measured in 4 months old control and adipose specific IR KO (FIRKO) male mice or C) in 4 months old control and adipose specific IGF1R KO male mice every 30 min for 3 hours after exposure to a 4°C environment (n=8 per group).

(**c**) mRNA abundance was measured by real time PCR in BAT from 4 months old male control and FIGIRKO mice. Results are mean ± SEM of 6 animals/group.

Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice.

Supplementary Figure S9



Supplementary Figure S9: Appearance of systemic brown adipocytes in white adipose tissues of control and FIGIRKO mice chronically treated with CL316243

(**a**) *UCP1, Cidea* and *Elovl3* mRNA abundance was measured by real time PCR in PG, SC and BAT in control and FIGIRKO mice injected daily with either saline or CL316243 (1μg/g body weight/day) intraperitoneally for 2 weeks. Results are mean±SEM of 5 animals/group and are expressed as fold change over the saline group.

Statistical significance assessed by two-tailed Student's t test, * $p<0.05$ between control and FIGIRKO mice, # $p<0.05$ between saline and CL316243 treated group.

(**b**) α-UCP1 immunohistochemistry staining of SC adipose tissues from control and FIGIRKO male mice injected daily with CL316243 (1μg/g body weight/day) for 2 weeks. Scale bar = 50μm.

Supplementary Table S1

Real time PCR primers

IR	FW	CCACCAATACGTCATTCACAAC
	RV	GGGCAGATGTCACAGAATCAA
IGF1R	FW	AGGAGAAGCCCATGTGTGAG
	RV	GTGTTGTCGTCCGGTGTGT
Leptin	FW	GGG CTT CAC CCC ATT CTG A
	RV	TGG CTA TCT GCA GCA CAT TTT G
Adiponectin	FW	GATGGCACTCCTGGAGAGAA
	RV	TCTCCAGGCTCTCCTTTCCT
Resistin	FW	CTG TCC AGT CTA TCC TTG CAC AC
	RV	CAG AAG GCA CAG CAG TCT TGA
C/EBPα	FW	CAAGAACAGCAACGAGTACCG
	RV	GTCACTGGTCAACTCCAGCAC
C/EBPβ	FW	CCAAGAAGACGGTGGACAA
	RV	CAAGTTCCGCAGGGTGCT
C/EBPδ	FW	ATCGACTTCAGCGCCTACA
	RV	GCTTTGTGGTTGCTGTTGAA
PPARγ	FW	TCAGCTCTGTGGACCTCTCC
	RV	ACCCTTGCATCCTTCACAAG
aP2	FW	GATGCCTTTGTGGGAACCT
	RV	CTGTCGTCTGCGGTGATTT
FAS	FW	GAGGACACTCAAGTGGCTGA
	RV	GTGAGGTTGCTGTCGTCTGT
HSL	FW	ACG GAT ACC GTA GTT TGG TGC
	RV	TCC AGA AGT GCA CAT CCA GGT
ATGL	FW	ACTGTGGCCTCATTCCTCCT
	RV	AACTGGATGCTGGTGTTGGT
GLUT4	FW	TGATTCTGCTGCCCTTCTGT
	RV	GGACATTGGACGCTCTCTCT
Adrb1	FW	CGTCCGTCGTCTCCTTCTAC
	RV	CGCAGCTGTCGATCTTCTTT
Adrb2	FW	GGAATTTTGGCAACTTCTGG
	RV	ACTCGGGCCTTATTCTTGGT
Adrb3	FW	GCT GAC TTG GTA GTG GGA CTC
	RV	TAG AAG GAG ACG GAG GAG GAG
TNFα	FW	ACGTGGAACTGGCAGAAGAG
	RV	GGCCATAGAACTGATGAGAGG
MCP1	FW	AGGTCCCTGTCATGATTCTG
	RV	GCTGCTGGTGATCCTCTTGT
F4/80	FW	TGGATGAGTGCTCCAGGAAT
	RV	GATGGCCAAGGATCTGAAAA

Dio2	**FW**	**CAGTGTGGTGCACGTCTCCAATC**
	RV	**TGAACCAAAGTTGACCACCAG**
PGC-1α	**FW**	**CCCTGCCATTGTTAAGACC**
	RV	**TGCTGCTGTTCCTGTTTTC**
mtTFA	**FW**	**AGT TCC CAC GCT GGT AGT GT**
	RV	**GCG CAC ATC TCG ACC C**
Nrf1	**FW**	**CAG CAA CCC TGA TGG CAC CGT GTC G**
	RV	**GGC CTC TGA TGC TTG CGT CGT CTG G**
COX2	**FW**	**TCTCCCCTCTCTACGCATTCT**
	RV	**TCATTGGTGCCCTATGGTTT**
Elovl3	**FW**	**GGACTTAAGGCCCTTTTTGG**
	RV	**TTCCGCGTTCTCATGTAGGT**
PRDM16	**FW**	**ACATCCGTGTAGCGTGTTCC**
	RV	**GCACCAACAGTTCCTCTCCA**
CIDEA	**FW**	**ATCACAACTGGCCTGGTTACG**
	RV	**TACTACCCGGTGTCCATTTCT**
UCP1	**FW**	**CTGCCAGGACAGTACCCAAG**
	RV	**TCAGCTGTTCAAAGCACACA**
UCP2	**FW**	**CAGGTCACTGTGCCCTAACCA**
	RV	**CACTACGTTCCAGGATCCCAA**
UCP3	**FW**	**GACTATGGATGCCTACAGAACC**
	RV	**ACTCCAGCAACTTCTCCTTG**
TBP	**FW**	**ACCCTTCACCAATGACTCCTATG**
	RV	**TGACTGCAGCAAATCGCTTGG**