## Supplemental Movie Legends

**Movie S1. Volume fluorescence-imaging of sympathetic arborizations in iWAT of the wildtype mice maintained at room temperature, related to Figure 1.**
The wildtype mice were maintained at room temperature, and their iWAT was processed for the whole-mount immunolabeling of tyrosine hydroxylase, and imaged at 12.6x magnification on the lightsheet microscope.

**Movie S2. Volume fluorescence-imaging of sympathetic arborizations in iWAT of the wildtype mice after cold challenge, related to Figure 1.**
The wildtype mice were subject to cold challenge for 5 days, and their iWAT was processed for the whole-mount immunolabeling of tyrosine hydroxylase, and imaged at 12.6x magnification on the lightsheet microscope.

## Supplemental Figures and Legends

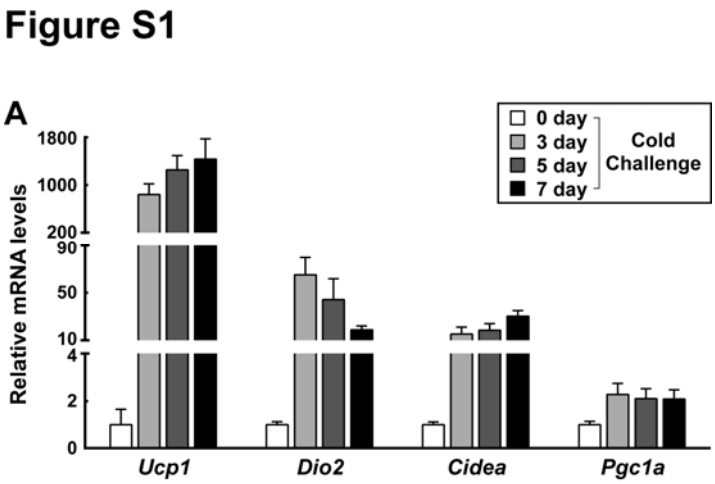


**Figure S1. Intra-adipose sympathetic plasticity in response to cold challenge, related to Figure 1.**

**(A)** The wildtype mice were subject to cold challenge. iWAT was harvested at indicated time points, and expression levels of the beiging-related genes were determined by the qPCR analysis. n=4, mean ± SEM.

## Figure S2

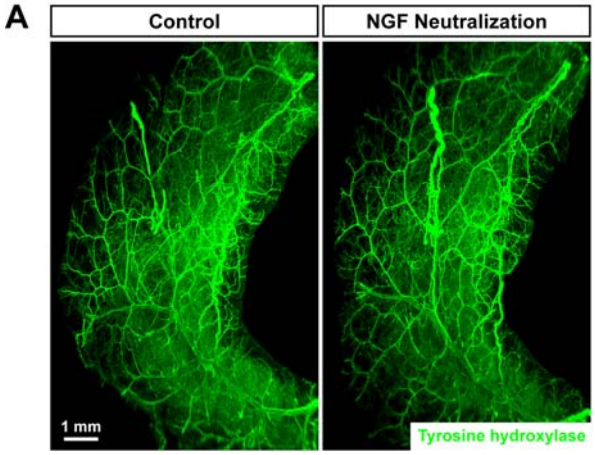


**Figure S2. Intra-adipose sympathetic plasticity is regulated by NGF, related to Figure 4.**

**(A)** The wildtype mice were administrated with NGF-neutralizing antibody or control IgG, and maintained at room temperature for 7 days. iWAT was harvested and processed for the volume fluorescence-imaging of anti-tyrosine hydroxylase. Representative 3D projections of iWAT imaged at 1.26x magnification on the lightsheet microscope.

## Figure S3

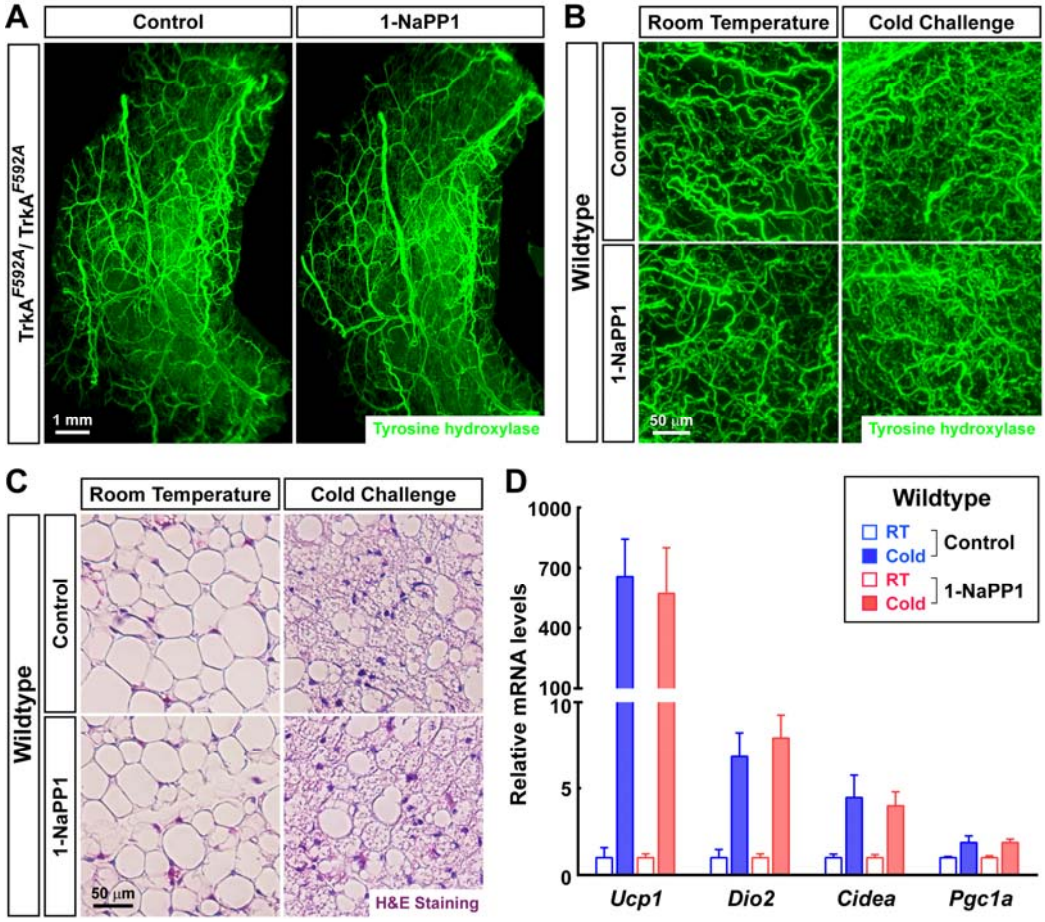


**Figure S3. Intra-adipose sympathetic plasticity is regulated by the TrkA signal, related to Figure 5.**

**(A)** *TrkA*$^{F592A/F592A}$ mice were daily treated with 1-NaPP1 or vehicle control. iWAT was processed for the volume fluorescence-imaging of anti-tyrosine hydroxylase. Representative 3D projections of iWAT imaged at 1.26x magnification on the lightsheet microscope. **(B to D)** The wildtype mice daily-treated with 1-NaPP1 or vehicle control were subject to cold challenge. **(B)** iWAT was processed for the volume fluorescence-imaging of anti-tyrosine hydroxylase. Representative 3D projections of iWAT imaged at 12.6x magnification on the lightsheet microscope. **(C)** Appearance of multilocular beige cells in iWAT was examined by H&E staining. **(D)** Expression levels of the beiging-related genes in iWAT were determined by the qPCR analysis. n=5, mean ± SEM.

## Figure S4

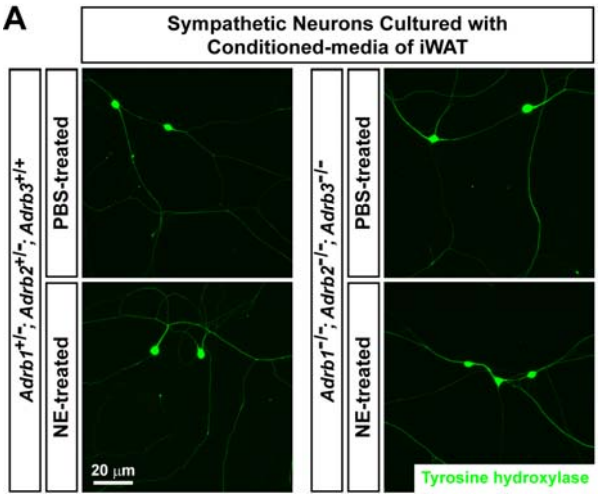


**Figure S4. Cold-elicited NGF expression in WAT depends on the catecholamine signal, related to Figure 6.**

**(A)** iWAT of *Adrb1*$^{-/-}$*; Adrb2*$^{-/-}$*; Adrb3*$^{-/-}$ mice or control mice (*Adrb1*$^{+/-}$*; Adrb2*$^{+/-}$*; Adrb3*$^{+/+}$) was *in vitro* treated with 100μM norepinephrine (NE) or control PBS. The conditioned-media of iWAT were collected and administrated to cultured sympathetic neurons. Representative images of sympathetic neurons immunolabeled by anti-tyrosine hydroxylase.