

Materials and Methods

Mice. Adipoq-Cre (Stock # 010803), Adipoq-Cre/ERT2 (Stock # 024671), Rosa26-Cre/ERT2 (Stock # 008463), and CAG-RFP-EGFP-LC3 (Stock # 027139) mice were from the Jackson Laboratory. *Pik3c3^{ff}* mice have been described elsewhere and are now available from the Jackson Laboratory. *Atg7^{ff}* mice were obtained from Dr. Masaaki Komatsu at The Tokyo Metropolitan Institute of Medical Science (Tokyo, Japan). We employed age- and sex-matched littermates for experimental and control groups. We obtained consistent observations from male and female mice. Sex-separated results are presented for several key findings, including alterations in ATs and metabolic parameters. Results from further mechanistic studies are presented as combined data from both sexes. We examined mice at the age specified in individual experiments. Mice were housed under specific pathogen-free conditions, fed with a regular chow diet (5LOD, LabDiet), provided food and water *ad lib* unless otherwise specified, and maintained on a 12-hour light/dark cycle at a controlled room temperature of 22°C, except for the cold treatment studies. Mice were sacrificed at non-fasting state for further analysis unless otherwise specified.