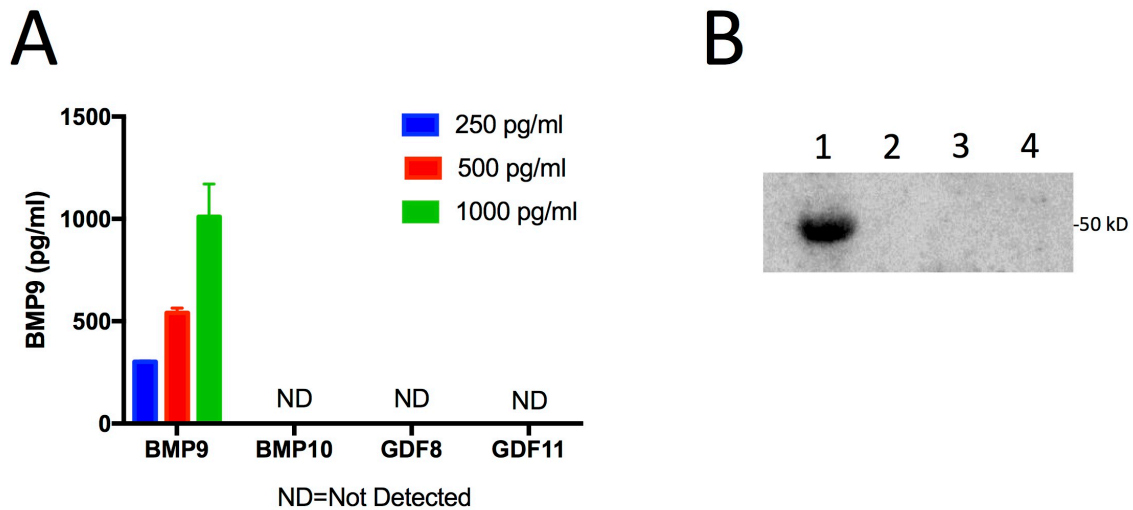


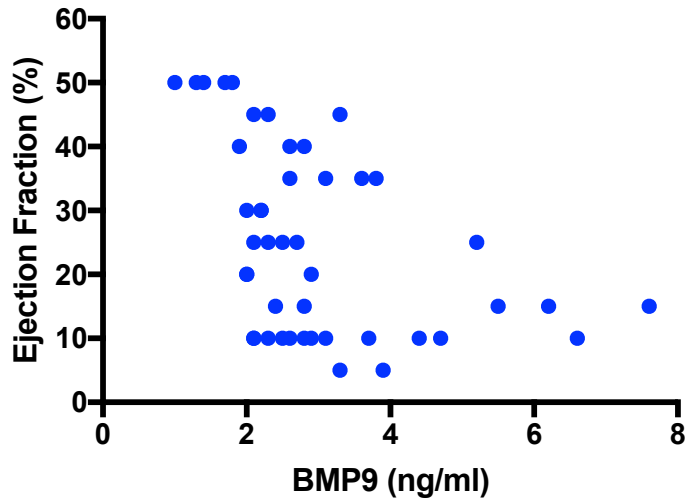
Supplemental Table 1. Primer sequences used for real time PCR

	Forward primer	Reverse primer
Alk1	TGA CTT TCT GCA GAG GCA GA	CGA CTC AAA GCA GTC TGT GC
PAI-I	GAC ACC CTC AGC ATG TTC ATC	AGG GTT GCA CTA AAC ATG TCA
Alk5	ATC CAT CAC TAG ATC GCC CT	CGA TGG ATC AGA AGG TAC AAG A
Id1	CAG GAT CAT GAA GGT CGC CA	GAA CAC ATG CCG CCT CGG
Id2	ACC AGA GAC CTG GAC AGA AC	CGG GTA CAA TTC CGC AGC TTT TAG

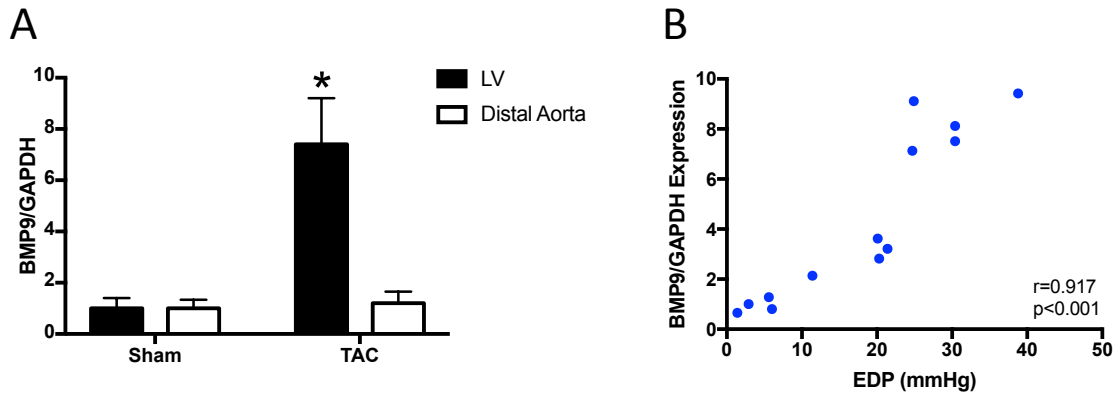


Supplemental Figure 1. BMP9 ELISA and Antibody Do Not Exhibit Cross-Reactivity with BMP10, GDF8 or GDF11

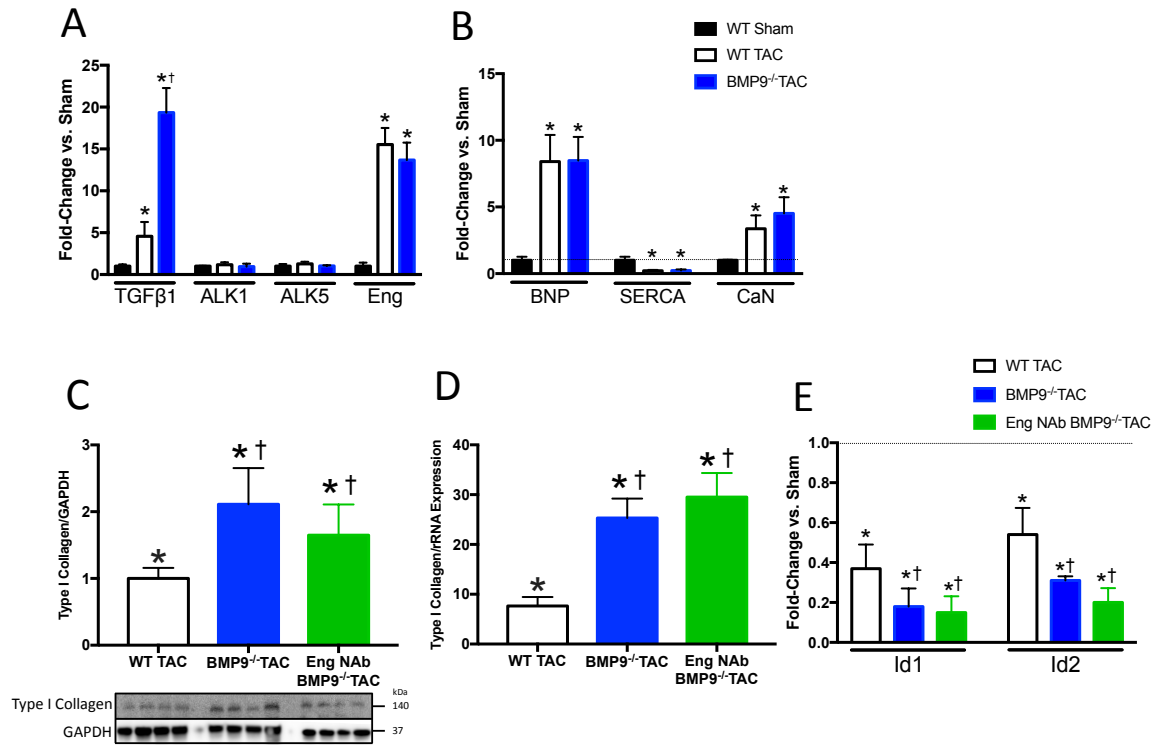
A) BMP9 levels measured by ELISA for recombinant human (rh) BMP9, rhBMP10, rhGDF8, rhGDF11 at 250-1000 pg/ml. B) BMP9 Western blot for rhBMP9, rhBMP10, rhGDF8, rhGDF11 at 100 ug/well (lanes 1-4 respectively).



Supplemental Figure 2. Left Ventricular Ejection Fraction Correlates with Circulating BMP9 Levels in Patients with Heart Failure
Correlation of left ventricular ejection fraction and plasma BMP9 levels (Pearson correlation coefficient $r = -0.45$, $p = 0.001$) measured by ELISA in N=45 patients with heart failure.

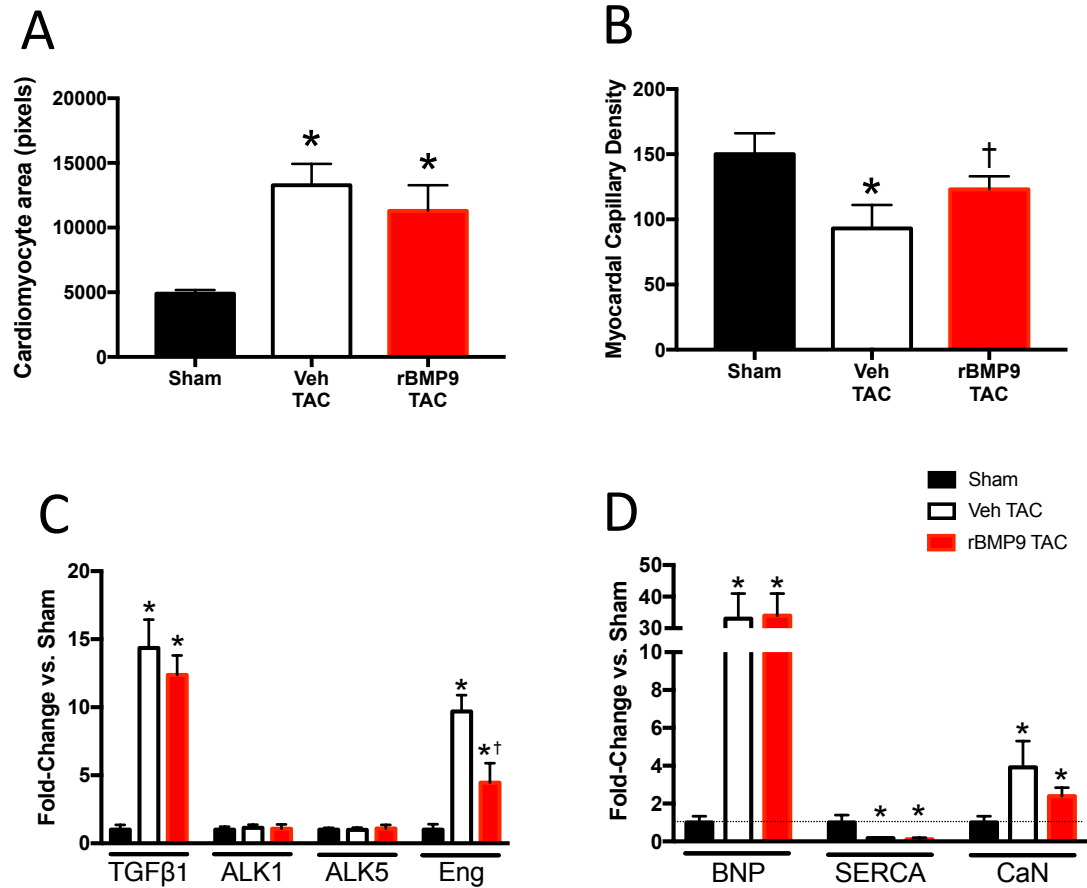


Supplemental Figure 3. BMP9 Expression is Induced by LV Pressure Overload
 A) LV protein expression of BMP9 in the LV and distal aorta in Sham and TAC operated mice. B) Scatterplot and Pearson correlation coefficient r of LV end diastolic pressure (EDP) and LV BMP9 protein levels. BMP9 levels are expressed as fold change compared to control. $p<0.05$: *, vs. Sham LV.



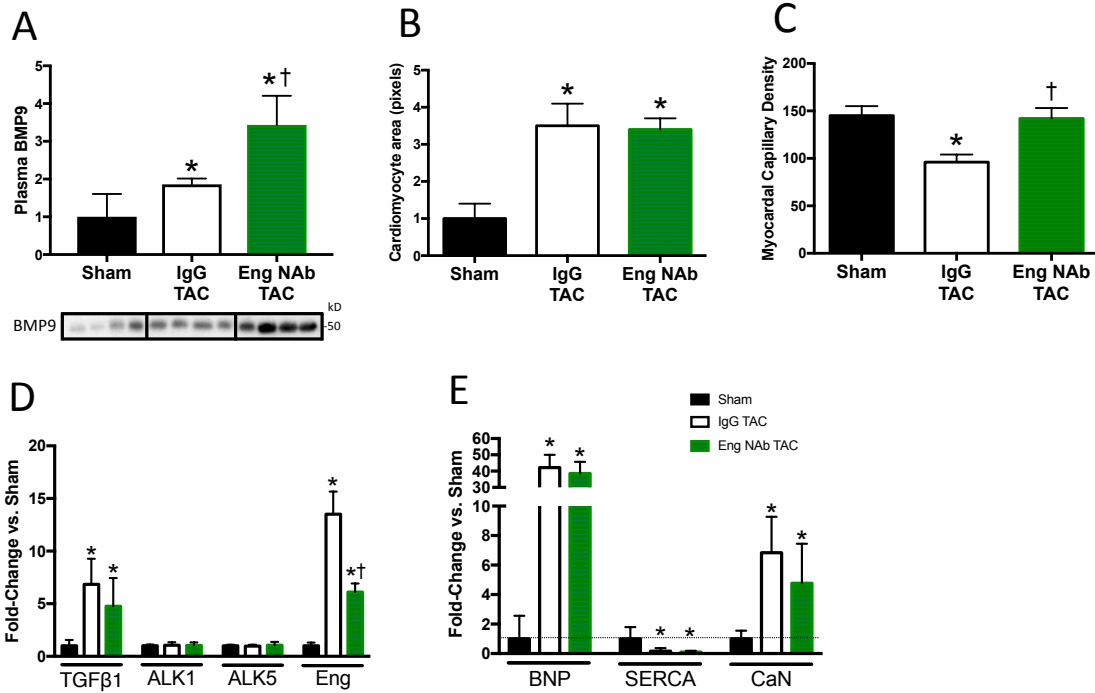
Supplemental Figure 4. BMP9 Deficiency Does Not Affect Markers of Cardiomyocyte Remodeling Following 2 weeks of TAC

A) LV mRNA levels of TGF- β 1, ALK1, ALK5 and Endoglin (Eng) and B) brain natriuretic peptide (BNP), sarcoplasmic reticulum ATPase (SERCA), calcineurin (CaN) in WT and BMP9^{-/-} mice after 2 weeks of TAC. LV mRNA levels are expressed as fold change compared to control. $p < 0.05$: *, vs. Sham LV. C) LV type I collagen and GAPDH expression, D) LV type I collagen mRNA expression and E) LV Id1 and Id2 mRNA expression in WT, BMP9^{-/-} mice and Eng NAb treated BMP9^{-/-} mice after 2 weeks of TAC. Data expressed as fold change vs. Sham. $p < 0.05$: *, vs. Sham LV; †, vs. WT TAC.



Supplemental Figure 5. Recombinant BMP9 Preserves Hypertrophy and Myocardial Capillary Density in Heart Failure

A-B) Quantitation of LV cardiomyocyte cross sectional area and myocardial capillary density expressed as CD31+ cells per high powered field in Sham, Vehicle treated (Veh-TAC) and recombinant mouse BMP9 treated (rBMP9) mice after TAC. C) LV mRNA levels of TGF-β1, ALK1, ALK5, Endoglin (Eng), and D) brain natriuretic peptide (BNP), sarcoplasmic reticulum ATPase (SERCA), and calcineurin (CaN). LV mRNA levels are expressed as fold change compared to control. p<0.05: *, vs. Sham LV; †, vs. Vehicle TAC.



Supplemental Figure 6. Neutralizing Endoglin Activity Preserves Hypertrophy and Myocardial Capillary Density in Heart Failure

A) Representative immunoblots and quantitation of plasma BMP9 levels in Sham, IgG treated and Eng NAb treated mice after TAC. B-C) Quantitation of LV cardiomyocyte cross sectional area and myocardial capillary density expressed as CD31+ cells per high powered field. D) LV mRNA levels of TGF- β 1, ALK1, ALK5, Endoglin (Eng), and E) brain natriuretic peptide (BNP), sarcoplasmic reticulum ATPase (SERCA), and calcineurin (CaN). LV mRNA levels are expressed as fold change compared to control. $p < 0.05$: *, vs. Sham LV; †, vs. IgG TAC.