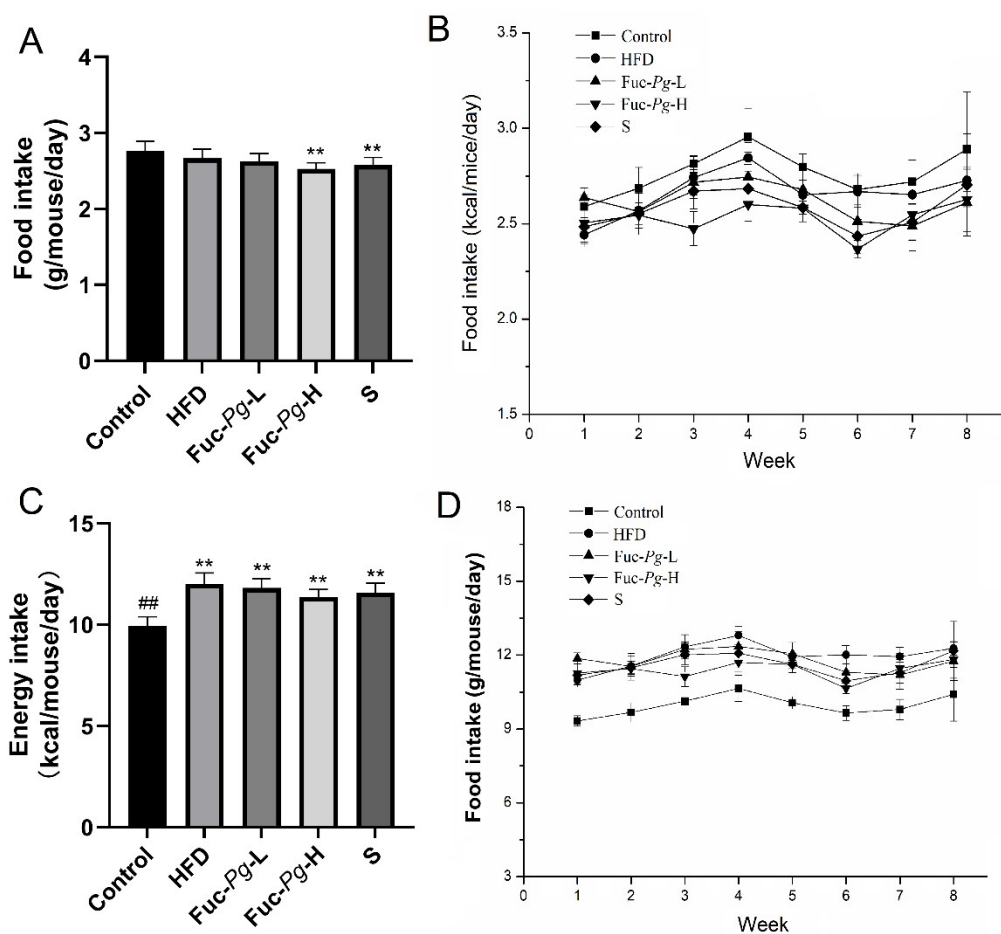
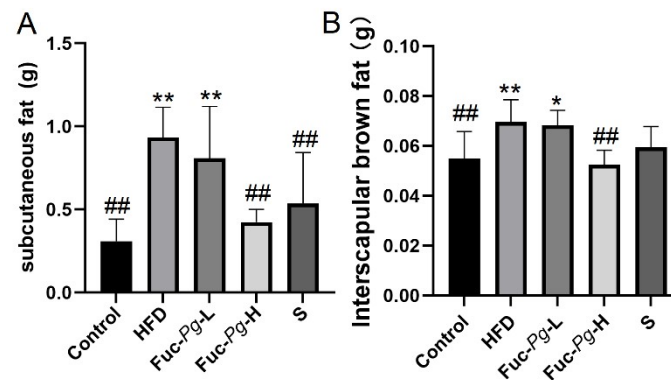


Supplementary Fig.1



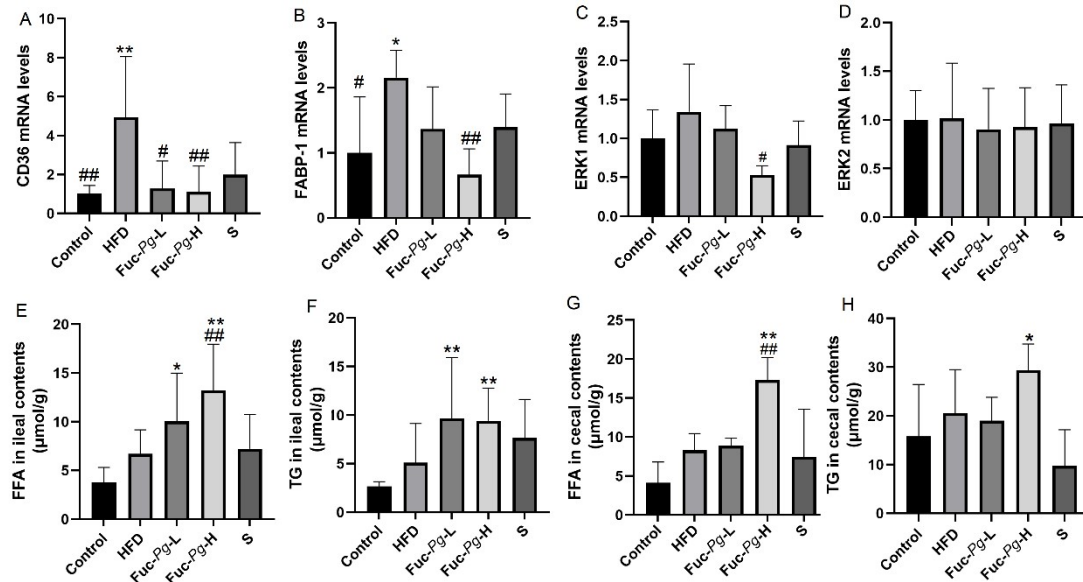
Supplementary Fig.1 (A) Average daily food intake (n = 8). (B) Average food intake weekly (n = 3). (C) Average daily energy intake (n = 8). (D) Average energy intake weekly (n=3). *: $P < 0.05$ compared with the control group; **: $P < 0.01$ compared with the control group; #: $P < 0.05$ compared with the HFD group; ###: $P < 0.01$ compared with the HFD group.

Supplementary Fig.2



Supplementary Fig.2 (A) subcutaneous fat weight (n = 8). (B) interscapular brown fat weight (n = 8). *: $P < 0.05$ compared with the control group; **: $P < 0.01$ compared with the control group; #: $P < 0.05$ compared with the HFD group; ##: $P < 0.01$ compared with the HFD group.

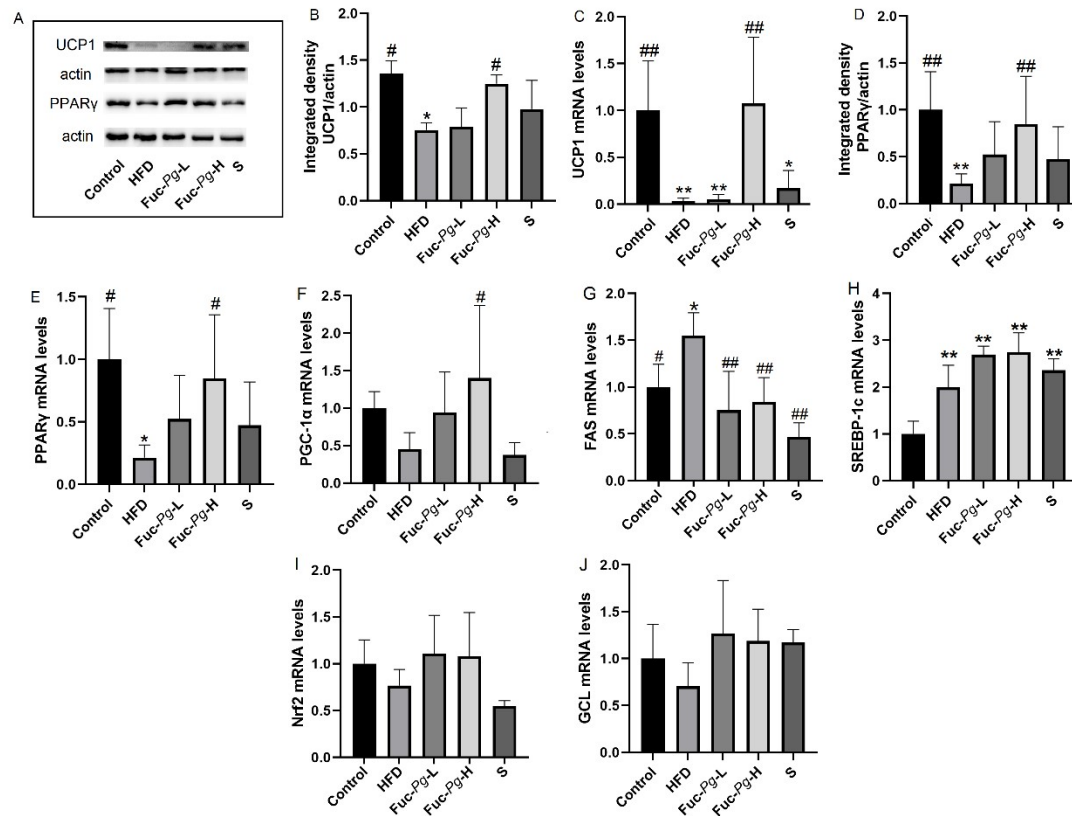
Supplementary Fig.3



Supplementary Fig.3 (A) Relative mRNA levels of CD36 in small intestine (n ≥ 4). (B) Relative mRNA levels of FABP-1 in small intestine (n ≥ 4). (C) Relative mRNA levels of ERK1 in small intestine (n ≥ 4). (D) Relative mRNA levels of ERK2 in small intestine (n ≥ 4). *: $P < 0.05$ compared with the control group; **: $P < 0.01$ compared

with the control group; #: $P < 0.05$ compared with the HFD group; ##: $P < 0.01$ compared with the HFD group.

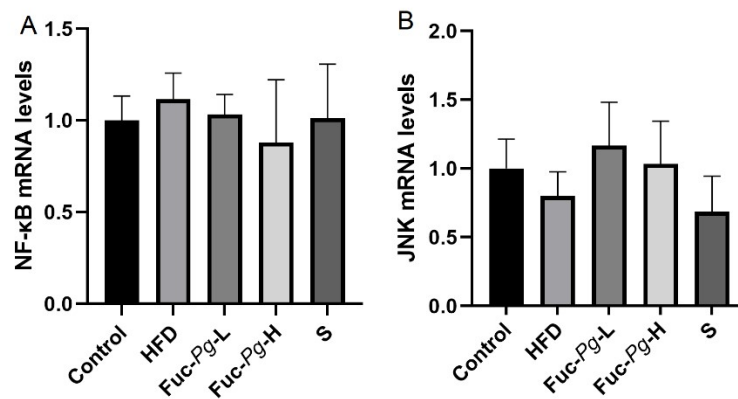
Supplementary Fig.4



Supplementary Fig.4 (A) Western blotting results UCP-1 and PPAR-γ protein expressions in the epididymal adipose tissue (n=3). (B) The relative intensities of UCP-1 against β-actin. (C) Relative mRNA levels of UCP-1 in the epididymal adipose tissue (n ≥ 4). (D) The relative intensities of PPAR-γ against β-actin. (E) Relative mRNA levels of PPAR-γ in the epididymal adipose tissue (n ≥ 4). (F) Relative mRNA levels of PGC-1α in the epididymal adipose tissue (n ≥ 4). (G) Relative mRNA levels of FAS in the epididymal adipose tissue (n ≥ 4). (H) Relative mRNA levels of SREBP-1c in the epididymal adipose tissue (n ≥ 4). (I) Relative mRNA levels of Nrf2 in the epididymal

adipose tissue ($n \geq 4$). (J) Relative mRNA levels of GCL in the epididymal adipose tissue ($n \geq 4$). *: $P < 0.05$ compared with the control group; **: $P < 0.01$ compared with the control group; #: $P < 0.05$ compared with the HFD group; ###: $P < 0.01$ compared with the HFD group.

Supplementary Fig.5



Supplementary Fig.5 (A) Relative mRNA levels of NF-κB in the liver tissue ($n \geq 4$). (B) Relative mRNA levels of JNK in the liver tissue ($n \geq 4$). *: $P < 0.05$ compared with the control group; **: $P < 0.01$ compared with the control group; #: $P < 0.05$ compared with the HFD group; ###: $P < 0.01$ compared with the HFD group.

Supplementary Table 1 The composition of the experimental diets fed to mice

Ingredients	Normal diet (g/kg)	HFD (g/kg)
Protein (casein, L-cystine)	194	244
Carbohydrate (corn Starch, sucrose, maltodextrin)	673	396
Fat (Soybean Oil, lard)	40	226
Cellulose	48	60
Mineral and vitamin mixture	45	71
TBHQ	0.01	0.045

Table 2 Gene specific primer sequences used in this study

	Forward primer	Reverse primer	Gen bank code
PPAR- γ	GCCATTGAGTGCCGAGTCTGTG	TTTGGTCAGCGGGAAGGACTTTATG	NM_001127330.3
UCP1	TCACCACCCTGGCAAAAACA	GCAGGTGTTTCTCTCCCTGAA	NM_009463.3
PGC1- α	ACCATGACTACTGTCACTCACTC	GTCACAGGAGGCATCTTTGAAG	NM_001402987.1
Nrf2	AAGCTTTCAACCCGAAGCAC	TTTCCGAGTCACTGAACCCA	NM_0317899.2
GCL	ATGTGGACACCCGATGCAGTATT	TGTCTTGCTTGTAGTCAGGATGGTTT	NM_012815.2
FASN	ATCCTGGAACGAGAACACGATCA	AGAGACGTGTCACTCCTGGACTT	NM_017332.1
SREBP1-c	GGAGGACATCTTGCTGCTTCTAACC	AATACAGTTCAACGCTCGCTCTAGG	NM_001358315.1
ERK1	ATAGGCATCCGAGACATCCTCAGAG	AAGGTCGCAGGTGGTGTGATAAG	NM_011952.2
ERK2	TGAAGACACAGCACCTCAGCAATG	GCAGCCCACAGACCAAATATCAATG	NM_001038663.1
FABP1	AGCCAGGAGAACTTTGAGCCATTC	CCAGCTTGACGACTGCCTTGAC	NM_017399.5
CD36	ATGCCAGTCGGAGACATGCTTATTG	TCCAACAGACAGTGAAGGCTCAAAG	NM_001159555.1
NF- κ B	GACCTGGCATCTGTGGACAACCTC	CCGCAATGGAGGAGAAGTCTTCATC	NM_001365067.1
JNK	ACTGTTCCCCGATGTGCTTTTCC	ACTCCTCTATTGTGTGCTCCCTCTC	NM_001310452.1
GAPDH	CCCATGTTTGTGATGGGTGT	GTGATGGCATGGACTGTGGT	NM_001289726.2
β -actin	TGCTGTCCCTGTATGCCTCTGG	ACCGCTCGTTGCCAATAGTGATG	NM_031144.3