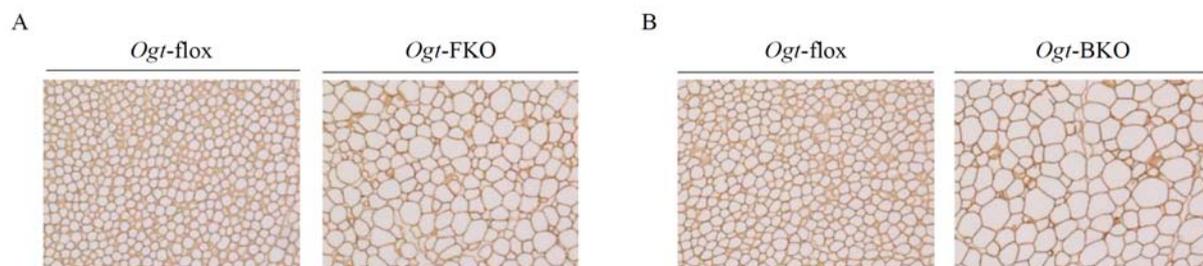


SUPPLEMENTARY DATA

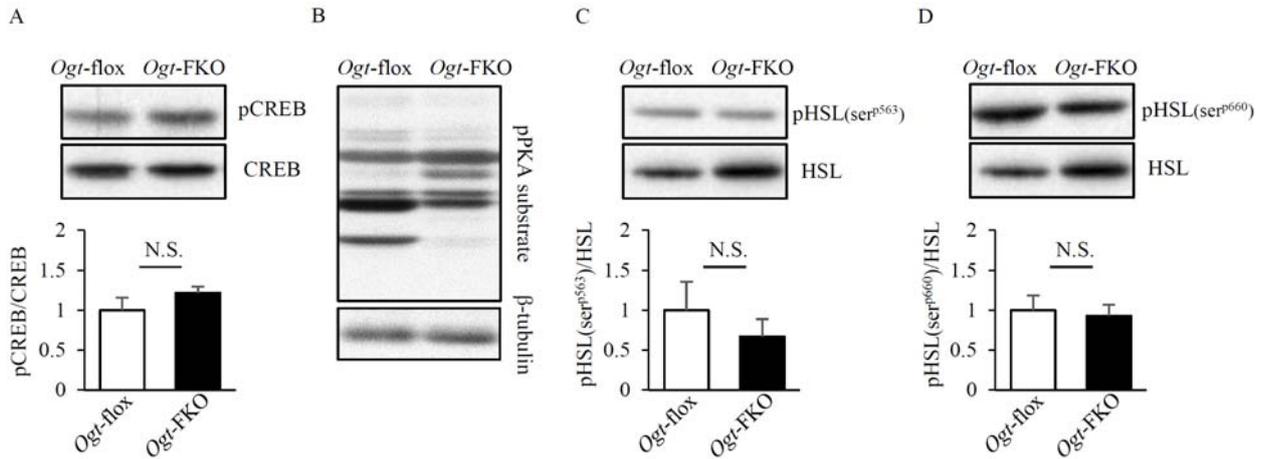
Supplementary Figure 1. *Ogt*-KO mice display an accumulation of enlarged lipid droplets in BAT cells. A: Representative immunohistochemical analysis of perilipin in BAT of control and *Ogt*-FKO mice. B: Representative immunohistochemical analysis of perilipin in BAT of control and *Ogt*-BKO mice.



SUPPLEMENTARY DATA

Supplementary Figure 2. *Ogt*-FKO mice show no significant changes in expression levels of proteins associated with the β -AR/PKA/CREB axis. A-D: Western blot analysis and its quantification (n=6 each). The Y-axis indicates that data is relative to controls. Data are means \pm SEM. NS indicates not statistically significant.

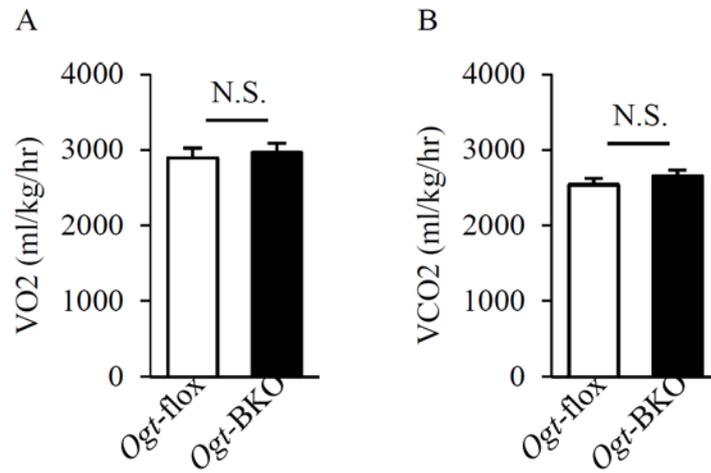
CREB: cAMP response element-binding protein, pPKA: phosho-(Ser/Thr) protein kinase A substrate, HSL: hormone sensitive lipase.



SUPPLEMENTARY DATA

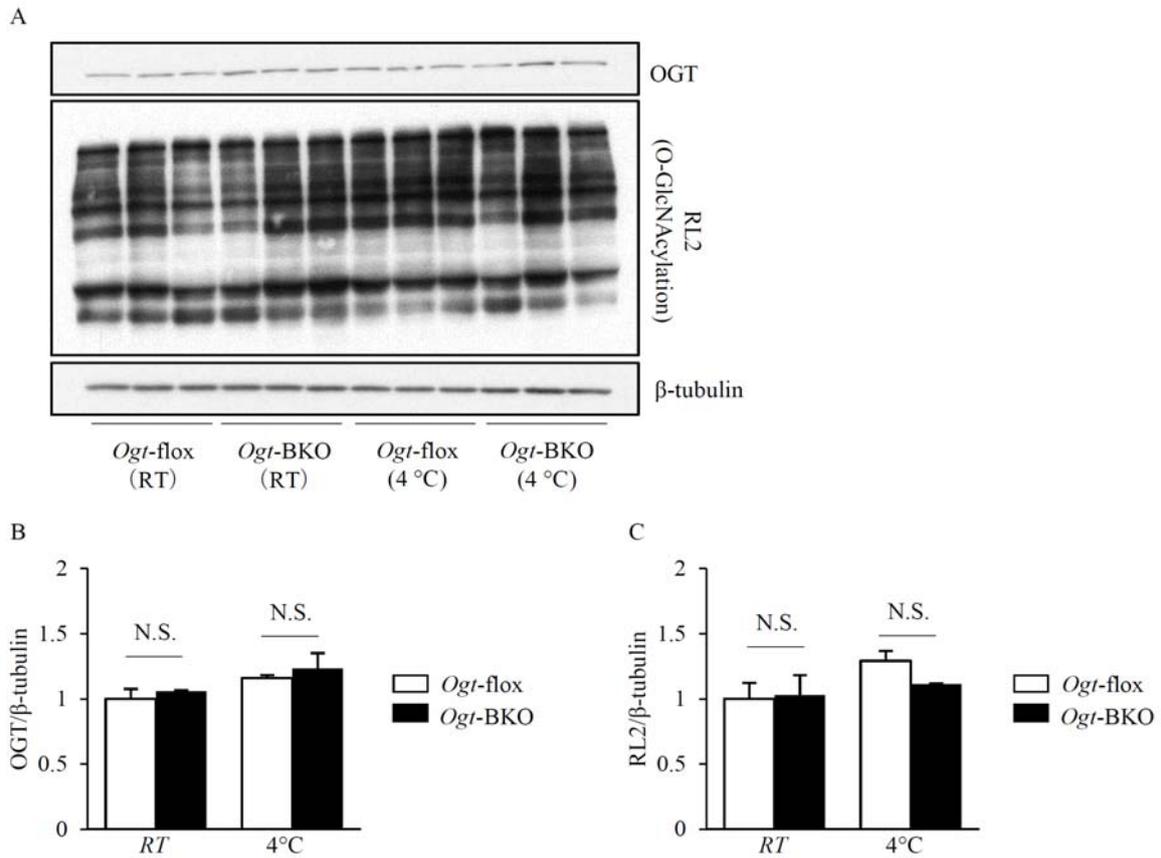
Supplementary Figure 3. VO₂ and VCO₂ show no difference in *Ogt*-BKO and control mice.

A and B: VO₂ and VCO₂ of *Ogt*-BKO (n=7) and control mice (n=6). Data are means ± SEM. NS indicates not statistically significant.



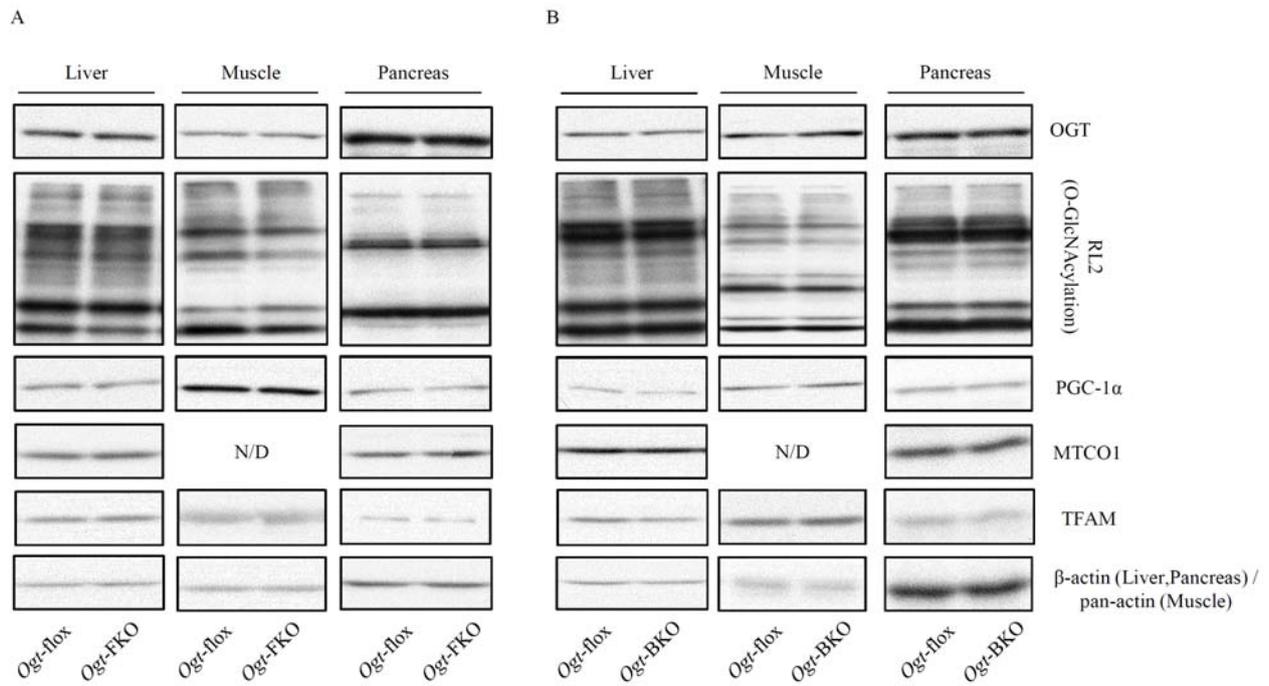
SUPPLEMENTARY DATA

Supplementary Figure 4. *Ogt*-BKO mice show no significant changes in expression levels of OGT, RL2 in iWAT after 3-hour cold exposure. A-C: Representative western blot analysis and its quantification for OGT and O-GlcNAcylation (RL2) in iWAT at RT and after cold exposure. (n=6 each). The Y-axis indicates that data is relative to controls. Data are means \pm SEM. NS indicates not statistically significant. RT: room temperature



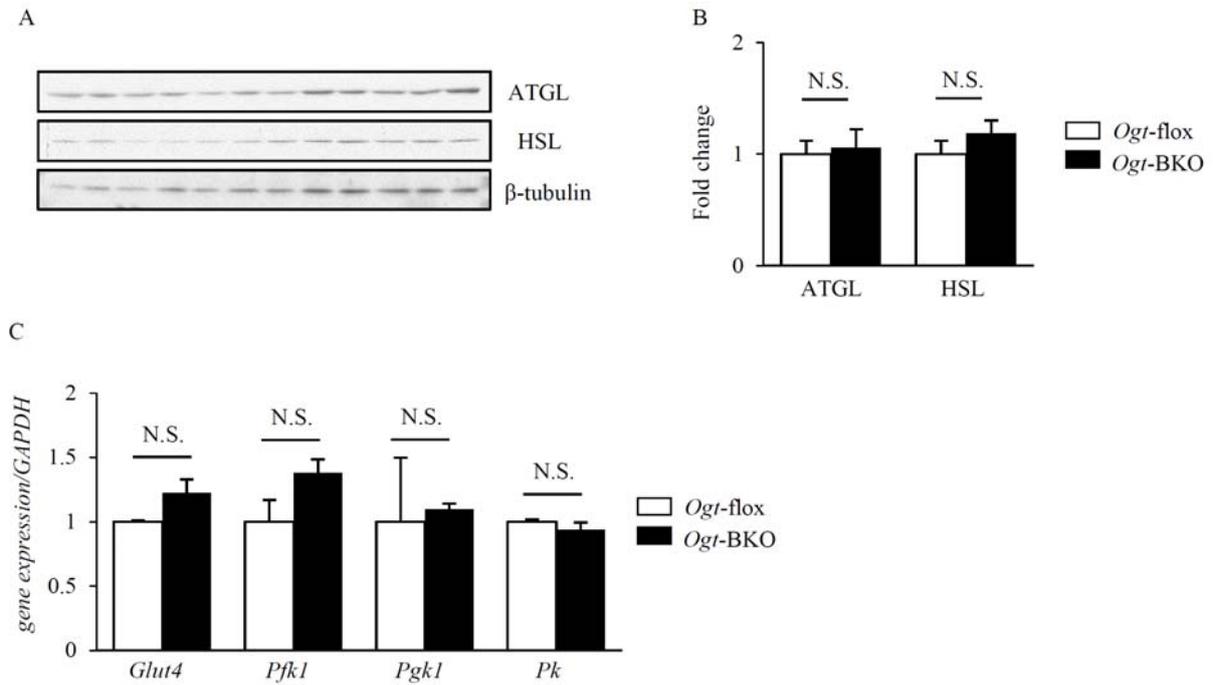
SUPPLEMENTARY DATA

Supplementary Figure 5. *Ogt*-FKO and *Ogt*-BKO mice show no significant changes in expression of OGT, RL2, PGC-1 α , MTCO1, and TFAM. A: Representative western blot analysis of *Ogt*-FKO and control mice (n=3 each). B: Representative western blot analysis of *Ogt*-BKO and control mice (n=3 each).



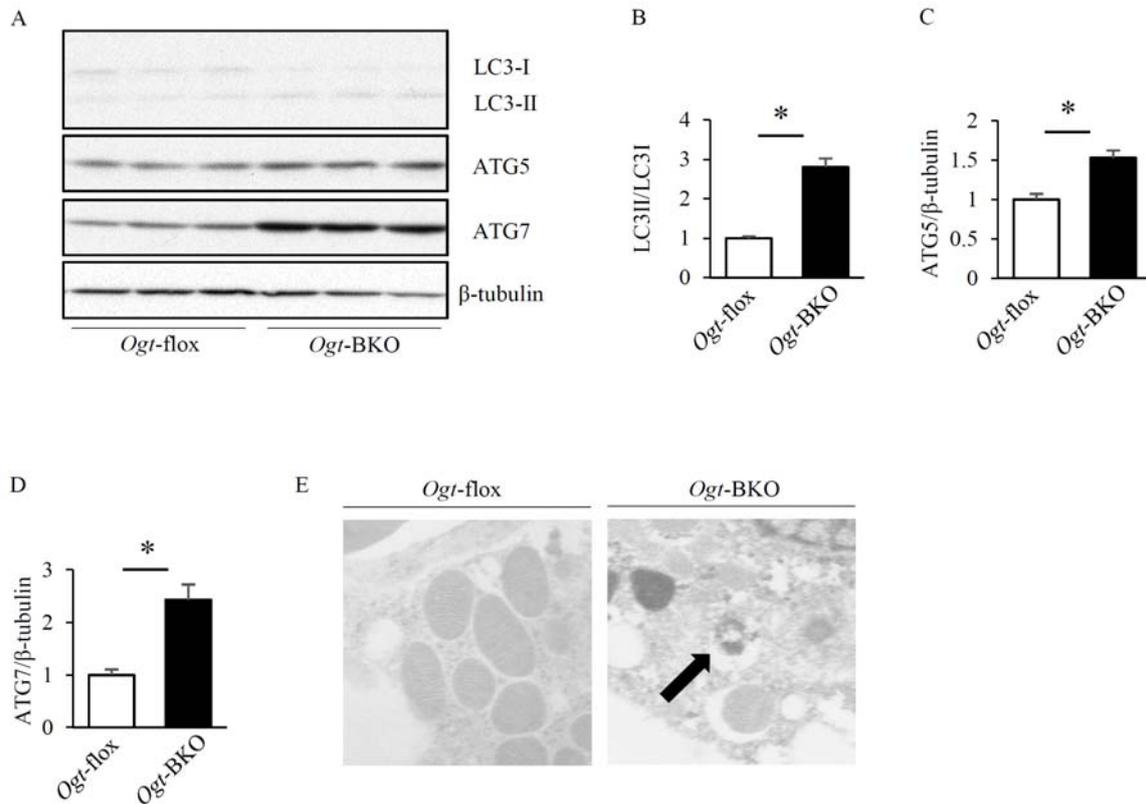
SUPPLEMENTARY DATA

Supplementary Figure 6. *Ogt*-BKO mice show no significant changes in expression of ATGL, HSL. A: Representative western blot analysis of *Ogt*-BKO and control mice (n=6 each). B: Quantitative ratios of ATGL and HSL to β -tubulin (n=6 each). The Y-axis indicates that data is relative to controls. C: qPCR analysis of BAT (n=4 each). Data are means \pm SEM, NS indicates not statistically significant. *Glut4*: Glucose transporter 4; *Pfk1*: Phosphofructokinase 1; *Pgk1*: Phosphoglycerate kinase 1, *Pk*: Pyruvate kinase



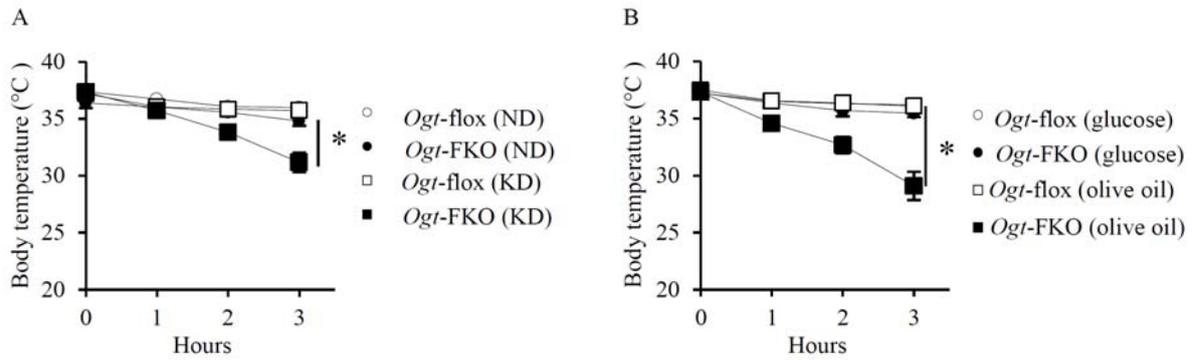
SUPPLEMENTARY DATA

Supplementary Figure 7. *Ogt*-BKO mice showed the enhancement of autophagy. A: Representative western blot analysis of *Ogt*-BKO and control mice (n=4-6 each). B-D: Quantitative ratios of ATG5 and ATG7 to β -tubulin, and ratio of LC3II to LC3I (n=4-6 each). The Y-axis indicates that data is relative to controls. E: Representative transmission electron microscopy of BAT from *Ogt*-BKO and control mice (allow; autophagosome). Data are means \pm SEM. * $P < 0.05$. NS indicates not statistically significant.



SUPPLEMENTARY DATA

Supplementary Figure 8. *Ogt*-FKO mice fed a normal diet can maintain body temperature, but *Ogt*-FKO mice fed a ketogenic diet can not. A and B: Body temperatures of *Ogt*-FKO and control mice at 4°C (n=5 each). Data are means ± SEM. **P* < 0.05. NS indicates not statistically significant. ND: normal diet; KD: ketogenic diet.



SUPPLEMENTARY DATA

Supplementary Table 1. Primer sequences

	Forward	Reverse
<i>Ucp1</i>	5'-GTGAAGGTCAGAATGCAAGC-3'	5'-AGGGCCCCCTTCATGAGGTC-3'
<i>Ppargc1a</i>	5'GTTTTATTTGCATCCAGAGC-3'	5'AAGCTTGCGCAGGTAA-3'
<i>ND1</i>	5'CCATTGTCAGACCCCATAAA-3'	5'GGTGTGGTATTGGTAGGGGAAC-3'
<i>ND2</i>	5'AGCATGAGGAGGACTTAACCAAAC-3'	5'TGAGGGATGGATTGTAAGGAAGA-3'
<i>ND3</i>	5'GCATTCTGACTTCCCCAAATAAATC-3'	5'GTGCAGAGCTTGTAGGGTCAAA-3'
<i>ND4</i>	5'CAAAGCCCATGTTGAAGCTC-3'	5'GGAGAGAAGGATGAAGGGGTATG-3'
<i>ND5</i>	5'ATCCTCACTTCAGCCAACAACA-3'	5'GTTTCGTCCATACCATCATCAA-3'
<i>Cidea</i>	5'CGTGGTGGACACAGAGGAGTT-3'	5'TCCCGATTCTTTGGTTGCT-3'
<i>Cox7a1</i>	5'CAGTACACTTGAAAGGCGGG-3'	5'CCAGCCCAAGCAGTATAAGC-3'
<i>Prdm16</i>	5'TCCCACCAGACTTCGAGCTA-3'	5'AAAGTCGGCCTCCTTCAGTG-3'
<i>Glut4</i>	5'ATCATCCGGAACCTGGAGG-3'	5'CGGTCAGGCGCTTAGACTC-3'
<i>Pfk1</i>	5'TGTGGTCCGAGTTGGTATCTT -3'	5'GCACTTCCAATCACTGTGCC -3'
<i>Pgk1</i>	5'GAGCCTCACTGTCCAAACTA -3'	5'CTTTAGCGCCTCCCAAGATA -3'
<i>Pk</i>	5'CTGTGGAGATGCTGAAGGAG -3'	5'CAACAGGACGGTAGAGAATGG -3'
<i>GAPDH</i>	5'ATGGCCTTCCGTGTTCT-3'	5'GCCTGCTTACCACCTTCT-3'
<i>Cox2</i>	5'TTTTCAGGCTTACCCTAGATGA-3'	5'GAAGAATGTTATGTTATGTTTACTCCTA-3'
<i>Ucp2</i>	5'GCGACCAGCCATTGTAGA-3'	5'GCGTTCGGGTACCATCCTAAC-3'