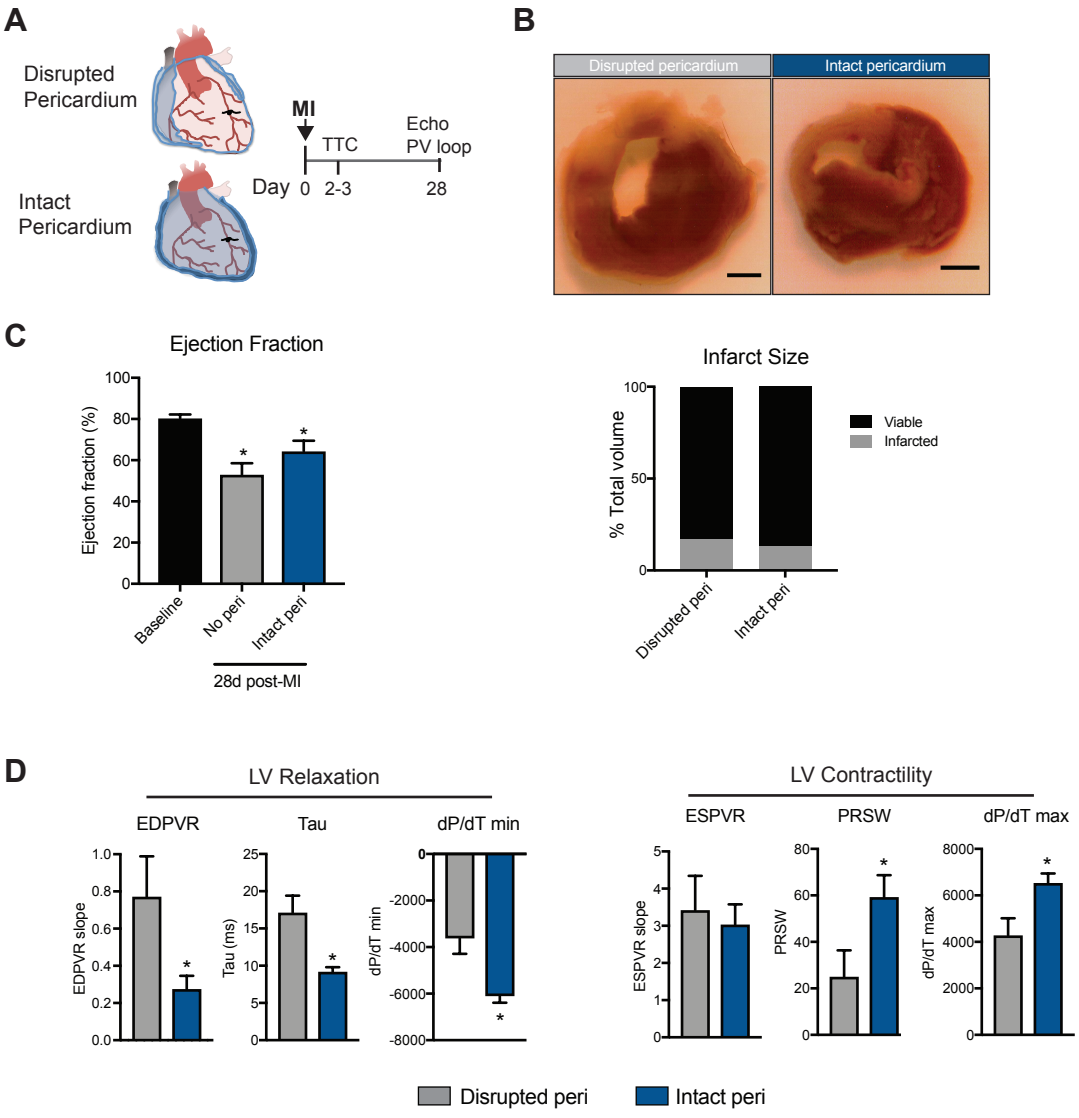

Fig. S1. An intact pericardial cavity preserves post-MI cardiac function, related to STAR Methods.

(A) Schematic timeline of coronary ligation procedure with disrupted or intact pericardium. (B) Representative triphenyl tetrazolium chloride (TTC) staining and quantification of infarcted myocardium 48-72hrs post-MI. scale bars = 1mm, n=4. LV functional parameters at 28 days post-infarct for animals with disrupted or intact pericardium measured by echocardiography (C) and pressure-volume assessment (D). Data represented as mean ± SEM, n= 7-14/group for echocardiography, n=6-7/group for pressure volume loop measurements. *=p<0.05, one-way ANOVA for ejection fraction, t-test for pressure volume loop measurements.

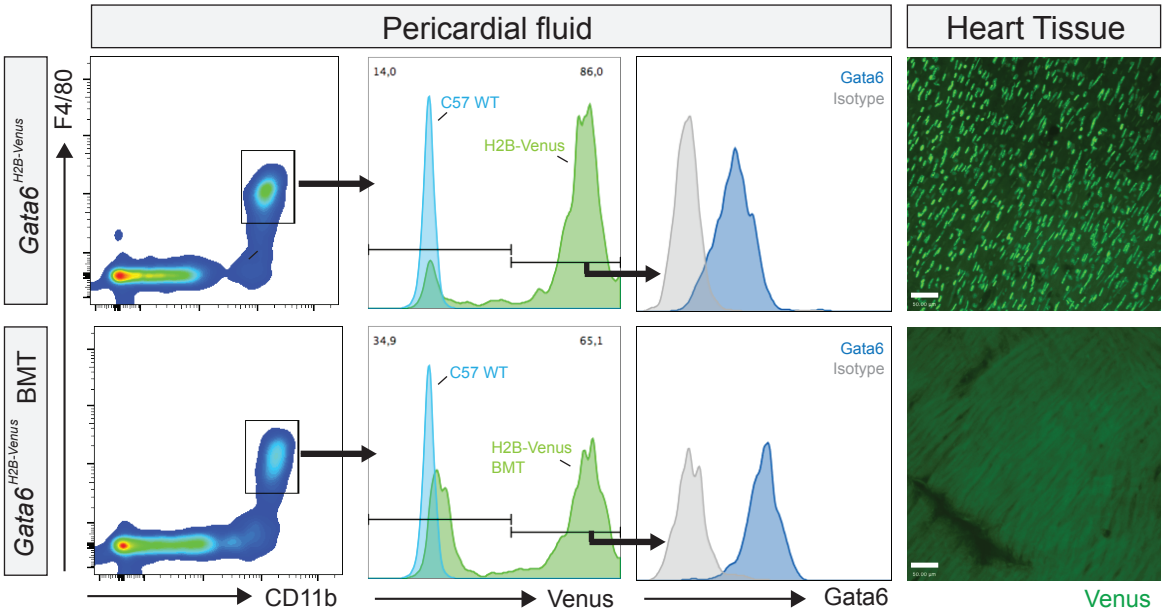

Fig. S2. *Gata6* $^{H2B\text{-}venus}$ bone marrow reconstitution of GPCMs, related Figure 4.

Representative flow cytometry plots of Venus and Gata6 expression by GPCM and whole mount fluorescence imaging of the heart from *Gata6*$^{H2B\text{-}venus}$ and *Gata6*$^{H2B\text{-}venus}$:C57BL/6J bone marrow chimera (8-10 weeks reconstitution) mice. Representative of 2 independent transfer experiments.

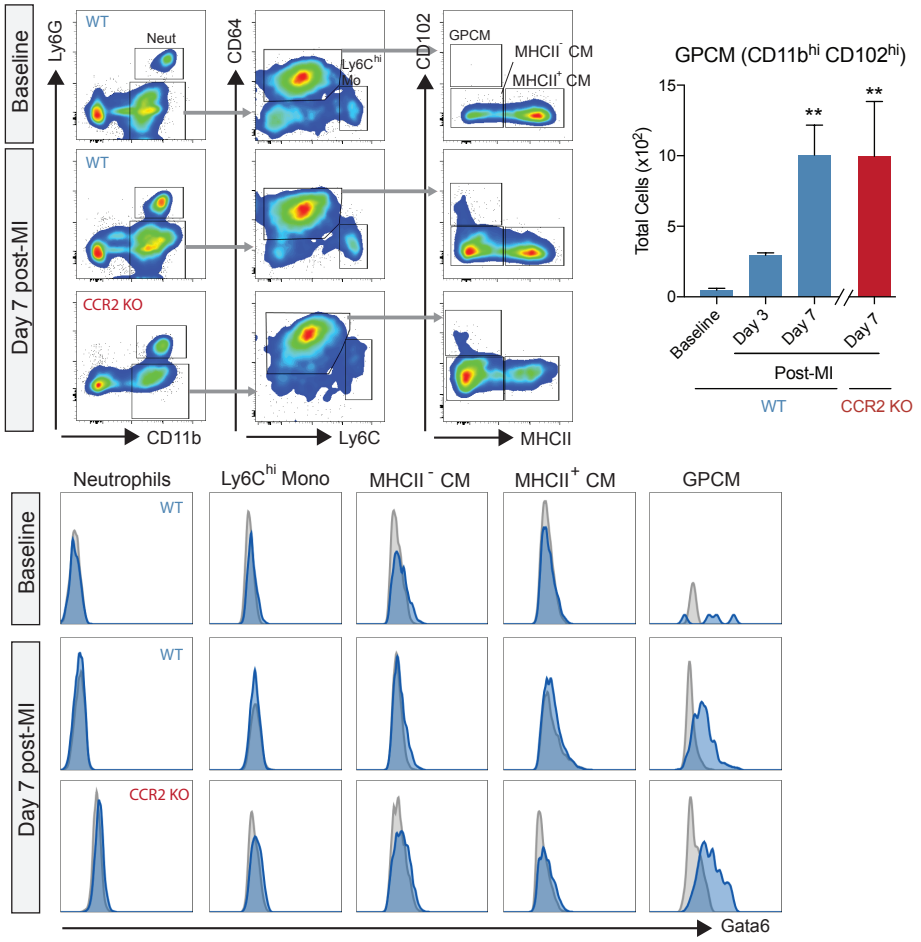

Fig S3. Recruitment of Gata6^{+} macrophages to the heart following MI, related to Figure 4.

Representative flow plots and quantification of GPCM (CD11b^{hi} CD102^{+}) number and Gata6 expression in ventricular heart tissue at multiple timepoints pre- and post-MI in the presence or absence of functional CCR2. Data represented as mean ± SEM, n= 3-11 from at least 2 independent experiments. **= p<0.01 vs. baseline, one-way ANOVA.

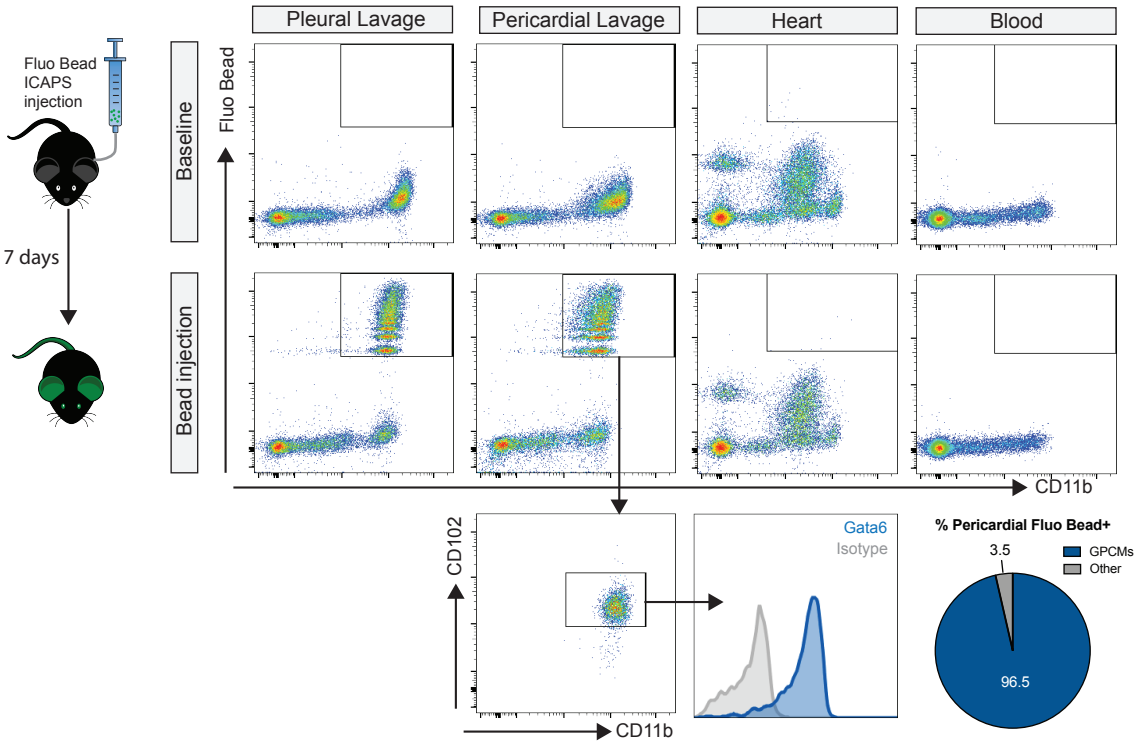

Fig. S4. Labeling of pericardial cavity macrophages with locally delivered fluorescent beads, related to Figure 5.

Representative flow cytometry plots fluorescent bead containing myeloid cells from the pleural cavity, pericardial cavity, cardiac tissue, and blood at baseline or 7 days following local injection of fluorescent beads using the ICAPS method. Bottom panels- Characterization of bead+ cells in the pericardial cavity as predominantly GPCMs. Representative of 3 independent experiments.

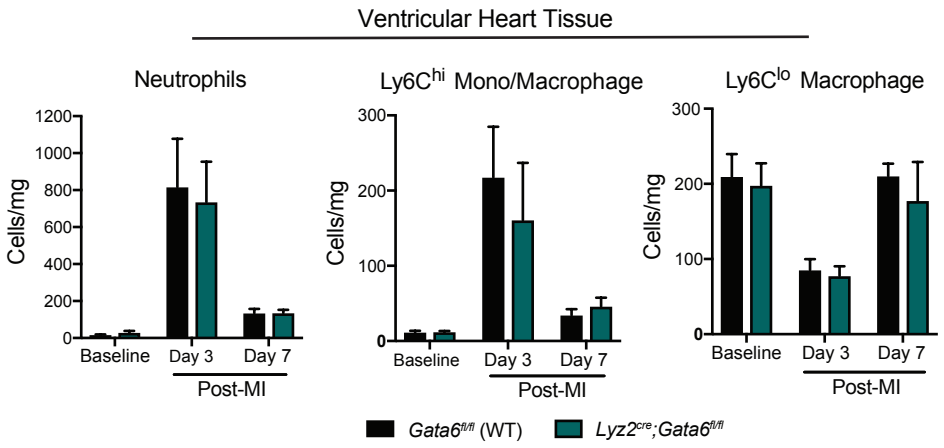

Fig. S5. Pericardial and cardiac myeloid populations in *Lyz2^{cre};Gata6$^{fl/fl}$* mice, related to Figure 6.

Quantification of neutrophil, Ly6C^{hi} monocytes/macrophage, and Ly6C^{lo} macrophages in mouse ventricular tissue pre- and post-MI in Gata6$^{fl/fl}$ (WT) and *Lyz2^{cre};Gata6$^{fl/fl}$* mice. n=3-11 from at least 2 independent experiments per timepoint.

	Disrupted pericardium		Intact pericardium		
	Mean	SEM	Mean	SEM	p-value
Body weight-Pre-MI (g)	29.50	1.85	28.00	1.58	0.555
HR (bpm)	519.85	12.33	526.27	8.19	0.665
SW (mmHg*µL)	317.19	171.82	1109.01	188.73	**0.011**
CO (µL/min)	4668.33	1309.29	9078.57	1271.34	**0.035**
SV (µL)	8.98	2.51	17.36	2.54	**0.040**
EF (%)	37.96	10.44	45.00	7.56	0.588
Ea (mmHg/µL)	18.12	5.70	5.87	1.14	**0.044**
PowMax (mmHg*µL/s)	35123.33	9514.28	59950.00	13171.58	0.167
dP/dt max (mmHg/s)	4282.50	736.05	6539.57	401.03	**0.017**
dP/dt min (mmHg/s)	-3632.00	654.92	-6111.57	278.58	**0.004**
Tau (ms)	17.14	2.27	9.21	0.60	**0.004**
PRSW	25.06	11.28	59.30	9.42	**0.038**
EDPVR	0.77	0.22	0.28	0.07	**0.040**
ESPVR	3.42	0.92	3.04	0.54	0.716

Table S1. Left ventricle Pressure-Volume Loop assessment 4 weeks post-MI in mice with intact or disrupted pericardium, related to STAR Methods.
HR-heart rate, SW-stroke work, CO-cardiac output, SV- stroke volume, EF- ejection fraction, Ea-Arterial elastance, PowMax- maximal power, dP-delta pressure, dV-delta volume, PRSW- preload recruitable stroke work, EDPVR- end diastolic pressure volume relationship, ESPVR- end systolic pressure volume relationship.

	Disrupted pericardium		Intact pericardium		
	Mean	SEM	Mean	SEM	p-value
Body weight-Pre-MI (g)	27.50	0.50	26.14	0.73	0.233
HR (bpm)	399.45	22.46	386.03	8.98	0.541
SW (mmHg*µL)	1532.10	249.05	1028.63	164.88	0.115
CO (µL/min)	8852.00	248.26	7128.17	497.37	**0.030**
SV (µL)	22.43	1.67	17.34	1.64	0.069
EF (%)	39.64	3.86	44.83	1.96	0.222
Ea (mmHg/µL)	4.01	0.32	4.84	0.33	0.123
PowMax (mmHg*µL/s)	28967.50	9309.50	17610.50	6361.66	0.325
dP/dt max (mmHg/s)	6271.25	335.11	5541.50	460.23	0.283
dP/dt min (mmHg/s)	-5094.50	587.88	-4615.50	500.07	0.556
Tau (ms)	8.81	0.21	8.74	0.75	0.944
PRSW	42.12	2.93	50.41	3.73	0.150
EDPVR	0.30	0.07	0.22	0.06	0.474
ESPVR	3.19	0.62	4.30	0.80	0.346

Table S2. Left ventricle Pressure-Volume Loop assessment 4 weeks post-sham surgery in mice with intact or disrupted pericardium, related to STAR Methods. HR-heart rate, SW-stroke work, CO-cardiac output, SV- stroke volume, V-volume, P-pressure, es- end systolic, ed- end diastolic, EF- ejection fraction, Ea-Arterial elastance, PowMax- maximal power, dP-delta pressure, dV-delta volume, PRSW- preload recruitable stroke work, EDPVR- end diastolic pressure volume relationship, ESPVR- end systolic pressure volume relationship.

	Gata6$^{fl/fl}$(WT)		*Lyz2*^{cre}*;Gata6*$^{fl/fl}$		
	Mean	SEM	Mean	SEM	p-value
Body weight-Pre-MI (g)	33.38	1.95	34.44	1.95	0.704
HR (bpm)	528.49	10.93	503.43	13.07	0.168
SW (mmHg*µL)	1718.25	172.06	1155.39	239.51	0.082
CO (µL/min)	12330.00	673.04	9068.56	1222.91	**0.040**
SV (µL)	23.38	1.36	18.04	2.46	0.087
EF (%)	48.08	3.53	33.21	3.62	**0.010**
Ea (mmHg/µL)	4.10	0.21	5.49	0.67	0.079
PowMax (mmHg*µL/s)	55853.75	18096.77	31899.78	10000.10	0.251
dP/dt max (mmHg/s)	7025.63	662.13	5889.67	491.95	0.183
dP/dt min (mmHg/s)	-6594.88	690.28	-5381.78	461.32	0.156
Tau (ms)	8.61	0.78	7.19	0.34	0.105
PRSW	71.65	9.26	53.58	3.66	0.077
EDPVR	0.11	0.03	0.37	0.07	**0.005**
ESPVR	2.77	0.30	3.16	0.36	0.417

Table S3. Left ventricle PV Loop assessment 4 weeks post-MI in *Gata6*$^{fl/fl}$ and *Lyz2*^{cre}*;Gata6*$^{fl/fl}$ mice, related to Figure 6.

MI- myocardial infarction**,** HR-heart rate, SW-stroke work, CO-cardiac output, SV-stroke volume, EF- ejection fraction, Ea-Arterial elastance, PowMax- maximal power, dP-delta pressure, dV-delta volume, PRSW- preload recruitable stroke work, EDPVR-end diastolic pressure volume relationship, ESPVR- end systolic pressure volume relationship.