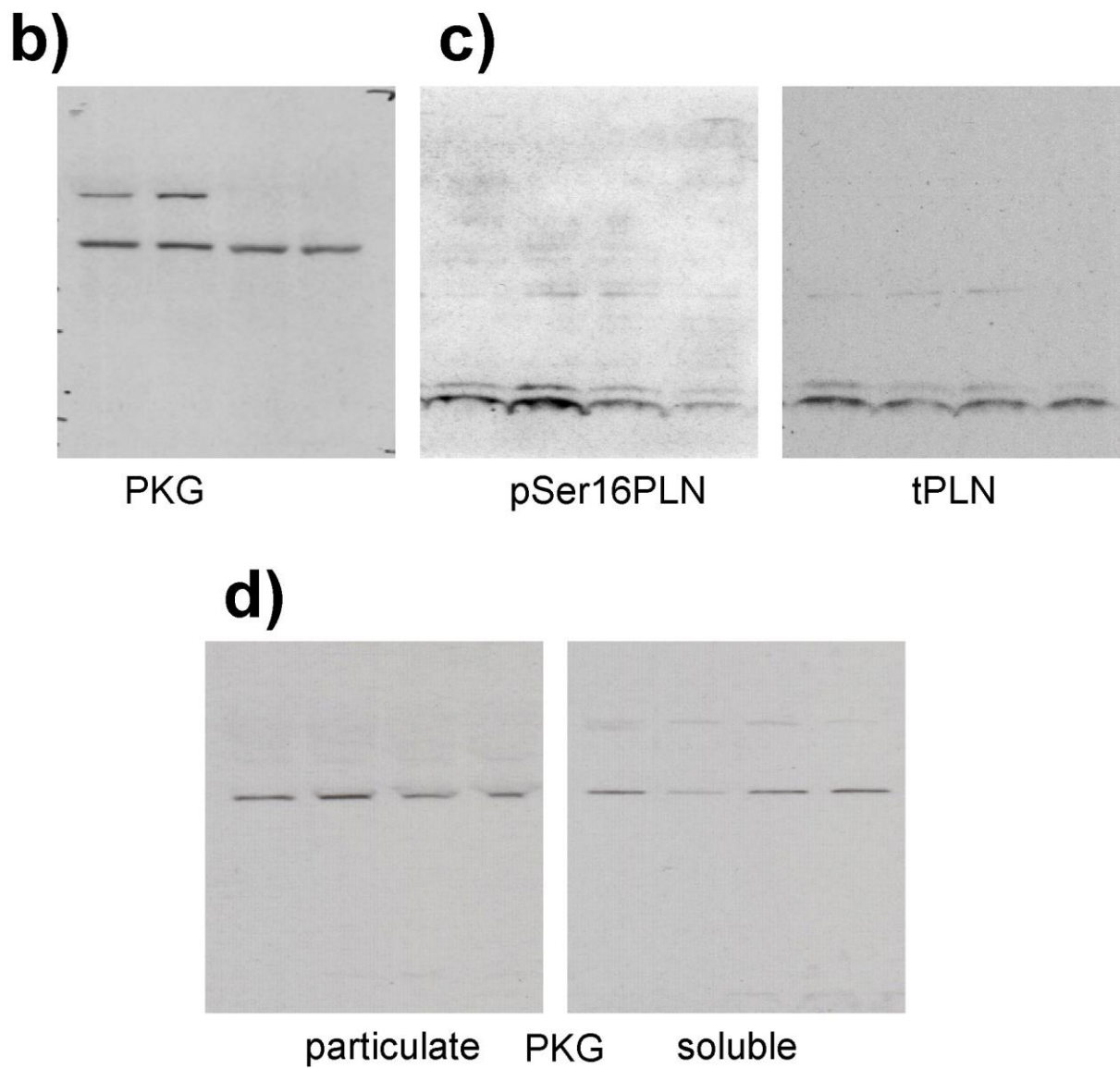


**Supplementary Figure 1** Uncropped scanned images of key western blots from Figure 1. Uncropped blots used in Figure 1 (a-b).



**Supplementary Figure 2** Uncropped scanned images of key western blots from Figure 2. Uncropped blots used in Figure 2 (b-d).

**Supplementary Table 1.** Echocardiography measurements from WT and C42S PKG1 $\alpha$  KI mice.

	WT	C42S PKG KI	
	n=13	n=14	
Body weight, g	28.2 $\pm$ 0.45	27.6 $\pm$ 0.30	ns
Heart Rate, bpm	549 $\pm$ 5.82	540 $\pm$ 4.72	ns
Intraventricular septum diastolic thickness, mm	0.86 $\pm$ 0.03	0.82 $\pm$ 0.03	ns
LV diastolic dimension, mm	4.22 $\pm$ 0.07	3.86 $\pm$ 0.07	p<0.01
Posterior wall diastolic thickness, mm	0.86 $\pm$ 0.04	0.89 $\pm$ 0.06	ns
Anterior wall diastolic thickness, mm	0.86 $\pm$ 0.04	0.81 $\pm$ 0.03	ns
Intraventricular septum systolic thickness, mm	1.36 $\pm$ 0.05	1.25 $\pm$ 0.04	ns
LV systolic dimension, mm	2.61 $\pm$ 0.08	2.53 $\pm$ 0.06	ns
Posterior wall systolic thickness, mm	1.31 $\pm$ 0.06	1.31 $\pm$ 0.05	ns
Anterior wall systolic thickness, mm	1.32 $\pm$ 0.04	1.24 $\pm$ 0.06	ns
Diastolic endocardial area, mm <sup>2</sup>	25.4 $\pm$ 0.91	20.8 $\pm$ 0.85	p<0.01
Systolic endocardial area, mm <sup>2</sup>	15.3 $\pm$ 0.92	13.9 $\pm$ 0.3	ns
Diastolic epicardial area, mm <sup>2</sup>	42.6 $\pm$ 1.14	37.7 $\pm$ 0.92	p<0.01
Systolic epicardial area, mm <sup>2</sup>	34.1 $\pm$ 1.00	32.2 $\pm$ 0.48	ns
LV systolic volume, $\mu$ L	25.5 $\pm$ 1.94	23.6 $\pm$ 1.54	ns
LV diastolic volume, $\mu$ L	80.1 $\pm$ 3.00	67.1 $\pm$ 1.85	p<0.01
Stroke volume, $\mu$ L	54.5 $\pm$ 1.47	43.5 $\pm$ 1.17	p<0.0001
Ejection Fraction, %	68.6 $\pm$ 1.23	66.52 $\pm$ 0.98	ns
Fractional Shortening, %	37.6 $\pm$ 1.32	36.7 $\pm$ 1.27	ns
Cardiac output, mL/min	29.3 $\pm$ 0.79	23.2 $\pm$ 0.64	p<0.0001
LV Mass, mg	115.3 $\pm$ 2.14	114.5 $\pm$ 3.35	ns
AV Peak velocity, mm/s	1876.4 $\pm$ 56.2	1798.3 $\pm$ 131.8	ns

Ao Velocity time integral, cm	6.06 ± 0.17	5.97 ± 0.50	ns
Transmitral E wave velocity (mm/s)	953.4 ± 19.7	820.9 ± 18.9	p<0.01
Transmitral A wave velocity (mm/s)	519.5 ± 19.4	609.9 ± 19.9	p<0.05
E/A ratio	1.84 ± 0.05	1.35 ± 0.03	p<0.001
Mitral annulus motion e' wave (mm/s)	31.8 ± 0.58	27.7 ± 0.80	p<0.05
Mitral annulus motion a' wave (mm/s)	16.9 ± 0.54	18.4 ± 0.42	p<0.05
e'/a' ratio	1.89 ± 0.09	1.51 ± 0.06	p<0.05

**Supplementary Table 2.** Pressure-volume measurements from WT and C42S PKG1 $\alpha$  KI mice.

	WT	C42S PKG KI	
	n=9	n=10	
Body weight, g	28.1 $\pm$ 0.8	28.8 $\pm$ 1.0	ns
Heart Rate, bpm	551 $\pm$ 12.7	563 $\pm$ 21.6	ns
End diastolic pressure, mmHg	3.2 $\pm$ 0.1	6.0 $\pm$ 1.1	p<0.05
End systolic pressure, mmHg	90.5 $\pm$ 3.6	91.5 $\pm$ 2.9	ns
LV developed pressure, mmHg	101.1 $\pm$ 2.5	96.0 $\pm$ 2.5	ns
Mean pressure, mmHg	39.0 $\pm$ 1.4	46.4 $\pm$ 1.5	p<0.05
End systolic volume, $\mu$ L	13.6 $\pm$ 1.5	14.1 $\pm$ 2.6	ns
End diastolic volume, $\mu$ L	34.5 $\pm$ 2.3	33.9 $\pm$ 3.1	ns
Stroke work, mmHg. $\mu$ L	2383.8 $\pm$ 121.0	2268.5 $\pm$ 138.7	ns
Ejection Fraction, %	84.9 $\pm$ 4.4	76.3 $\pm$ 7.7	ns
dP/dt max, mmHg/s	9603.8 $\pm$ 299.6	8528.9 $\pm$ 279.5	p<0.05
dP/dt min, mmHg/s	-10624.9 $\pm$ 389.4	-8900.6 $\pm$ 586.9	p<0.05
Tau (Weiss), ms	5.35 $\pm$ 0.23	6.30 $\pm$ 0.33	p<0.05