

Table S1 Primers for q-PCR

Primer name	Forward primer sequence (5'-3')	Reverse primer sequence (5'-3')
<i>Ucp1</i>	TCAGGATTGGCCTCTACGAC	TGCATTCTGACCTTCACGAC
<i>Pgc1a</i>	TGCTAGCGGTTCTCACAGAG	AGTGCTAAGACCGCTGCATT
<i>Dio2</i>	CCTGCCAGTCTTTTTCTCCA	ACGTGCACCACACTGGAAT
<i>Cidea</i>	CTCGGCTGTCTCAATGTCAA	CCGCATAGACCAGGAACTGT
<i>Prdm16</i>	ACTTTGGATGGGAGCAGATG	CTCCAGGCTCGATGTCCTTA
<i>Hadc1</i>	CTTACGAAACAGCGGTG	CTTCTCCAGGTACTCGTTA
<i>Hadc2</i>	TGCTGAAGAAATGACTAAATACC	CAAAGAGTCCATCAAACAC
<i>Hadc3</i>	AATGTGCCCTTACGAGATGG	GTAGCCACCACCTCCCAGTA
<i>Hadc4</i>	GCCTTCAGAACGGTGGTTAT	TACCCAAAACATTTGGCAGA
<i>Hadc5</i>	AGTGAGAGCACCCAGGAAGA	GTACACCTGGAGGGGCTGTA
<i>Hadc6</i>	TCCACCGCCAAGATTCTTC	CAGCACACTTCTTCCACCAC
<i>Hadc7</i>	TGAAGAATGGCTTIGCTGTG	CACTGGGGTCCTGGTAGAAA
<i>Hadc8</i>	AGGTGATGAGGACCATCCAG	ACCCTCCAGACCAGTTGATG
<i>Hadc9</i>	AGGATGATGATGCCTGTGGTGGAT	GAGTTGTGCTTGATGCTGCCTTGT
<i>Hadc10</i>	CAGAGGAAGAGTTGGGCTTG	GGTGTCCGGGTGAAAGTAGA
<i>Pparg2</i>	TCTGGGAGATTCTCCTGTTGA	GGTGGGCCAGAAATGGCATCT
<i>Cebp/b</i>	TGGACAAGCTGAGCGACGAG	TGTGCTGCGTCTCCAGTTG
<i>Cebp/a</i>	GGACAAGAACAGCAACGAGTA	GCAGTTGCCATGGCCTTGA
<i>Cycophlln A</i>	TATCTGCACTGCCAAGACTGAGTG	CTTCTTGCTGGTCTTGCCATTCC
<i>aP2</i>	ACACCGAGATTTCCTTCAAACCTG	CCATCTAGGGTTATGATGCTCTTCA
<i>Adiponectin</i>	GCACTGGCAAGTTCTACTGCAA	GTAGGTGAAGAGAACGGCCTTGT
<i>CD36</i>	GCAAAGAACAGCAGCAAAAATC	CAGTGAAGGCTCAAAGATGG
<i>ATGL</i>	ACAGTGTCCCCATTCTCAGG	TTGGTTCAGTAGGCCATTCC
<i>HSL</i>	AGACACCAGCCAACGGATAC	ATCACCTCGAAGAAGAGCA
<i>Glut4</i>	GTGACTGGAACACTGGTCCTA	CCAGCCACGTTGCATTGTAG
<i>Fasn</i>	GGAGGTTGCTTGAAGAG	CTGGATGTGATCGAATGCT

Figure S1

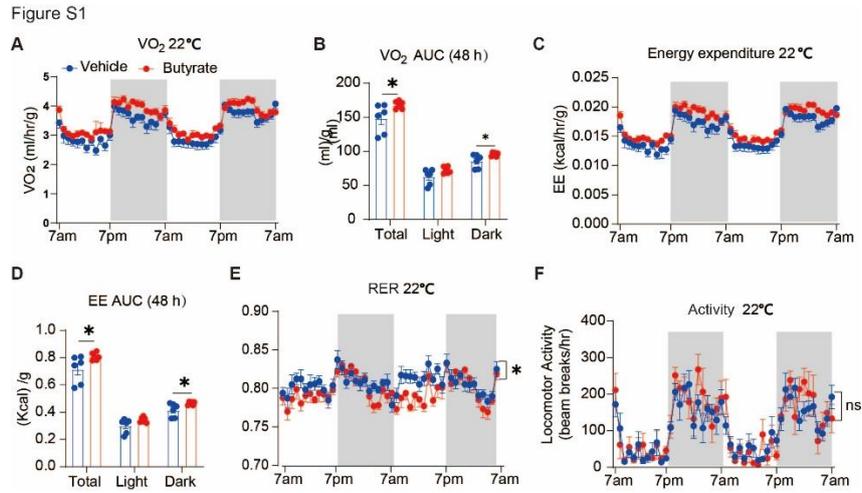


Figure S1. Butyrate supplementation increases energy expenditure. After 7 weeks of HFD intervention with or without butyrate, mice were housed in a Promethion metabolic measurement system at 22°C. After 3 days acclimatization, the oxygen consumption (A-B), energy expenditure (C-D), respiratory exchange ratio (RER; E) and physical activity (F) were monitored and calculated. Data are shown as means \pm SEM (n=6) during a 48-hour cycle. Unpaired two-tailed Student's t test was used in B and D. Two-way ANOVA was used in E and F. *P<0.05.

Figure S2

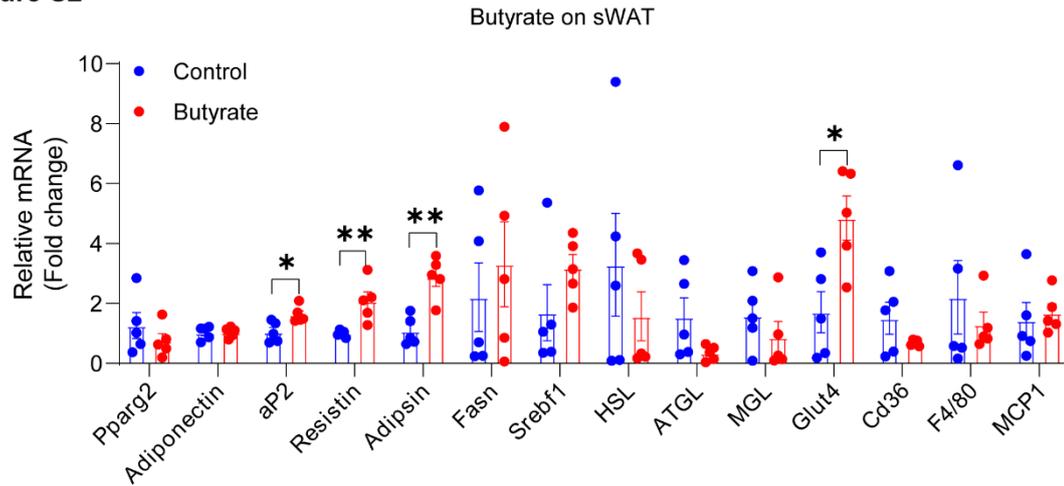


Figure S2. Butyrate supplementation affects sWAT function. After 9 weeks intervention, mRNA expression of adipogenesis, adipokine, lipogenesis, lipolysis, glucose uptake, fatty acid transportation and inflammation were analyzed using q-PCR in sWAT. Data were shown as means \pm SEM (n=5). Unpaired two-tailed Student's t test was used. *P<0.05, **P<0.01.

Figure S3

Figure S3

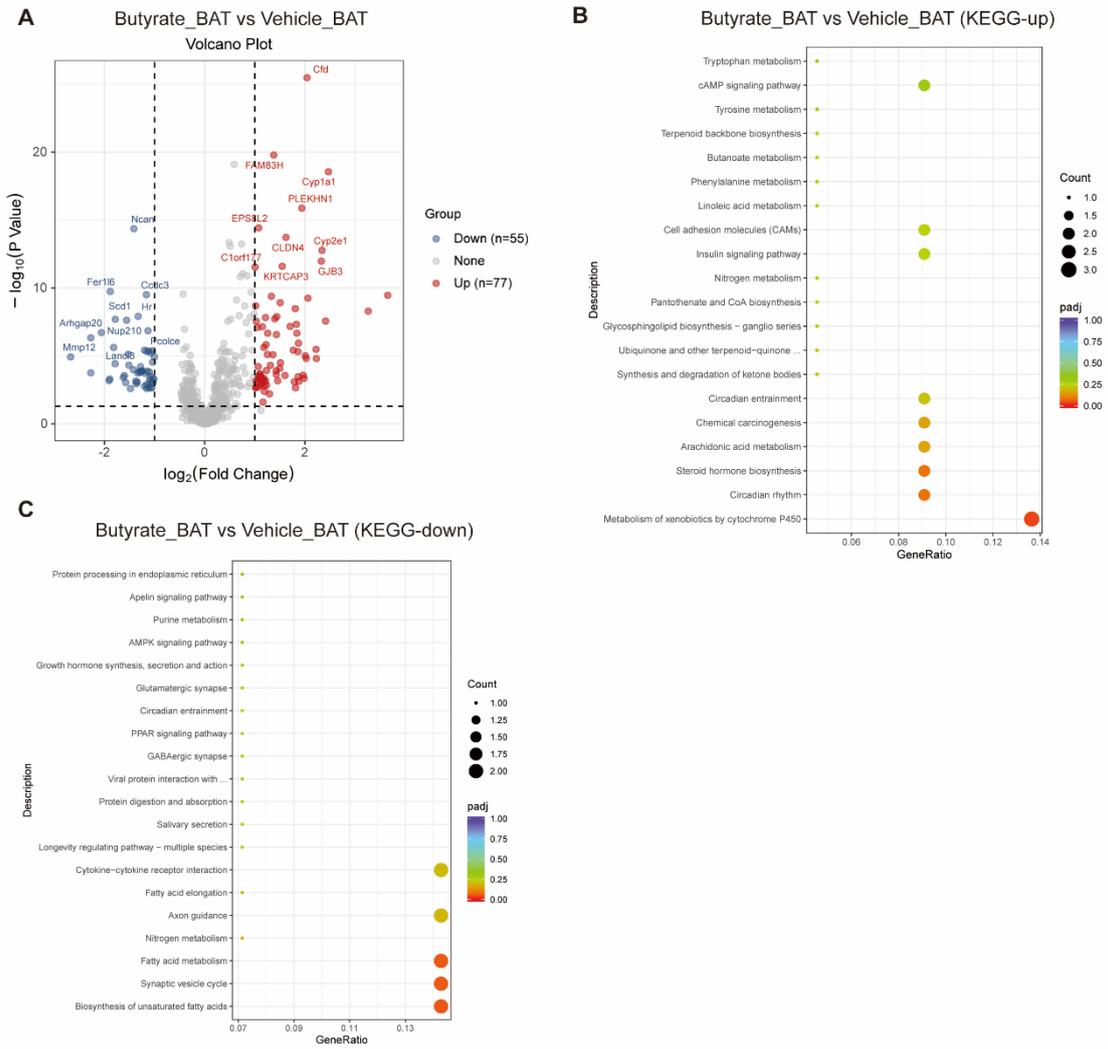


Figure S3. Butyrate supplementation markedly remodels the global transcriptome landscape of iBAT. Mice were fed a high-fat diet and treated with or without butyrate for 9 weeks. Heat map depicting the profile of differential gene expression in iBAT (A). Enriched KEGG terms of iBAT that were significantly higher expressed in butyrate group (B). Enriched KEGG terms of iBAT that were significantly lower expressed in butyrate group (C).

Figure S4

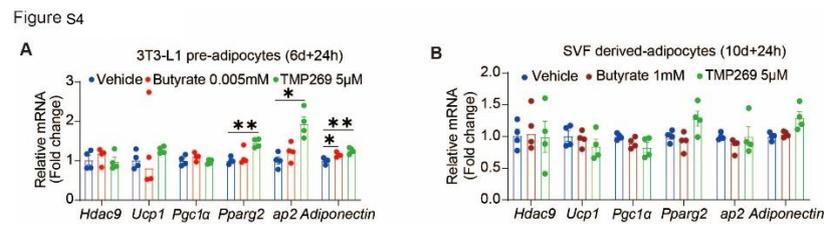


Figure S4. Butyrate and the HDAC9 inhibitor TMP269 had little effects on mature adipocytes. 3T3-L1 pre-adipocytes were differentiated for 6 days and then treated with PBS, 5 μM butyrate or 5 μM HDAC9 inhibitor TMP269 for 24 h, mRNA levels were analyzed by q-PCR (A). Stromal vascular fraction (SVF) of mouse sWAT was isolated and cultured to induce adipocytes for 10 days and then treated with PBS, 1mM butyrate or 5 μM TMP269 for 24 h, mRNA levels were analyzed by q-PCR (B). Data were shown as mean ± SEM (n=4). One way ANOVA was used. *P<0.05, **P<0.01.