Supplemental Figures

Figure S1

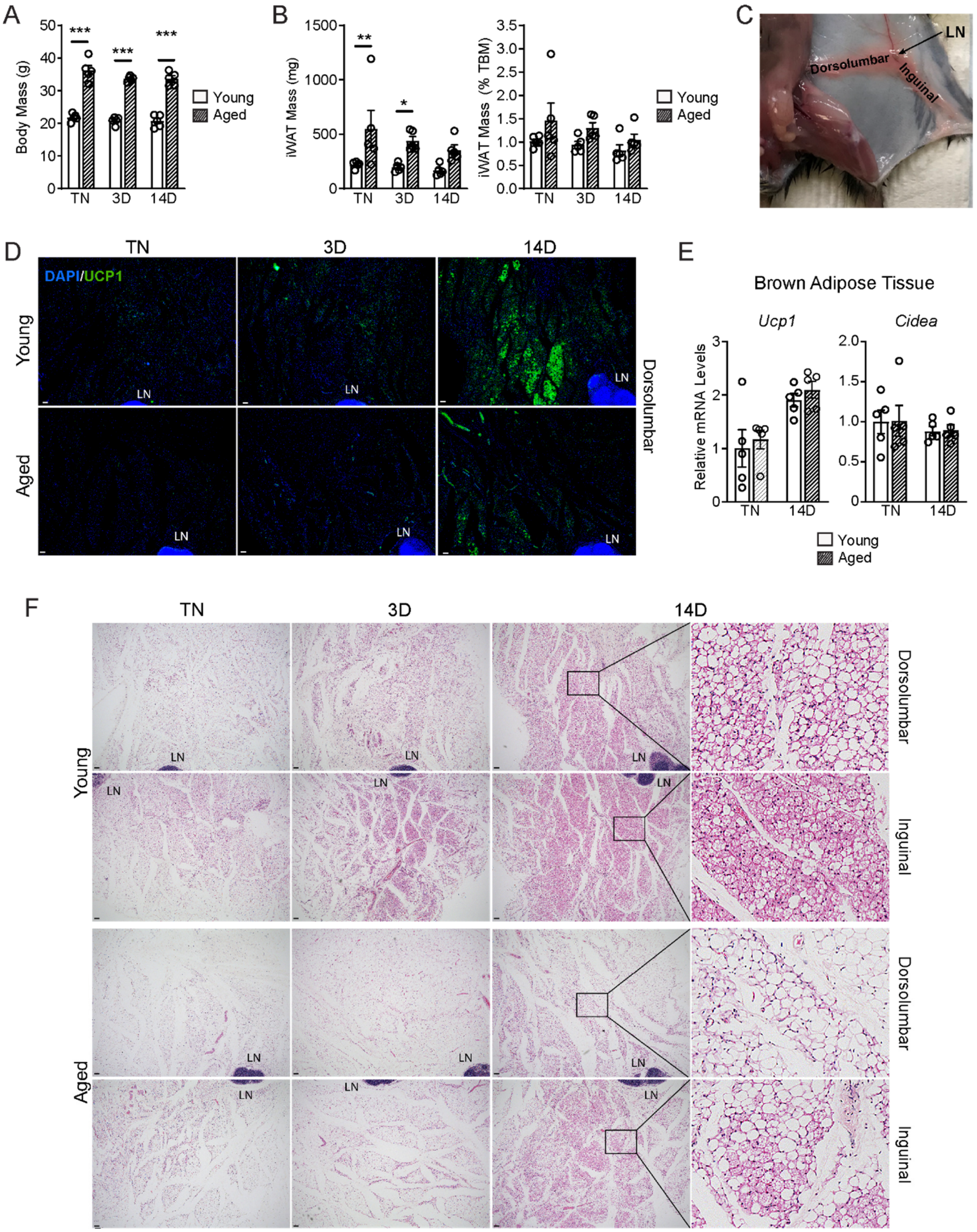

Figure S1, related to Figure 1. (**A-B**) Body mass and iWAT mass of mice described in Figure 1A, n=5. (**C**) Mouse dissection with lymph node (LN) orientation showing the dorsolumbar and inguinal regions of the iWAT pad. (**D**) Immunofluorescence analysis of iWAT with UCP1 (green) and DAPI (blue). LN=lymph node. Scale bar 100 μm. (**E**) mRNA levels of *Ucp1* and *Cidea* in BAT of young and aged mice housed at TN, and either maintained at TN or exposed to cold for 2 weeks. (**F**) H&E staining of serial sections of iWAT from D (above) and Figure 1C, LN=lymph node. Scale bar 100 μm. Data represent mean ± SEM, points represent biological replicates, analyzed using a Student's t-test with a two-way ANOVA with a Tukey correction for multiple comparisons. Significance: not significant, P > 0.05; * P < 0.05 ** P < 0.01; *** P < 0.001.

Figure S2

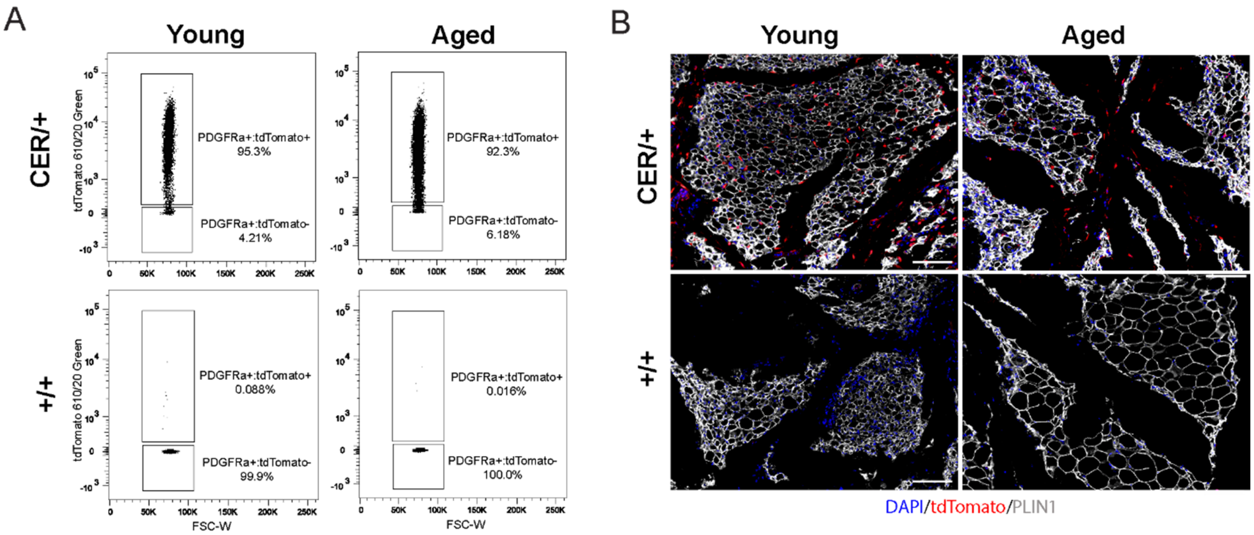

Figure S2, related to Figure 2. (**A**) Representative flow cytometry plots showing expression of tdTomato in gated Live, Lin^{-}; PDGFRα^{+} stromal vascular cells isolated from young and aged reporter mice (described in Figure 2) immediately after treatment with tamoxifen (tmx, pulse). (**B**) Immunofluorescence analysis of iWAT from young and aged reporter mice with tdTomato (red), PLIN1 (white) and DAPI (blue) after the tmx pulse, scale bar 100 μm.

Figure S3

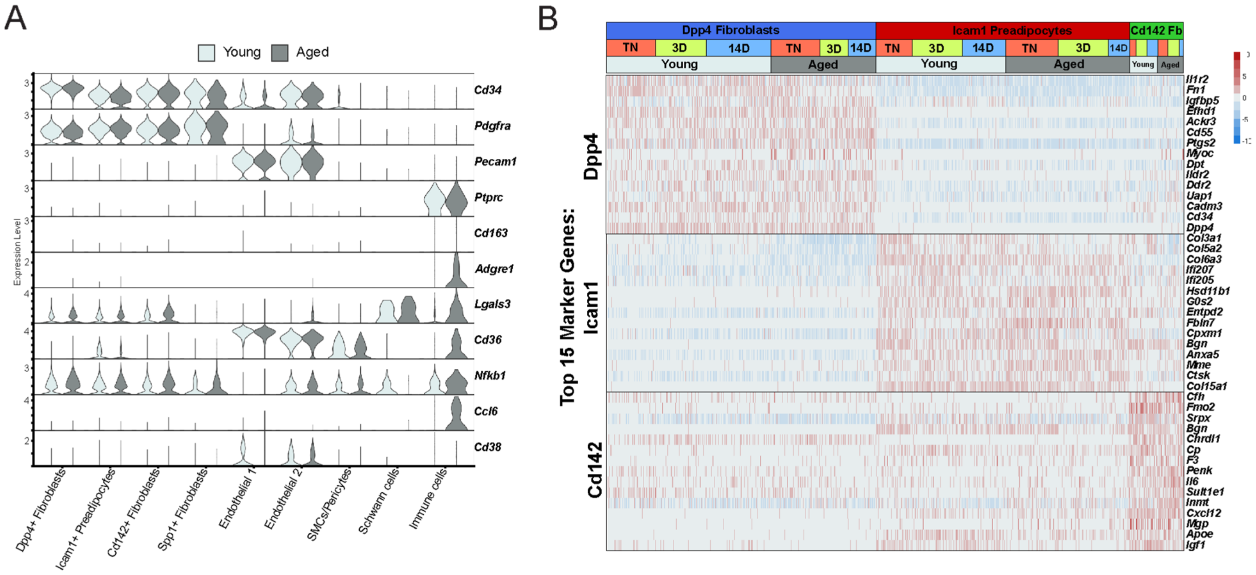

Figure S3, related to Figure 3. (**A**) Violin plot showing expression of ARC marker genes in cell clusters split by age, Y-axis = log-scale normalized read count. (**B**) Expression heatmap of top ASPC marker genes across age and housing conditions.

Figure S4

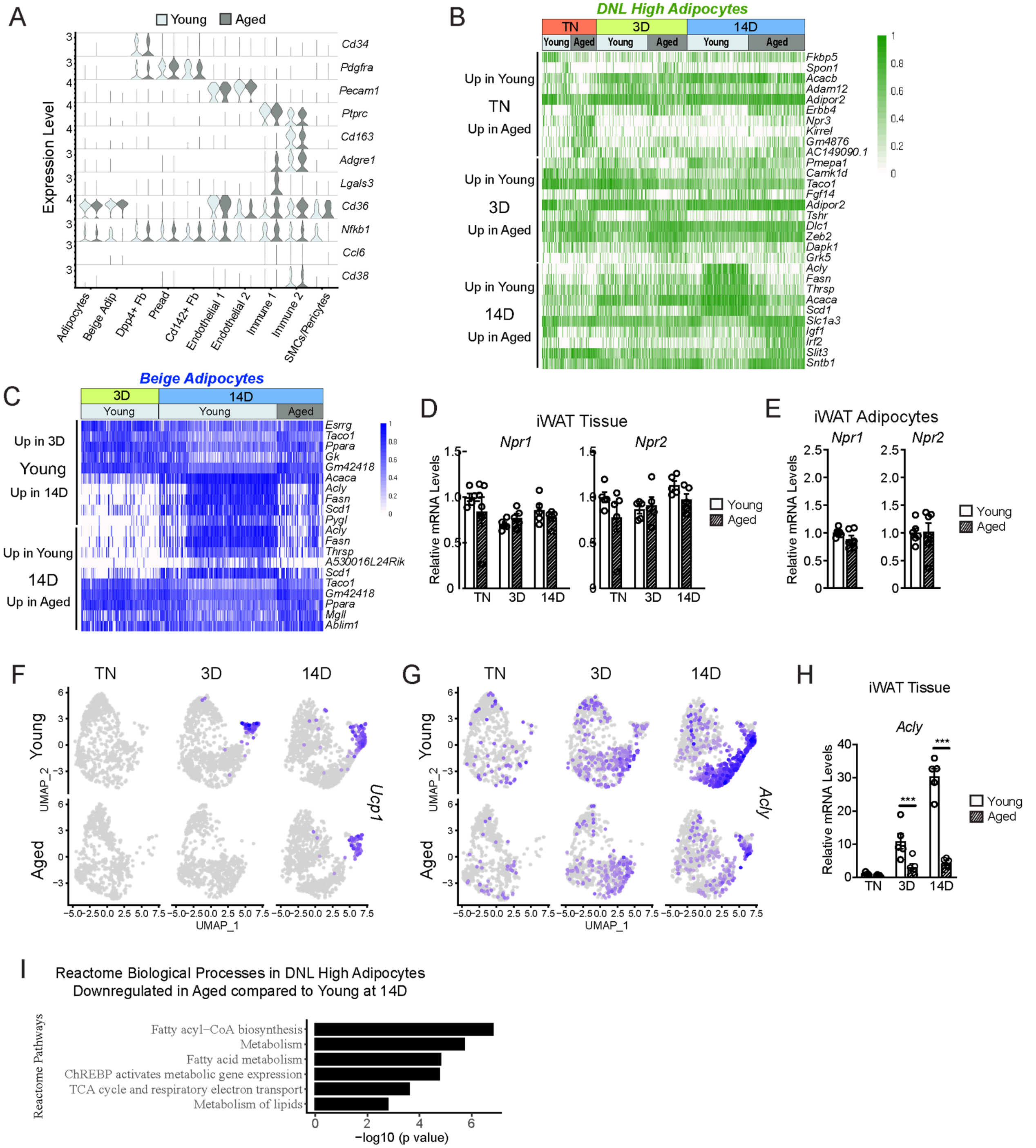

Figure S4, related to Figures 5,6. (**A**) Violin plot showing expression levels of ARC marker genes split by age, y-axis = log-scale normalized read count. (**B**) Expression heatmap of the top aging-regulated genes in DNL-high adipocytes. (**C**) Expression heatmap of the top aging-regulated and cold-regulated genes in beige adipocytes. (**D-E**) *Npr1* and *Npr2* mRNA levels in (D) iWAT from mouse groups described in Figure 1A, n=5 and (E) isolated adipocytes from iWAT from TN-acclimated young and aged mice, n=6. (**E-F**) UMAP of *Ucp1* (E) and *Acly* (F) mRNA levels in adipocyte populations (from Figure 5D). (**H**)

Acly mRNA levels in iWAT from mouse groups described in Figure 1A, n=5. (**G**) Enrichment analysis displaying the top six Reactome pathways in DNL high adipocytes downregulated in aged at 14 days. Data represent mean ± SEM, points represent biological replicates, 2 groups analyzed using a Student's t-test, and multiple conditions analyzed with a two-way ANOVA with a Tukey correction for multiple comparisons. Significance: not significant, $P > 0.05$; * $P < 0.05$ ** $P < 0.01$; *** $P < 0.001$.