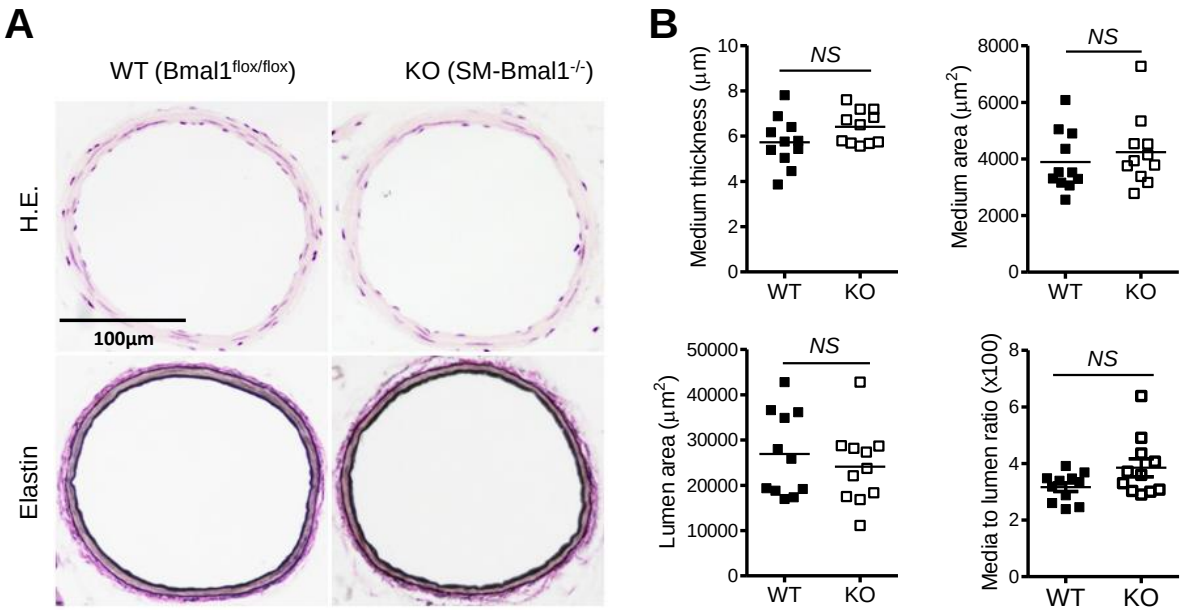
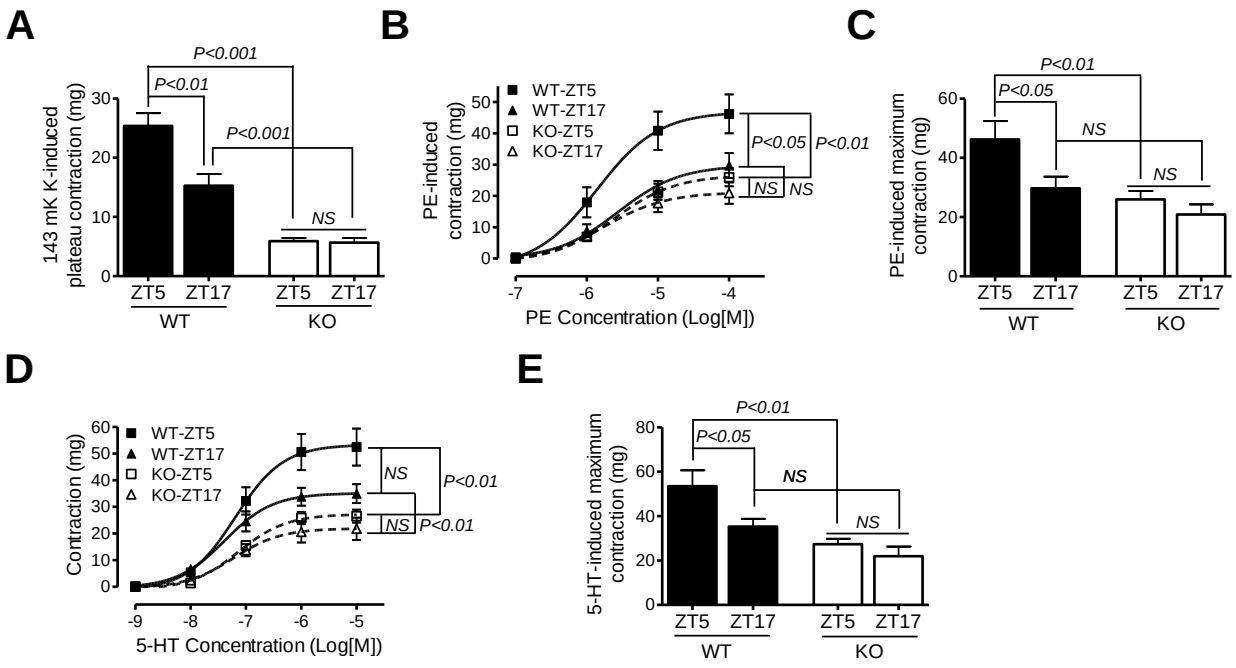
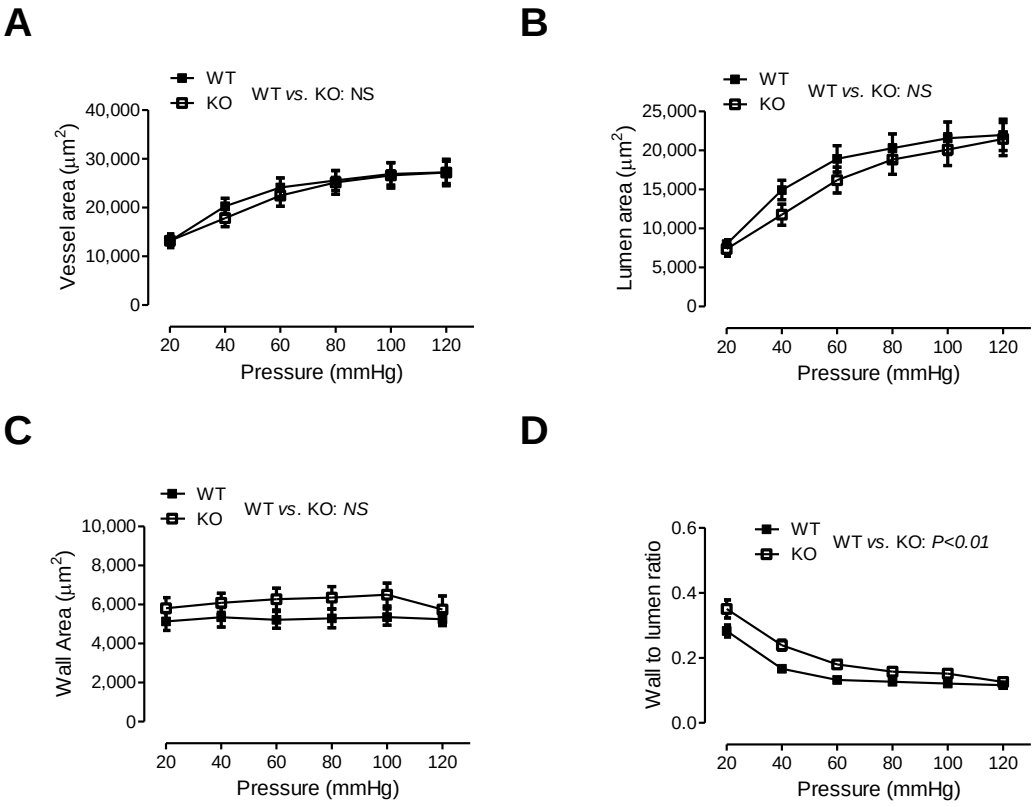
SUPPLEMENTAL DATA



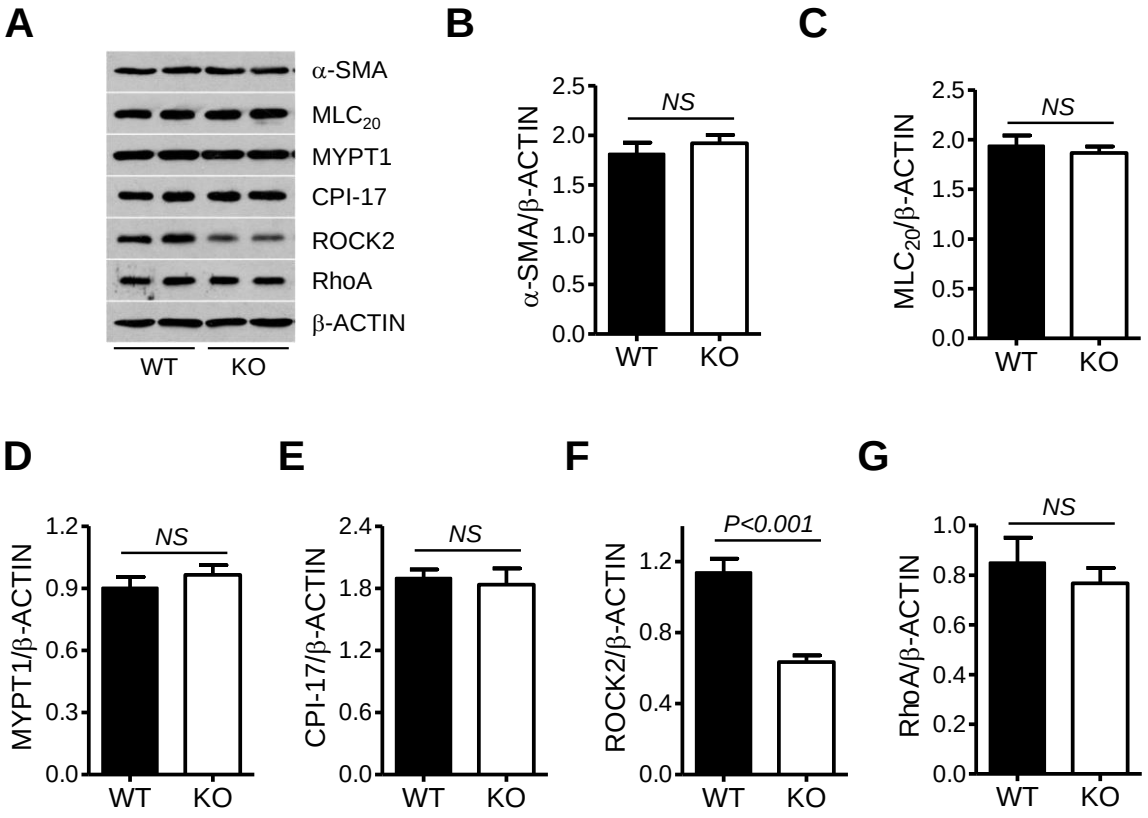
Supplemental Figure 1. Lack of detectable vascular remodeling in the 2nd branch of mesenteric arteries isolated from the SM-*Bmal1*-KO mice. (**A**) Representative H&E (the upper panel) and elastin staining (the bottom panel) cross-sectional photographs. (**B**) Quantification of the medium thickness, medium area, lumen area, and medium to lumen ratio from the elastin staining data.



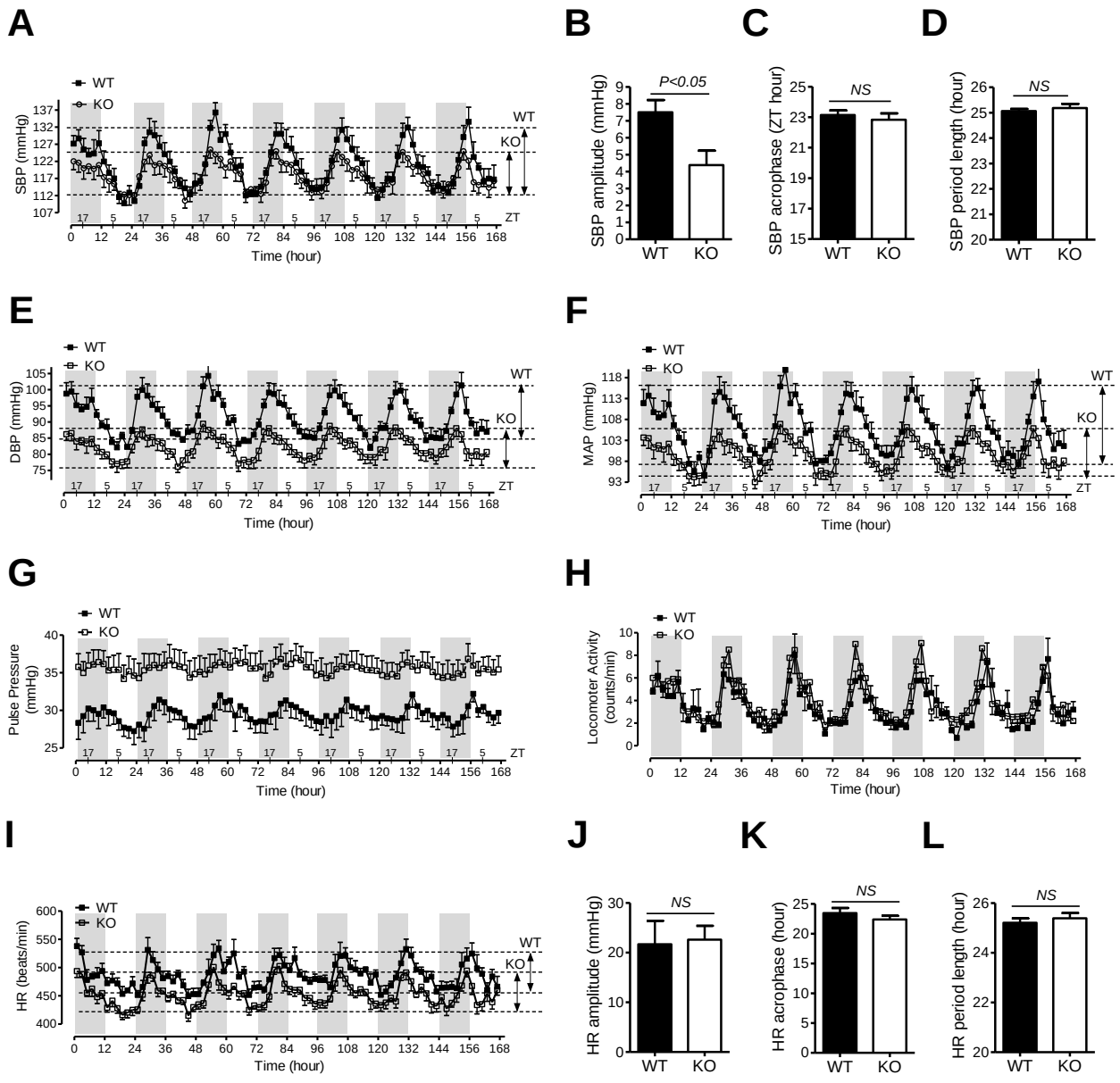
Supplemental Figure 2. The time-of-day variation in contractile responses is suppressed in right renal artery from SM-*Bmal1*-KO mice. (**A**) The plateau response to 143 mM K^+ (n=15). (**B** and **C**) The concentration-response curve (**B**) and the maximum response (**C**) to phenylephrine (PE; n=7-11). (**D** and **E**) The concentration-response curve (**D**) and the maximum response (**E**) to serotonin (5-HT; n=7-11).



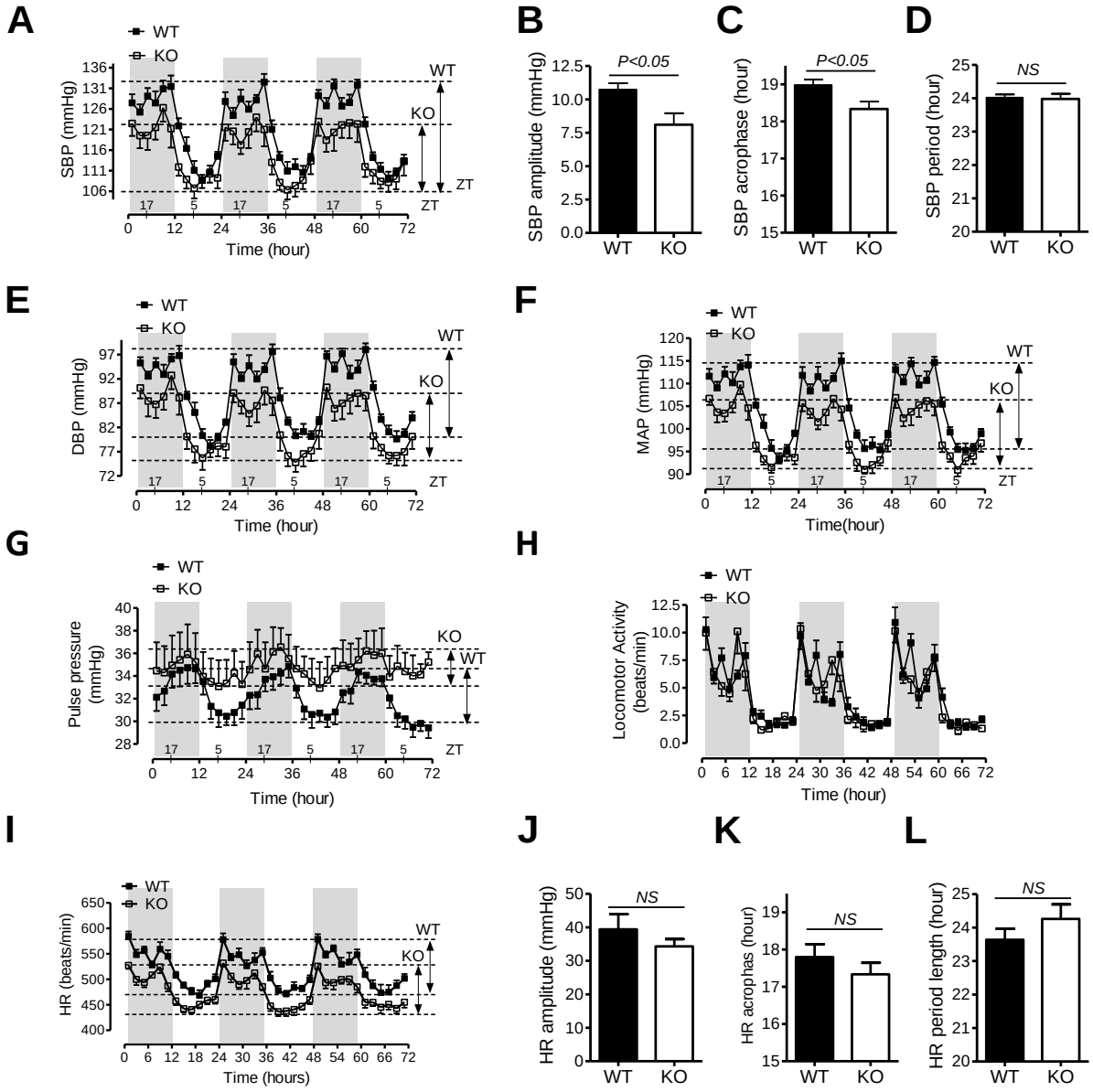
Supplemental Figure 3. Vessel structure of the 5th branch of mesenteric arteries. The cross-sectional vessel area (**A**), the cross-sectional lumen area (**B**), the cross-sectional wall area (**C**), and the wall to lumen ratio (**D**) were calculated from the outer and inner diameters of the vessels as described (1). N=6-7.



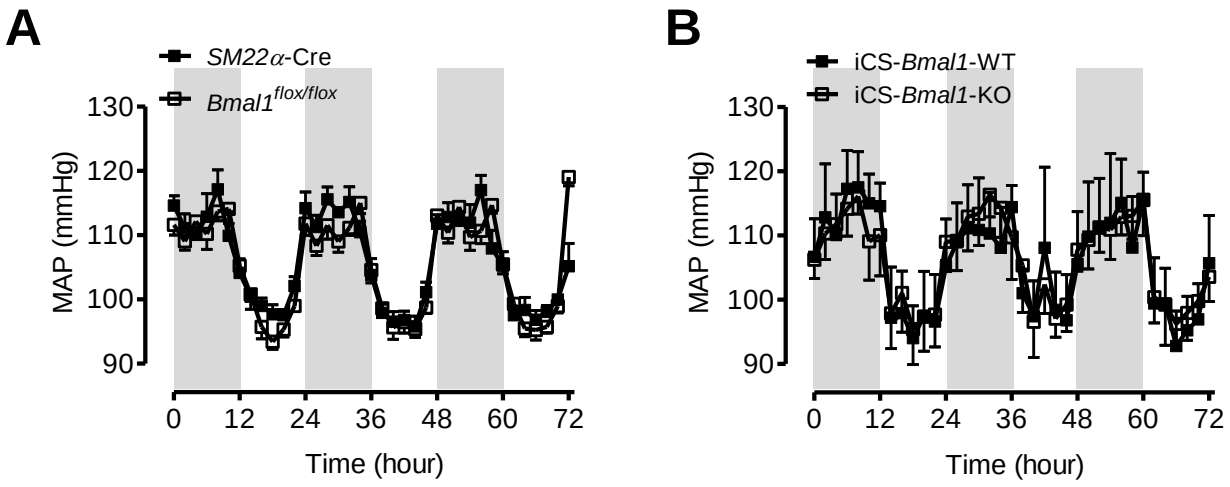
Supplemental Figure 4. ROCK2 protein expression is selectively suppressed in mesenteric arteries from SM-*Bmal1*-KO mice. Representative Western-blots (**A**) and quantitative data (**B-G**; n=8-14) of smooth muscle alpha actin (α-SMA; **B**), myosin light chain (MLC_{20}; **C**), myosin phosphatase target subunit 1 (MYPT1; **D**), 17 kDa PKC-potentiated protein phosphatase-1 inhibitor (CPI-17; **E**), Rho-kinase 2 (ROCK2; **F**), and small molecular weight G-protein RhoA (RhoA; **G**).



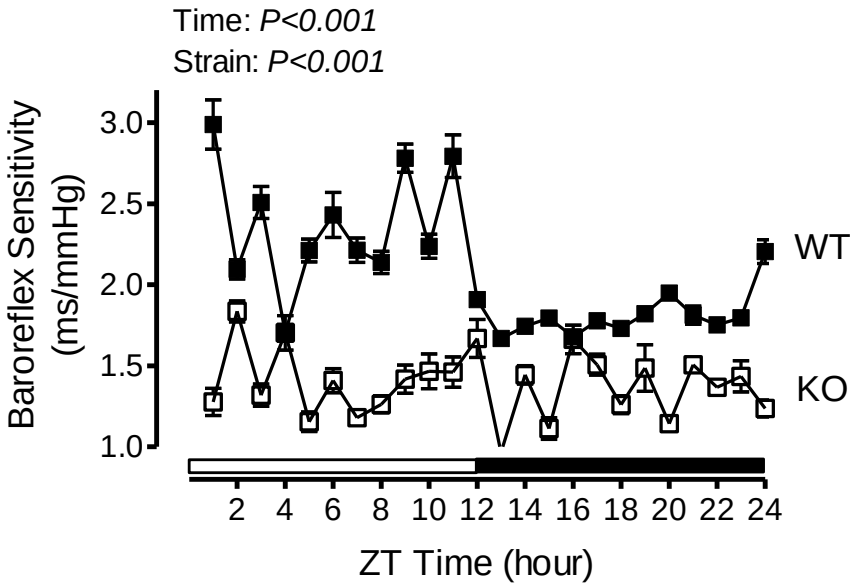
Supplemental Figure 5. Circadian rhythms in blood pressure, but not in locomotor activity and heart rate, are altered in SM-*Bmal1*-KO mice under constant light condition. (**A**, **E-I**) 2-h means of consecutive 7 day's telemetric recording of the systolic blood pressure (SBP; **A**), diastolic blood pressure (DBP; **E**), mean blood pressure (MAP; **F**), pulse pressure (**G**), locomotor activity (**H**), and heart rate (HR; **I**) under constant light conditions (n=5-7). (**B-D**) SBP circadian oscillations in amplitude (**B**), acrophase (**C**), and period length (**D**). (**J-L**) HR circadian oscillations in amplitude (**J**), acrophase (**K**), and period length (**L**).



Supplemental Figure 6. Circadian rhythms in blood pressure, but not in locomotor activity and heart rate, are altered in SM-*Bmal1*-KO mice under 12:12 light/dark condition. (**A**, **E-I**) 2-h means of **c**onsecutive 3 day's telemetric recording of the systolic blood pressure (SBP; **A**), diastolic blood pressure (DBP; **E**), mean blood pressure (MAP; **F**), pulse pressure (**G**), locomotor activity (**H**), and heart rate (HR; **I**) under 12:12 light/dark conditions (n=8). (**B**-**D**) SBP Circadian oscillations in amplitude (B), acrophase (C), and period length (D). E). (**J**-**L**) HR circadian oscillations in amplitude (J), acrophase (K), and period length (L).



Supplemental Figure 7. Smooth muscle specific *Cre*-recombinase expression or cardiomyocyte-specific deletion of *Bmal1* has no significant effect on blood pressure level and circadian oscillations. (**A**) Consecutive 3 day's telemetric recording of mean arterial pressure (MAP) under 12:12 light/dark condition in *SM22α-Cre* mice and *Bmal1*$^{flox/flox}$ mice (**A**, n=6 to 8). (**B**) Consecutive 3 day's telemetric recording of MAP in inducible cardiomyocyte specific *Bmal1*-KO mice (iCS-*Bmal1*-KO) and control mice (iCS-*Bmal1*-WT, B, n=3-4). To delete *Bmal1* from cardiomyocyte, the Cre-recombination was activated by consecutive intraperitoneal injection of tamoxifen (2mg/day) for 5 consecutive days and the control mice were administered with vehicle (15% ethanol in sunflower seed oil).



Supplemental Figure 8. The time of day variation in spontaneous baroreflex sensitivity is suppressed in *Bmal1*-KO mice. The systolic blood pressure data collected under 12:12 light:dark condition were used for the sequence analysis of the spontaneous baroreflex sensitivity. The data were obtained from 6 to 22 mice in each strain. Note that the difference between dark and light phase detected in the WT littermates mice was mostly lost in the SM-*Bmal1*-KO mice.

Supplemental Table 1

Mean arterial pressure before and after phenylephrine (PE) injections

	Bmal1$^{flox/flox}$				SM-*Bmal1*-KO			
PE dose	ZT5 (mmHg)		ZT17 (mmHg)		ZT5 (mmHg)		ZT17 (mmHg)	
(μg/ml)	basal	injection	basal	injection	basal	injection	basal	injection
5	83.3	92.2	80.5	86.7	74.4	81.3	74.0	78.7
10	81.9	95.1	82.4	90.2	76.4	85.2	72.8	81.5
50	80.9	106.0	80.3	98.5	79.6	96.4	71.9	87.2

Seven to 10 days after the implantation of telemetry transmitters, the SM-*Bmal1*-KO and WT littermate were anesthetized at ZT5 and ZT17, respectively. A catheter was inserted into femoral vein and various doses of phenylephrine (5, 10, and 50 μg/kg) were bolus injected. Maximal pressure increase was recorded. n=3 for each mouse strain. Values are expressed as mean value ± SEM from 3 mice.

Supplemental Table 2

PCR primers

Gene	Primer	Sequence	Application
Mouse *Bmal1*	Forward Reverse	5’-GTCGGGACAAAATGAACAGTTT-3’C 5’-TCCTGGACATTGCATTGCAT-3’	Real-time PCR
Mouse *Rock2*	Forward Reverse	5’-TTTCTAAACATGCGAAGAATCTCATATG-3’ 5’-CTTCTACCCCATTTCTTCCAAGTC-3’	Real-time PCR
Mouse *Per1*	Forward Reverse	5’-ATCCTCCCTGAAAAGGGGTA-3’ 5’-GGATCTCTTCCTGGCATCTG-3’	ChIP assay
Mouse *Rock2*	Forward Reverse	5’-AATCAGAACCCTAGGACGCA-3’ 5’-ATATATCAGCACACACATGTAAATGTG-3’	ChIP (E-box 5 to E-box 8)
Mouse *Rock2*	Forward Reverse	5’-AACTCAGAAATCCGCCTGC-3’ 5’-ATGTTTTCATGCTGGGTG-3’	ChIP (E-box 9 to E-box 10)
Mouse *Rock2*	Forward Reverse	5’-TCCTATTTTAGGTTTTTCTGAGATCCA-3’ 5’-CATGGCATTTATTGTAAATCGTGTTCT-3’	Cloning *Rock2* promoter

SUPPLEMENTAL METHODS

Morphometric Analysis of Mesentery Artery. Secondary order branch mesenteric arteries were embedded in paraffin, sectioned, and stained with Hematoxylin-Eosin and elastin as described (2). Elastin stained slides were used for morphometric analysis as described (3).

Analysis of spontaneous baroreflex sensitivity. Baroreflex sensitivity for control of heart rate was calculated from spontaneous fluctuations in systolic arterial blood pressure and heart rate using the sequence technique and a custom-made software [Hemolab Ver. 7.5 (July 21, 2009), down loaded from http://www.haraldstauss.com/HemoLab/HemoLab.html]. Recordings were obtained at a high sampling rate of 1000 Hz. A period of 10 minutes with minimal locomotor activity was selected for analysis from each hour over the 24-h day for analysis. Sequences of ≥ 4 consecutive blood pressure pulses where the systolic arterial pressure and pulse interval are positively correlated (r^2>0.80) were counted. Baroreflex sensitivity was calculated as the average slope of the systolic pressure-pulse interval relationships.

Supplemental References

1. Rigsby CS, Pollock DM, and Dorrance AM. Spironolactone improves structure and increases tone in the cerebral vasculature of male spontaneously hypertensive stroke-prone rats. *Microvasc Res*. 2007;73(3):198-205.
2. Liu S, Xie Z, Daugherty A, Cassis LA, Pearson KJ, Gong MC, and Guo Z. Mineralocorticoid Receptor Agonists Induce Mouse Aortic Aneurysm Formation and Rupture in the Presence of High Salt. *Arterioscler Thromb Vasc Biol*. 2013;33(1568-79.
3. Su W, Xie Z, Liu S, Calderon LE, Guo Z, and Gong MC. Smooth muscle-selective CPI-17 expression increases vascular smooth muscle contraction and blood pressure. *Am J Physiol Heart Circ Physiol*. 2013;305(1):H104-13.