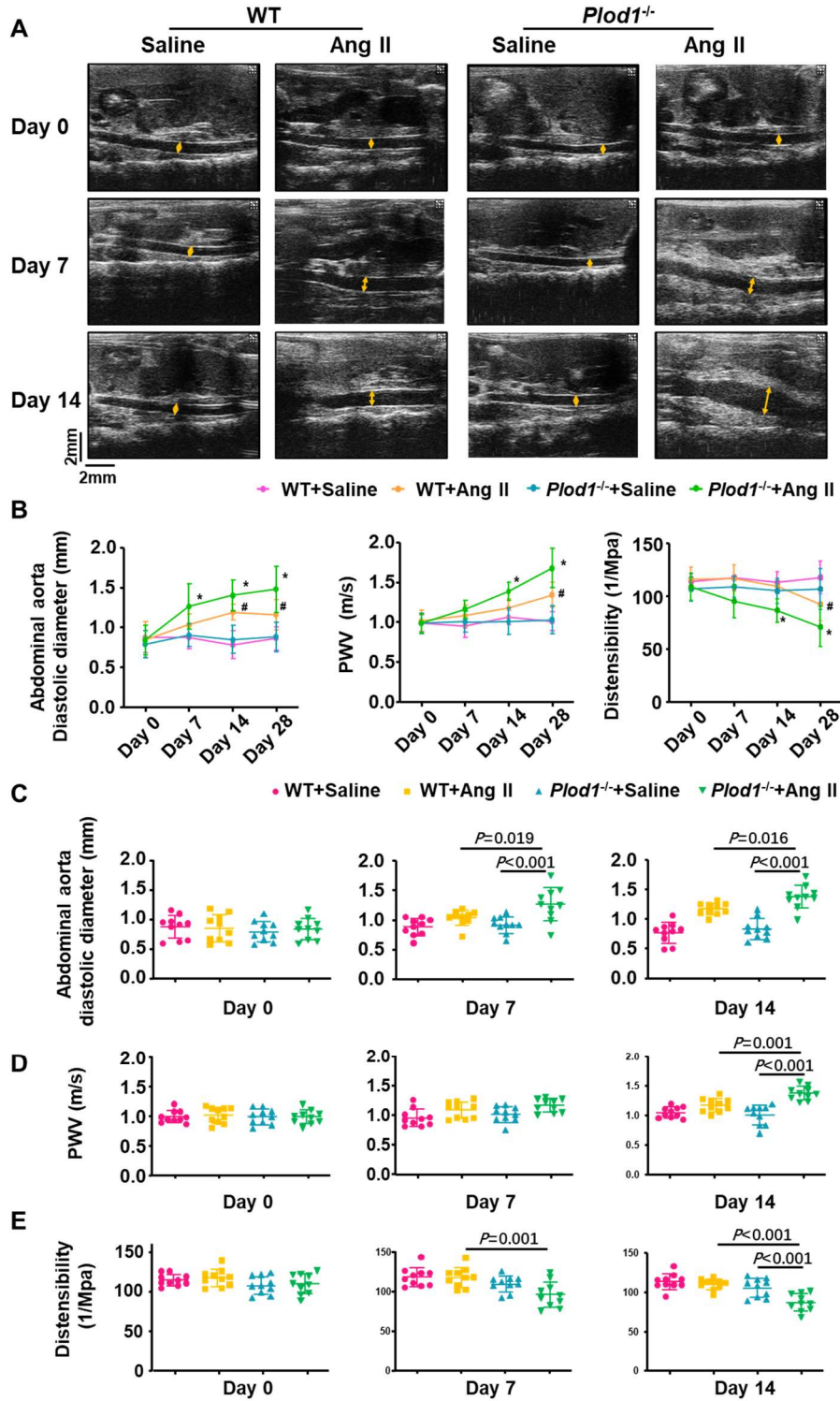


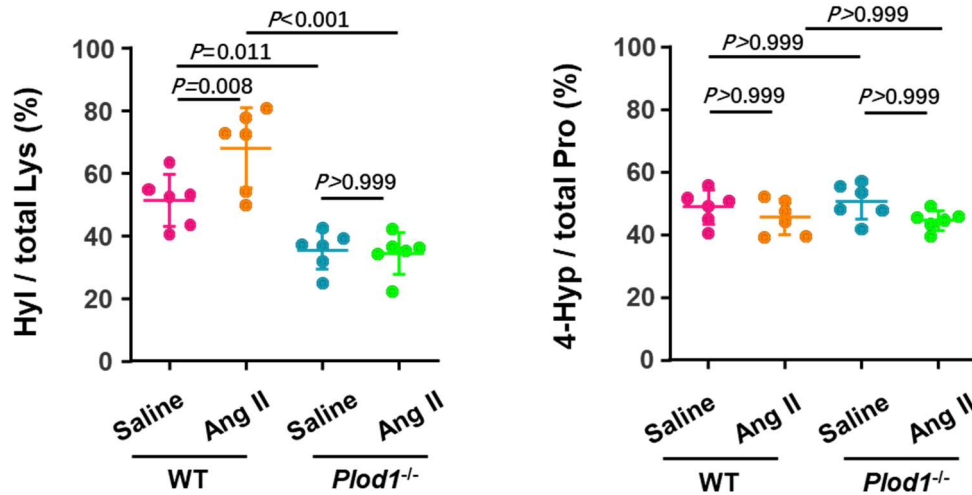
# Supplementary Material

## Supplementary Figures

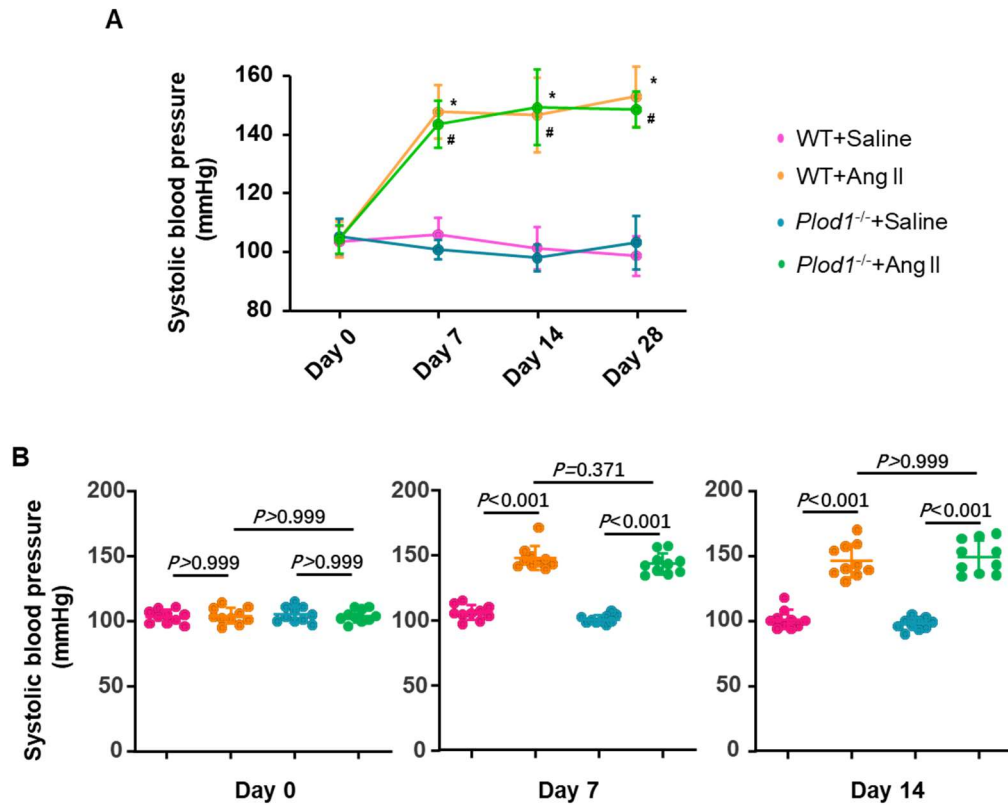


**Figure S1** The changes in abdominal aortic structure and function at different time points after saline or angiotensin II (Ang II) infusion in mice. **A**,

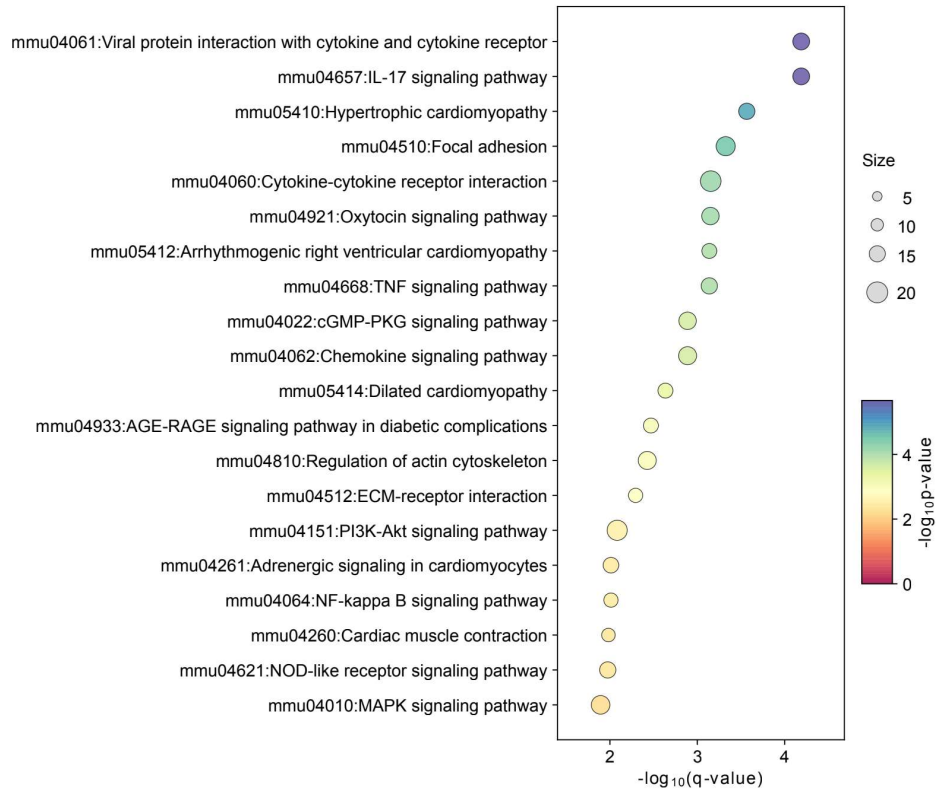
Representative images of transabdominal ultrasound measurements (lumen is indicated in yellow line) at different time points after saline or Ang II infusion from wild-type (WT) and *Plod1*<sup>-/-</sup> mice. **B**, Quantification of abdominal aorta diastolic diameter, pulse-wave velocity (PWV) and distensibility of aortic wall by ultrasound at different time points after saline or Ang II infusion (n = 10). \**P* < 0.05 vs corresponding baseline (day 0) levels of *Plod1*<sup>-/-</sup> group, #*P* < 0.05 vs corresponding baseline levels of WT group. One-way ANOVA with the Bonferroni post hoc test. Quantification of abdominal aorta diastolic diameter (**C**), PWV (**D**) and distensibility (**E**) of aortic wall by ultrasound at baseline, day 7 and day 14 after saline or Ang II infusion (n = 10). Two-way ANOVA with the Bonferroni post hoc test.



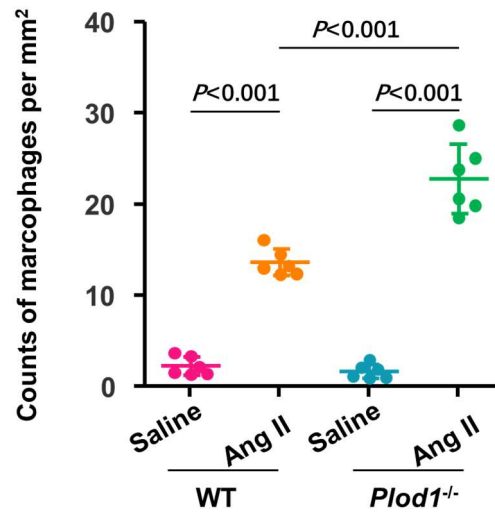
**Figure S2 Comparison of lysine and proline posttranslational modifications in wild-type (WT) and *Plod1*<sup>-/-</sup> aortas after saline or angiotensin II (Ang II) infusion.** Quantification of unmodified lysine (Lys), unmodified proline (Pro), hydroxylysine (Hyl), and 4-hydroxyproline (4-Hyp) was performed by UPLC-MS/MS assay in WT and *Plod1*<sup>-/-</sup> aortas. The percentage was calculated as the concentrations of hydroxylated lysine/proline divided by the concentrations of total lysine/proline (n = 6). Two-way ANOVA with the Bonferroni post hoc test.



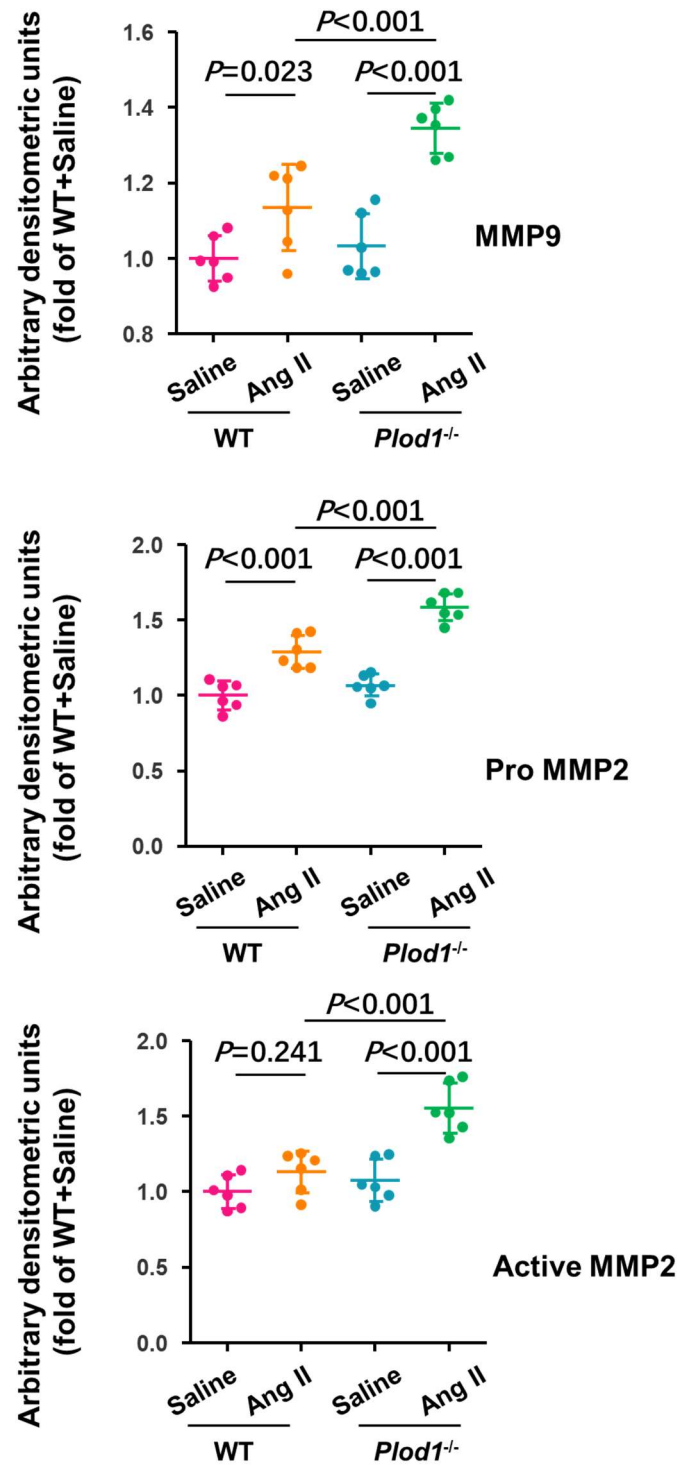
**Figure S3 The changes in systolic blood pressure at different time points after saline or angiotensin II (Ang II) infusion in mice. A,** Quantification of systolic blood pressure at different time points after saline or Ang II infusion from wild-type (WT) and *Plod1*<sup>-/-</sup> mice (n = 10). \**P* < 0.05 vs corresponding baseline (day 0) levels of *Plod1*<sup>-/-</sup> group, #*P* < 0.05 vs corresponding baseline levels of WT group. One-way ANOVA with the Bonferroni post hoc test. **B,** Quantification of systolic blood pressure at baseline, day 7 and day 14 after saline or Ang II infusion (n = 10). Two-way ANOVA with the Bonferroni post hoc test.



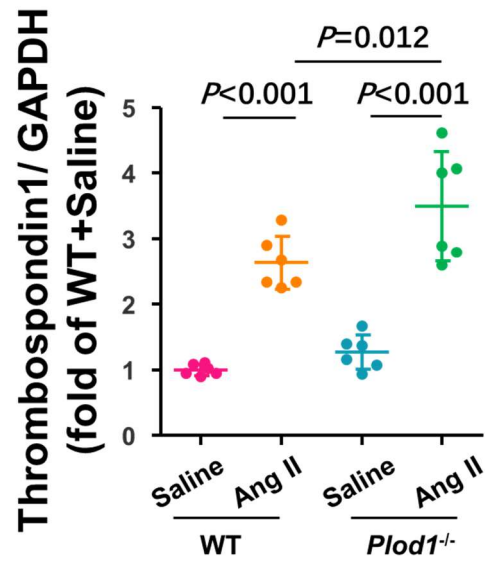
**Figure S4. Top terms showing enrichment from KEGG pathways analysis of the genes that are differentially expressed between *Plod1*<sup>-/-</sup> and wild-type mice after angiotensin II infusion.**



**Figure S5. Quantification of macrophage population in abdominal aortas from wild-type (WT) and *Plod1*<sup>-/-</sup> mice following 2 weeks of saline or angiotensin II (Ang II) infusion. n = 6. Two-way ANOVA with the Bonferroni post hoc test.**

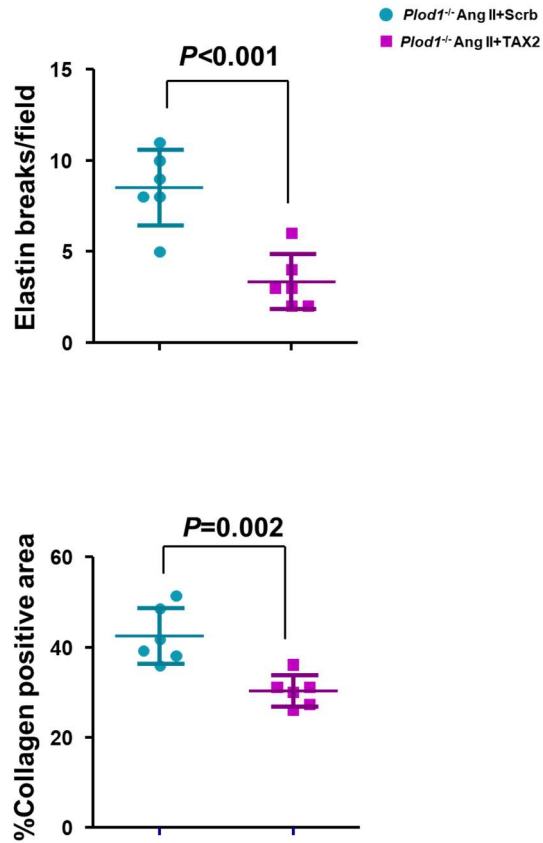


**Figure S6. Quantitative analysis of the MMP9, Pro-MMP2 and MMP2 activity in abdominal aortas from wild-type (WT) and *Plod1*<sup>-/-</sup> mice following 2 weeks of saline or angiotensin II (Ang II) infusion. n = 6. Two-way ANOVA with the Bonferroni post hoc test.**

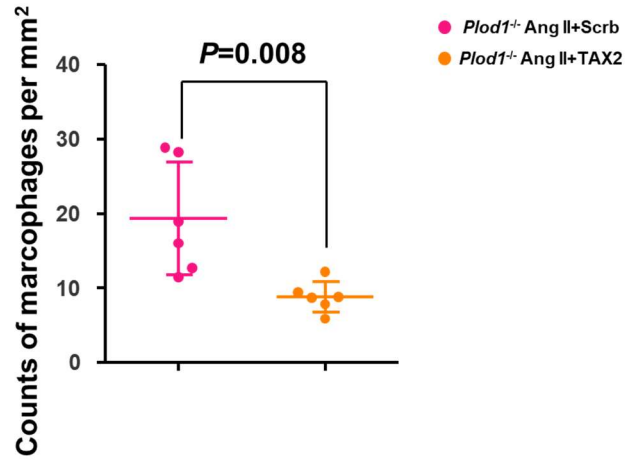


**Figure S7. Quantitative analysis of immunoblot for thrombospondin-1 in the abdominal aorta from wild-type (WT) and *Plod1*<sup>-/-</sup> mice after angiotensin II (Ang II) or saline infusion. n = 6. Two-way ANOVA with the Bonferroni post hoc test.**

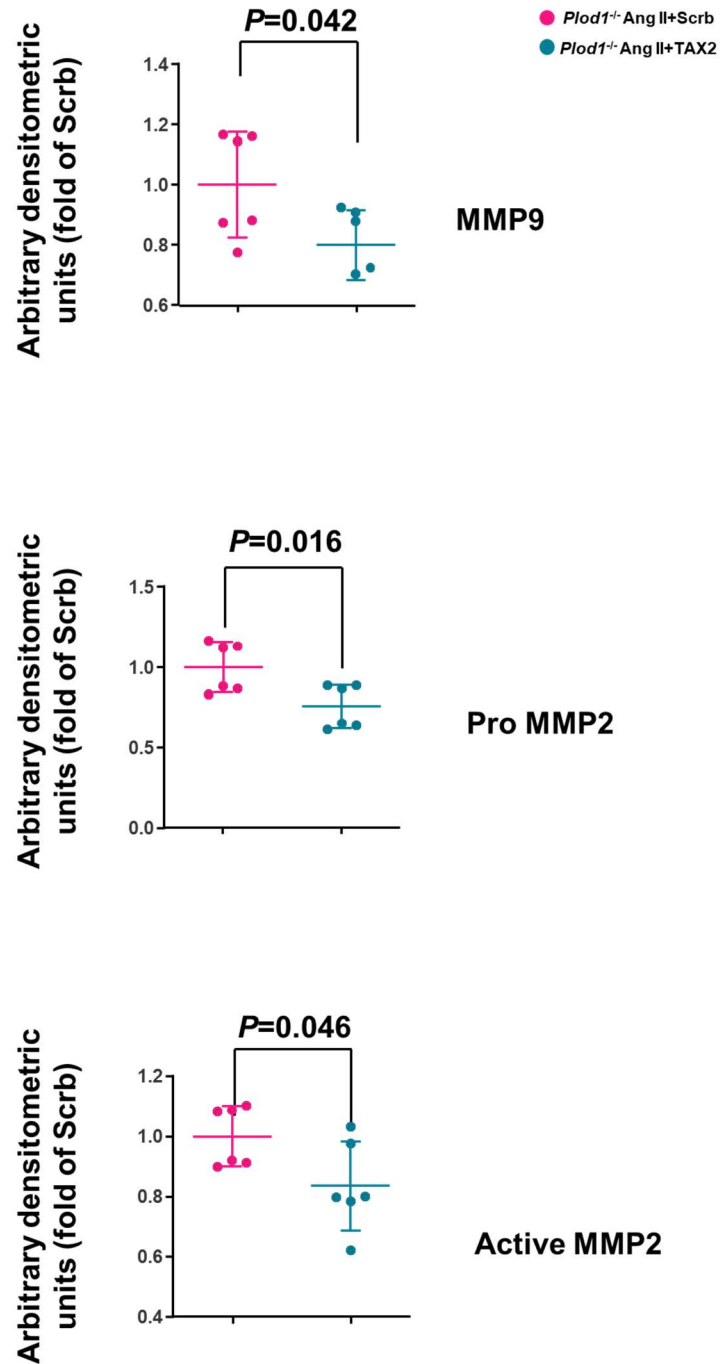




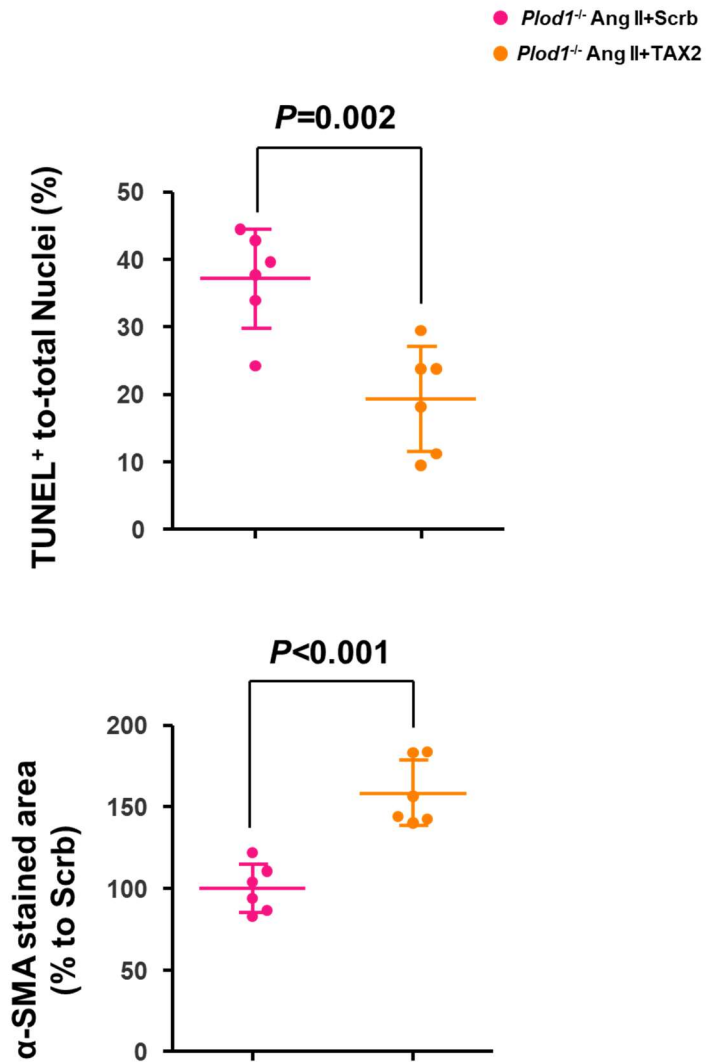
**Figure S8. Quantification of elastin breakage (upper) and collagen content (lower) in abdominal aortas from *Plod1*<sup>-/-</sup> mice treated with scrambled peptide (Scrb) or TAX2 followed by angiotensin II (Ang II) infusion for 2 weeks. n = 6. Student's unpaired two-tailed t-test.**



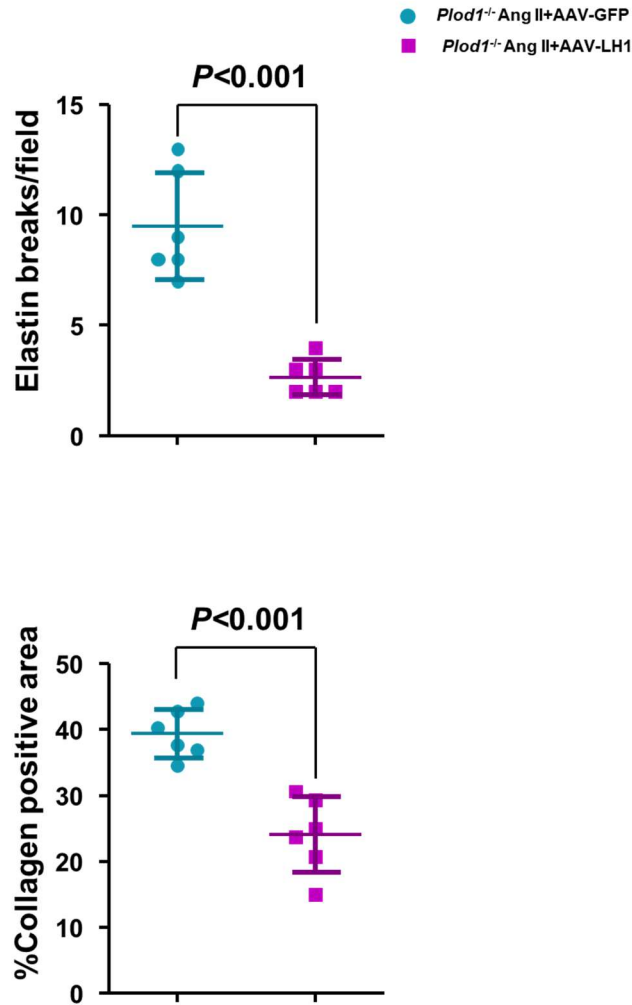
**Figure S9. Quantification of macrophage population in abdominal aortas from *Plod1*<sup>-/-</sup> mice treated with scrambled peptide (Scrb) or TAX2 followed by angiotensin II (Ang II) infusion for 2 weeks. n = 6. Student's unpaired two-tailed t-test.**



**Figure S10. Quantitative analysis of the MMP9, Pro-MMP2 and MMP2 activity in abdominal aortas from *Plod1*<sup>-/-</sup> mice treated with scrambled peptide (Scrb) or TAX2 followed by angiotensin II (Ang II) infusion for 2 weeks. n = 6. Student's unpaired two-tailed t-test.**



**Figure S11. Quantitative analysis of apoptotic cells (upper) and  $\alpha$ -SMA (lower) in abdominal aortas from *Plod1*<sup>-/-</sup> mice treated with scrambled peptide (Scrb) or TAX2 followed by angiotensin II (Ang II) infusion for 2 weeks. n = 6. Student's unpaired two-tailed t-test.**



**Figure S12. Quantification of elastin breakage (upper) and collagen content (lower) in abdominal aortas from *Plod1*<sup>-/-</sup> mice treated with AAV-GFP or AAV-LH1 followed by angiotensin II (Ang II) infusion for 2 weeks. n = 6. Student's unpaired two-tailed t-test.**

## Supplementary Tables

**Table S1: Clinical information for the human aorta specimens.**

|  | <b>Human healthy (non-aneurysmal)<br/>aorta (n = 6)</b> |     |    |     |    |    | <b>Human abdominal aortic aneurysm<br/>(n = 6)</b> |     |    |     |     |    |
|--|---|-----|----|-----|----|----|--|-----|----|-----|-----|----|
| <b>SAMPLE#</b>   | #1  | #2  | #3 | #4  | #5 | #6 | #1   | #2  | #3 | #4  | #5  | #6 |
| <b>Age (years)</b>                                       | 51  | 58  | 45 | 61  | 10 | 57 | 47   | 48  | 64 | 71  | 44  | 66 |
| <b>Sex</b>   | M   | M   | M  | M   | M  | M  | M  | M   | M  | M   | M   | M  |
| <b>Aneurysm<br/>Size (Aortic<br/>diameter in<br/>mm)</b> | NA  | NA  | NA | NA  | NA | NA | 45   | 58  | 62 | 82  | 67  | 73 |
| <b>Comorbidities</b>                                     |   |     |    |     |    |    |  |     |    |     |     |    |
| Smoking  | NO  | NO  | NO | YES | NO | NO | YES  | NO  | NO | YES | NO  | NO |
| Obesity  | NO  | NO  | NO | NO  | NO | NO | NO   | NO  | NO | YES | NO  | NO |
| Family History   | NO  | NO  | NO | NO  | NO | NO | NO   | NO  | NO | NO  | NO  | NO |
| Hypertension   | NO  | NO  | NO | YES | NO | NO | YES  | YES | NO | YES | NO  | NO |
| Diabetes   | NO  | YES | NO | NO  | NO | NO | NO   | NO  | NO | NO  | YES | NO |
| <b>Medications</b>                                       |   |     |    |     |    |    |  |     |    |     |     |    |
| Statins  | NO  | NO  | NO | NO  | NO | NO | NO   | NO  | NO | NO  | NO  | NO |
| ACE<br>Inhibitors  | NO  | NO  | NO | YES | NO | NO | YES  | NO  | NO | YES | NO  | NO |
| ARBs   | NO  | NO  | NO | NO  | NO | NO | NO   | NO  | NO | NO  | NO  | NO |
| Beta Blockers  | NO  | NO  | NO | NO  | NO | NO | NO   | NO  | NO | NO  | NO  | NO |
| Antiplatelets  | NO  | NO  | NO | NO  | NO | NO | YES  | NO  | NO | NO  | NO  | NO |

M = male; ACE = Angiotensin converting enzyme; ARB = Angiotensin Receptor Blocker.

**Table S2. Sequence of each primer used in real-time PCR**

| Gene Symbol  | Sequence  |
|--------------|---|
| <i>I16</i>   | Forward: 5'-TAGTCCTTCCTACCCCAATTTC-3'<br>Reverse: 5'-TTGGTCCTTAGCCACTCCTTC-3'   |
| <i>Ccl2</i>  | Forward: 5'-TTAAAAACCTGGATCGGAACCAA-3'<br>Reverse: 5'-GCATTAGCTTCAGATTACGGGT-3' |
| <i>Gapdh</i> | Forward: 5'-CTCATGACCACAGTCCATGC-3'<br>Reverse: 5'-CACATTGGGGGTAGGAACAC-3'      |