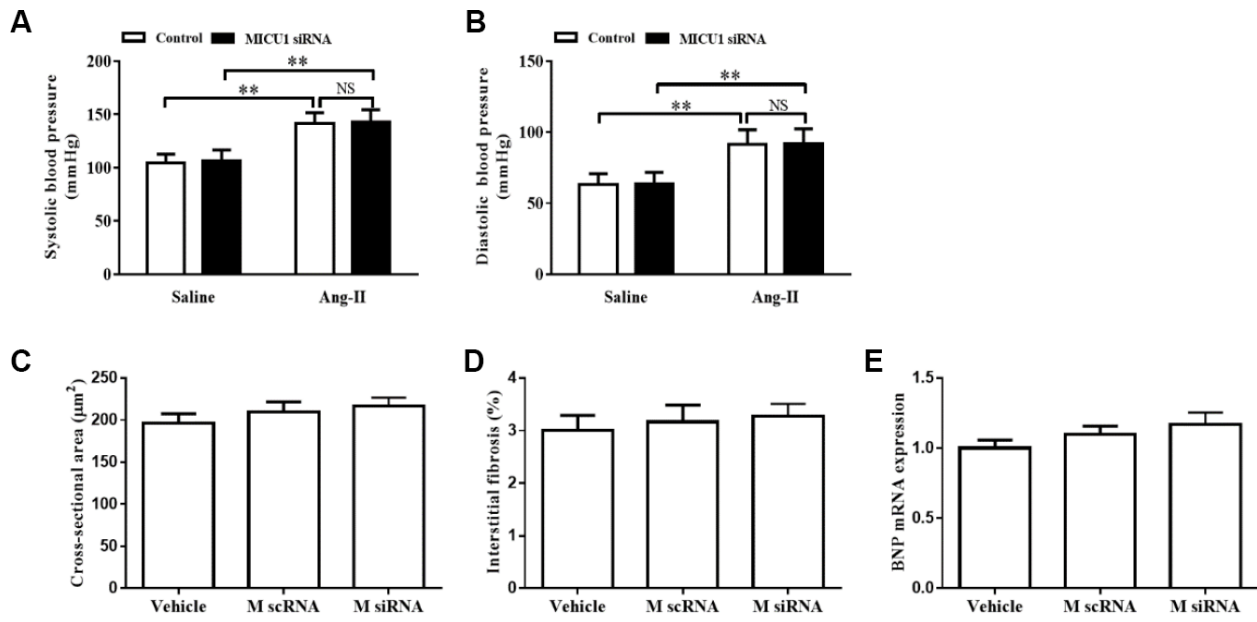
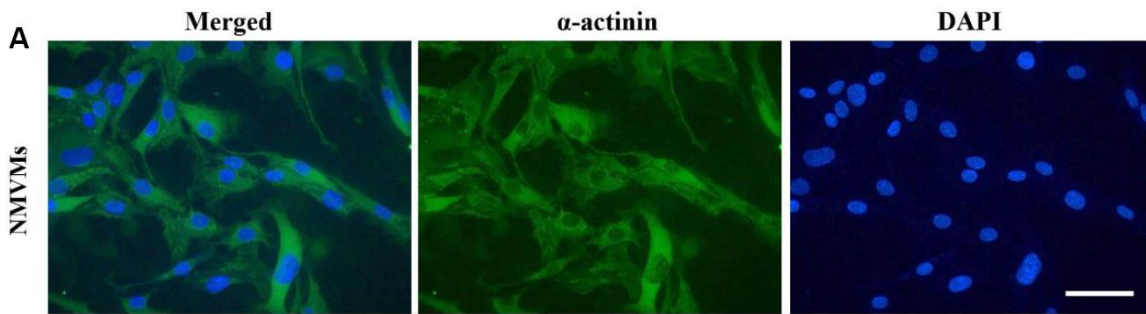


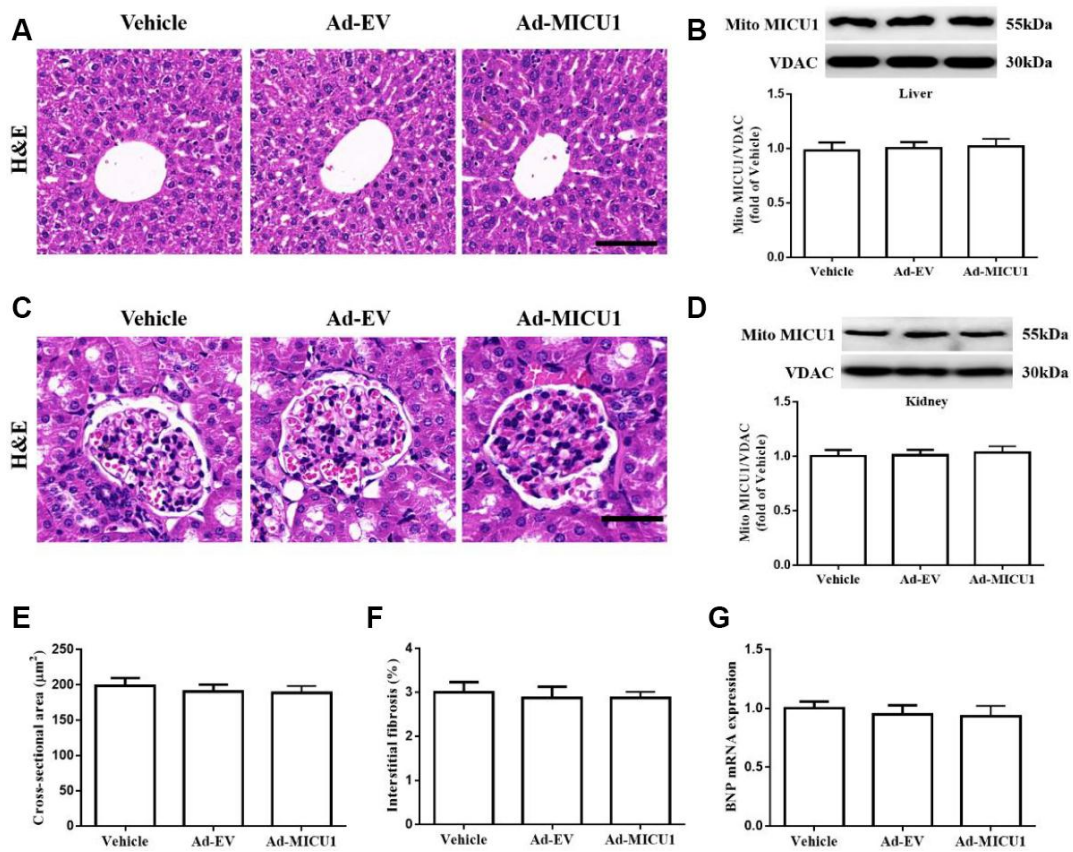
**SUPPLEMENTARY FIGURES**



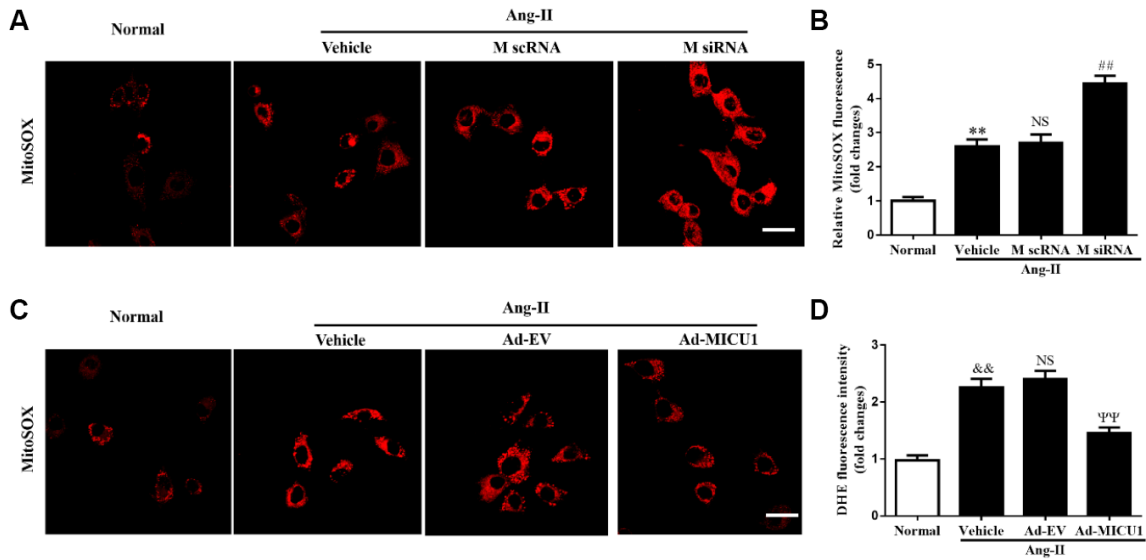
**Supplementary Figure 1. The blood pressure and hypertrophic related indicators in MICU1 knockdown mice was determined.** (A, B) The systolic blood pressure (SBP) and diastolic blood pressure (DBP) were determined by a noninvasive tail-cuff plethysmography. (C) Cross-sectional cardiomyocyte areas were summarized. (D) The interstitial fibrosis was quantified. (E) The mRNA expression of BNP was detected by qRT-PCR. M scRNA, scrambled siRNA; M siRNA, MICU1-specific siRNA. Presented values are means  $\pm$  SEM. N=6-8/group. \*\* $P$ <0.01 vs. Control in Saline.



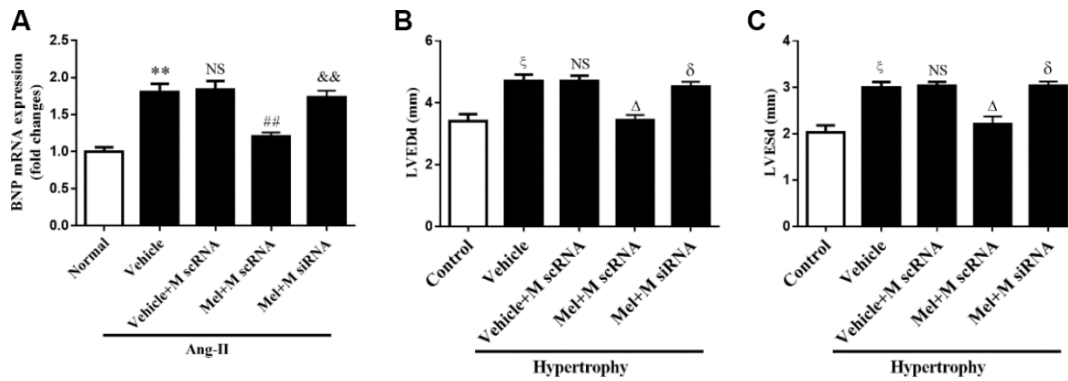
**Supplementary Figure 2. Positive immunofluorescence staining of NMVMs.** (A) The isolated neonatal mice ventricular myocytes NMVMs were authenticated by  $\alpha$ -actinin staining. Scale bars=10  $\mu\text{m}$ .



**Supplementary Figure 3. The effects and efficiency of MICU1 adenovirus in control mice.** (A, C) The structure of liver (A) and kidney (C) was observed by H&E staining after intramyocardial injection of adenovirus in control mice. (B, D) The protein levels of MICU1 in liver (B) and kidney (D) after intramyocardial injection of adenovirus in control mice was detected by western blotting. (E) Cross-sectional cardiomyocyte areas were summarized. (F) The interstitial fibrosis was quantified. (G) The mRNA expression of BNP was measured by qRT-PCR. Ad-EV, control adenovirus; Ad-MICU1, recombinant adenovirus encoding MICU1. Presented values are means  $\pm$  SEM. N=6-8/group.



**Supplementary Figure 4. MICU1 mediated cardiomyocyte hypertrophy by modulating oxidation states.** (A, B) The mitochondrial ROS levels in cardiomyocytes treated with Ang-II and MICU1 siRNA were analyzed by fluorescent probe MitoSOX. Representative confocal microscope images (A) and fluorescence quantitation (B) were presented. Scale bars=20  $\mu$ m. (C, D) The mitochondrial ROS levels in NMVMs treated with Ang-II and Ad-MICU1 were analyzed by fluorescent probe MitoSOX. Representative confocal microscope images (D) and fluorescence quantitation were presented. Scale bars=20  $\mu$ m. Presented values are means  $\pm$  SEM. N=6-8/group. \*\* $P$ <0.01 vs. Normal (1); ## $P$ <0.01 vs. M scRNA of Ang-II; && $P$ <0.01 vs. Normal (2);  $\psi\psi$  $P$ <0.01 vs. Ad-EV of Ang-II.



**Supplementary Figure 5. The effects of melatonin on BNP, LVEDd and LVESd.** (A) The mRNA expression of BNP was measured by qRT-PCR. (B, C) Echocardiographic assessment of left ventricular end-diastolic dimension (LVEDd) and left ventricular end-systolic dimension (LVESd) was used to reflect cardiac function. Data represent the means  $\pm$  SEM. N=6-8/group. \*\* $P$ <0.01 vs. Normal; ## $P$ <0.01 vs. (Vehicle + M scRNA) of Ang-II; && $P$ <0.01 vs. (Mel + M scRNA) of Ang-II;  $\zeta$  $P$ <0.05 vs. Control;  $\Delta$  $P$ <0.05 vs. (Vehicle + M scRNA) of Hypertrophy;  $\delta$  $P$ <0.05 vs. (Mel + M scRNA) of Hypertrophy.