

Supplementary Materials for

An innovative biologic system for photon-powered myocardium in the ischemic heart

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Published 14 June 2017, *Sci. Adv.* **3**, e1603078 (2017)

DOI: 10.1126/sciadv.1603078

This PDF file includes:

- fig. S1. High-resolution grayscale scanning electron micrograph before false coloring.
- fig. S2. High-resolution false-colored scanning electron micrograph.
- fig. S3. In vivo rodent model of acute myocardial infarction.
- table S1. Effect of *S. elongatus* therapy on myocardial oxygenation in acute ischemia model.
- table S2. Effect of *S. elongatus* therapy on myocardial surface temperature in acute ischemia model.
- table S3. Effect of *S. elongatus* therapy on LV hemodynamics in acute ischemia model.
- table S4. Effect of *S. elongatus* therapy on CO in acute ischemia model.
- table S5. Long-term effect of *S. elongatus* therapy on LV function in IR model.

Supplementary Materials

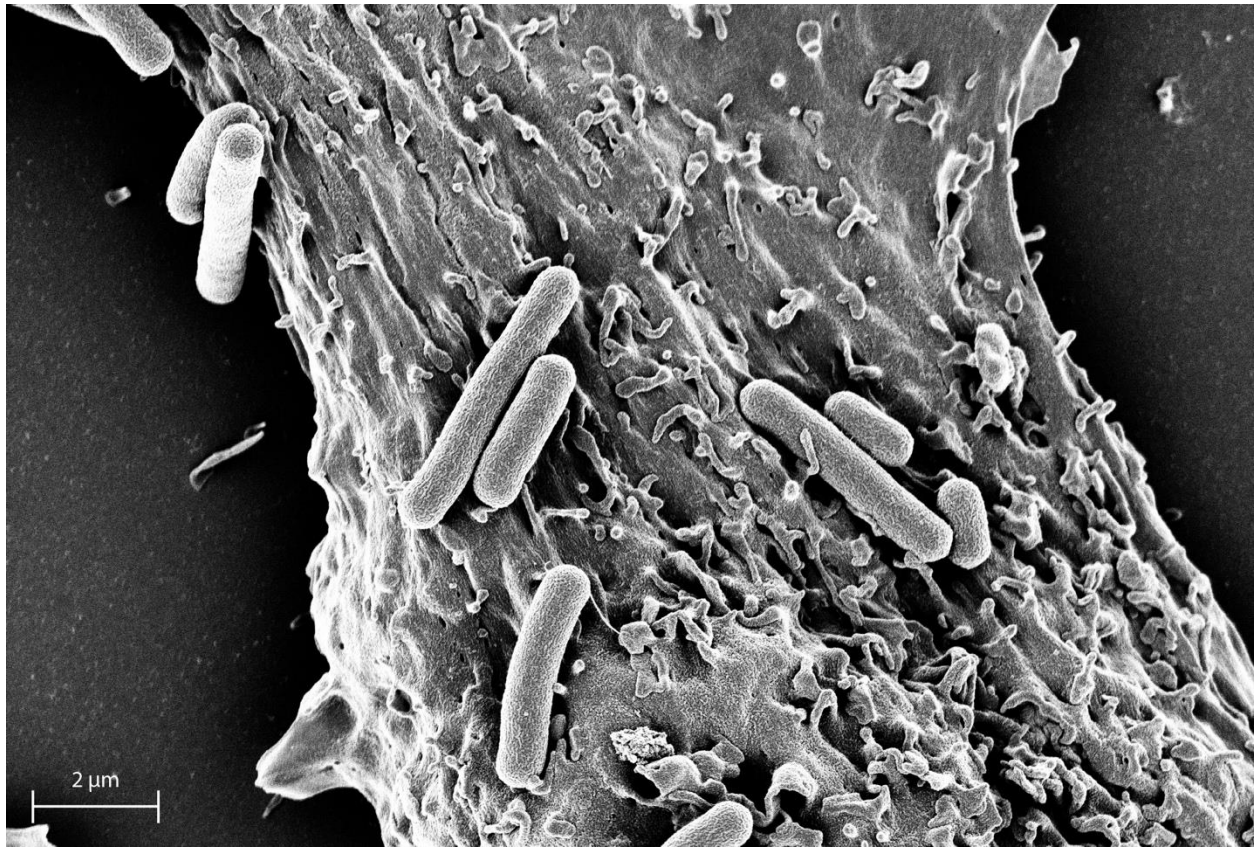


fig. S1. High-resolution grayscale scanning electron micrograph before false coloring. Rodent cardiomyocyte cocultured with *S. elongatus*. Taken with a Zeiss Sigma FESEM with EHT 2.00 kV, WD 5.2 mm, Signal A InLens, Mag 5.73 KX.

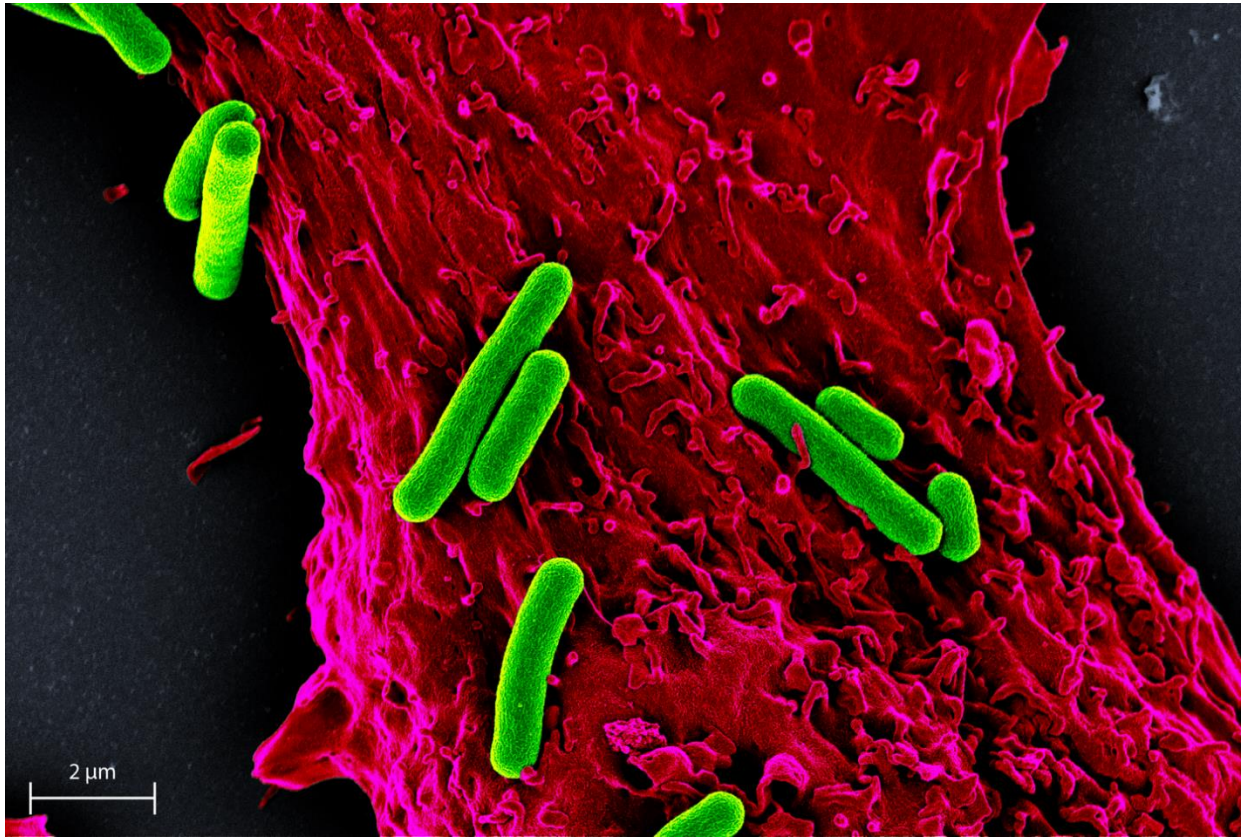


fig. S2. High-resolution false-colored scanning electron micrograph. Rodent cardiomyocyte cocultured with *S. elongatus*. Taken with a Zeiss Sigma FESEM with EHT 2.00 kV, WD 5.2 mm, Signal A InLens, magnification 5.73 KX. False-color image created with Adobe Photoshop.

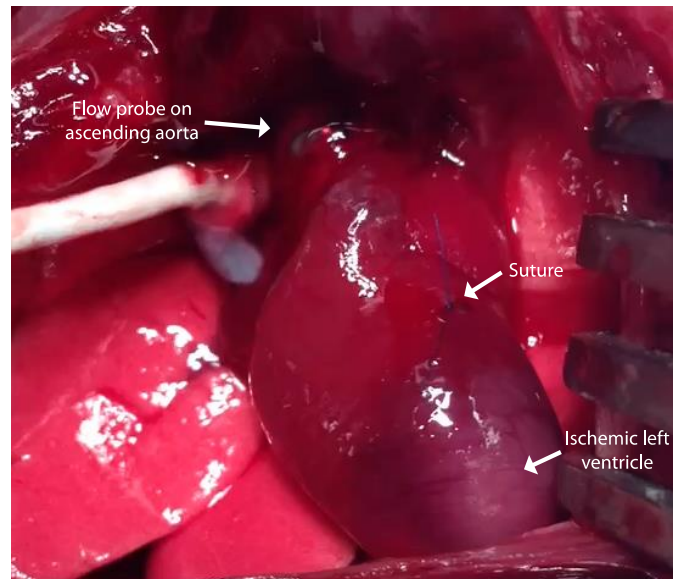


fig. S3. In vivo rodent model of acute myocardial infarction. Viewed through a median sternotomy incision, a flow probe is placed around the ascending aorta and the left anterior descending coronary artery is ligated with a monofilament suture. The area of ischemic left ventricle is noted by its pale appearance.

table S1. Effect of *S. elongatus* therapy on myocardial oxygenation in acute ischemia model.

	Control (n=5)	<i>S. elongatus</i> dark (n=5)	<i>S. elongatus</i> light (n=5)	P value
Baseline O ₂ (torr)	30.7±5.7	31.6±9.3	27.3±4.1	0.3
10 minutes post-injection O ₂ (torr)	3.2±1.0	1.4±0.8	8.8±1.3	0.004
20 minutes post-injection O ₂ (torr)	3.1±0.3	1.7±1.0	10.5±5.1	0.003
10 minutes post-injection O ₂ normalized to ischemia nadir	2.7±0.9	2.5±1.5	24.6±6.4	0.002
20 minutes post-injection O ₂ normalized to ischemia nadir	1.8±0.5	3.3±1.9	24.4±10.2	0.004

table S2. Effect of *S. elongatus* therapy on myocardial surface temperature in acute ischemia model.

	Control (n=5)	<i>S. elongatus</i> (n=5)	P value
Baseline temperature (°F)	94.67±1.13	94.78±1.02	>0.5
Infarct temperature normalized to baseline	0.974±0.003	0.979±0.012	>0.5
10 minutes post-injection temperature normalized to baseline	0.969±0.002	0.976±0.009	0.29
20 minutes post-injection temperature normalized to baseline	0.956±0.004	0.981±0.01	0.04

table S3. Effect of *S. elongatus* therapy on LV hemodynamics in acute ischemia model.

	BASELINE			INFARCT			45 MINUTES POST-INJECTION		
	Control (n=5)	<i>S. elongatus</i> (n=5)	P value	Control (n=5)	<i>S. elongatus</i> (n=5)	P value	Control (n=5)	<i>S. elongatus</i> (n=5)	P value
Pmax (mmHg)	91.1±9.4	95.3±11.1	>0.5	88.0±10.2	96.8±10.2	>0.5	72.0±11.5	102.2±8.8	0.04
dP/dt (mmHg/sec)	4876±610	4821±834	>0.5	3749±300	4298±827	>0.5	2759±281	4851±725	0.02

table S4. Effect of *S. elongatus* therapy on CO in acute ischemia model.

	Control (n=5)	<i>S. elongatus</i> without infarct (n=5)	<i>S. elongatus</i> dark (n=5)	<i>S. elongatus</i> light (n=5)	P value
Baseline cardiac output (mL/min)	30.8±3.4	35.0±3.5	33.4±2.9	33.4±3.7	0.7
15 minute post-infarction cardiac output (mL/min)	23.4±3.7	N/A	26.4±2.1	27.2±2.4	0.53
45 minute post-injection cardiac output (mL/min)	19±3.4	35.8±3.7	23.6±4.0	30.3±4.8	0.05

table S5. Long-term effect of *S. elongatus* therapy on LV function in IR model.

	Saline control (n=7)	<i>S. elongatus</i> (n=10)	P value
Troponin (ng/mL)	16.5±10.5	6.5±4.8	0.05
Ejection fraction (%)	36.9±4.7	48.3±10.5	0.02
End-systolic volume (μL)	487±140	327±133	0.03
Slope of end-systolic pressure-volume relationship	0.19±0.08	0.35±0.12	0.01