

Supporting Information

Simultaneous Measurement of Contractile Force and Field Potential of Dynamically Beating Human iPS Cell-Derived Cardiac Cell Sheet-Tissue with Flexible Electronics

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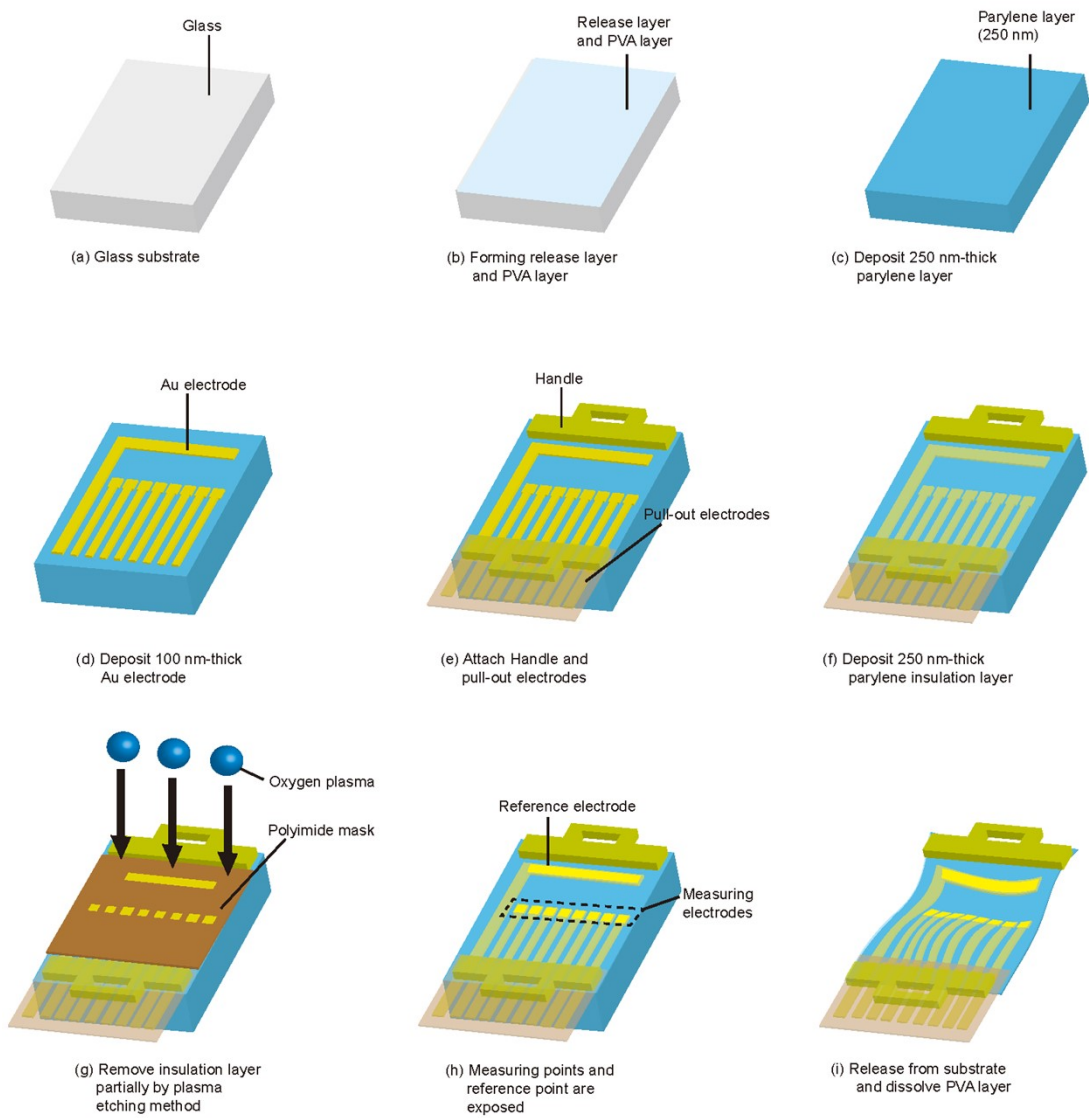


Fig.S1 Fabrication process of flexible electronic sheet for simultaneous measurement of contractile force and extracellular field potential.

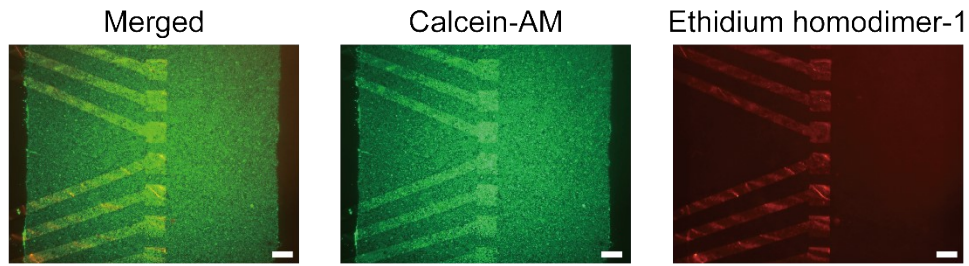


Fig.S2 Viability of cardiac cell sheet tissue on flexible electronics after peeling from glass substrate. The viability of the cardiac cell sheet tissue was demonstrated by Live-dead staining with calcein-AM (green) specific for live cells and ethidium homodimer-1 (red) specific for dead cells. Note that gold electrode has red auto fluorescence. (Scale bar, 10 mm).

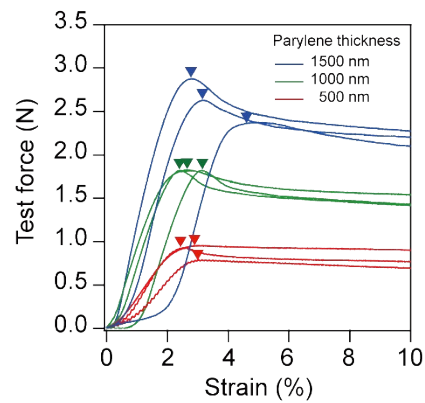


Fig.S3 Tensile test results for each thickness of thin film. Force-strain curves for each film thickness are shown. Arrows indicate the break of thin films.

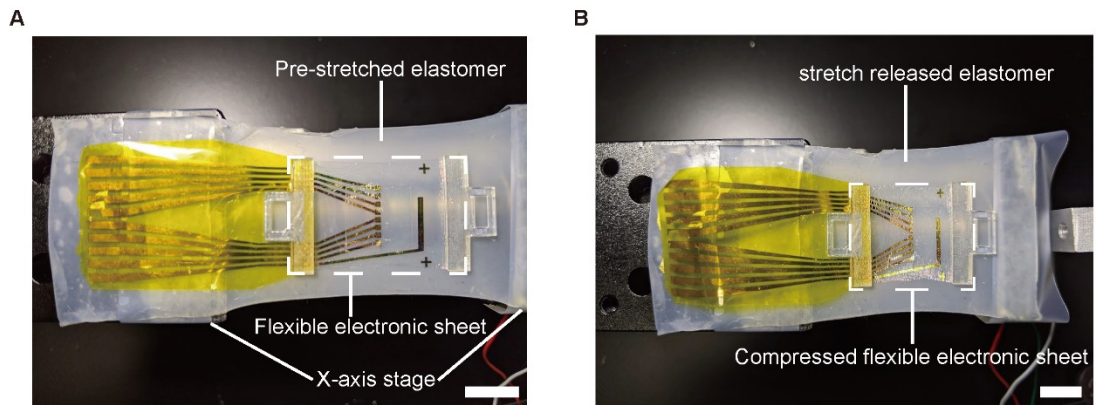


Fig.S4 Method for generating 20 % compressive strain on flexible electronic sheet by pre-stretched elastomer. **A**, flexible electronic sheet on pre-stretched elastomer. **B**, 20% compressed flexible electronic sheet by releasing pre-stretch of elastomer. (scale bar, 10 mm)

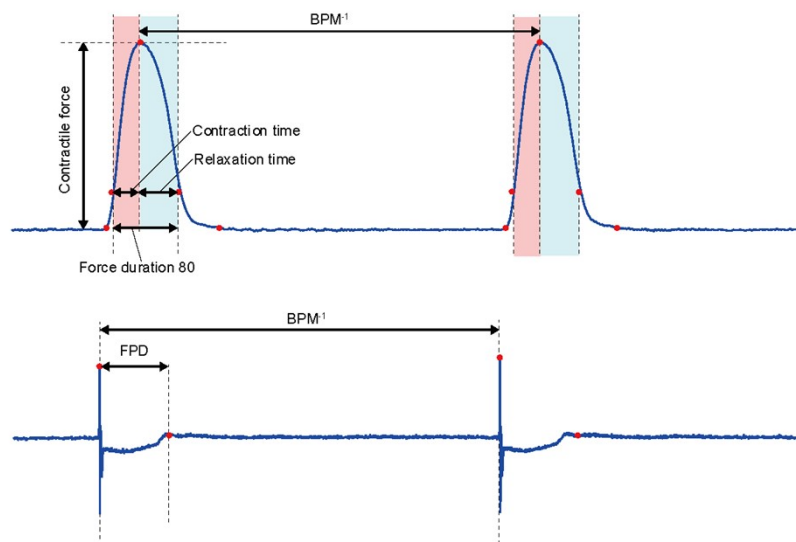


Fig.S5 Analysis parameters of contractile force and extracellular field potential.

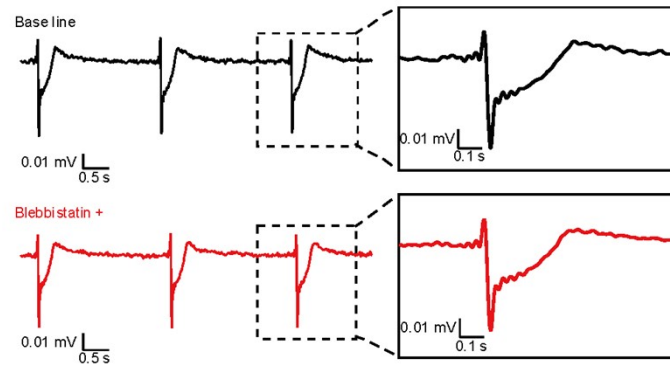


Fig.S6 Expanded view of change in field potential before and after administering blebbistatin.

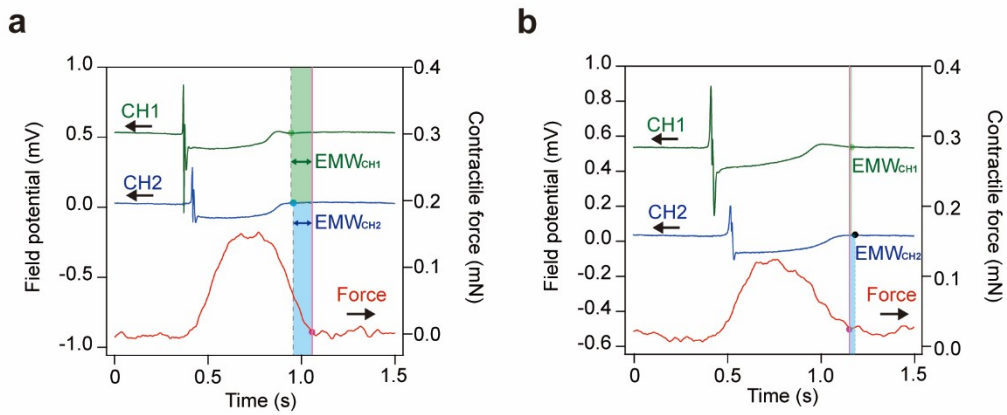


Fig. S7 Illustration of the difference in EMW due to the choice of the extracellular field potential. **a**, before administering E-4031. **b**, after administering E-4031. EMW_{CH1} was analyzed using extracellular field potential 1 (CH1). EMW_{CH2} was analyzed using extracellular field potential 2 (CH2)

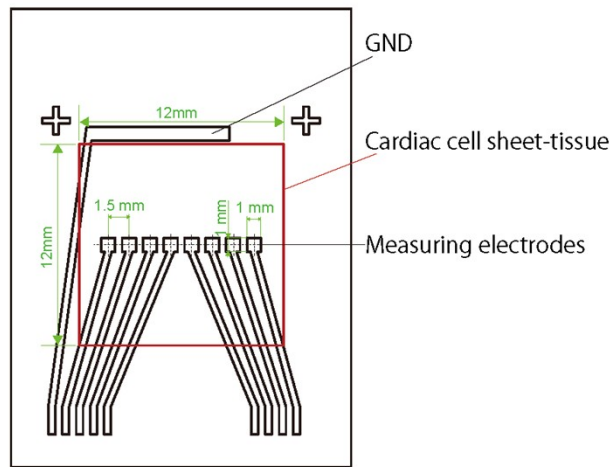


Fig.S8 Detail electrodes size of flexible electronics.

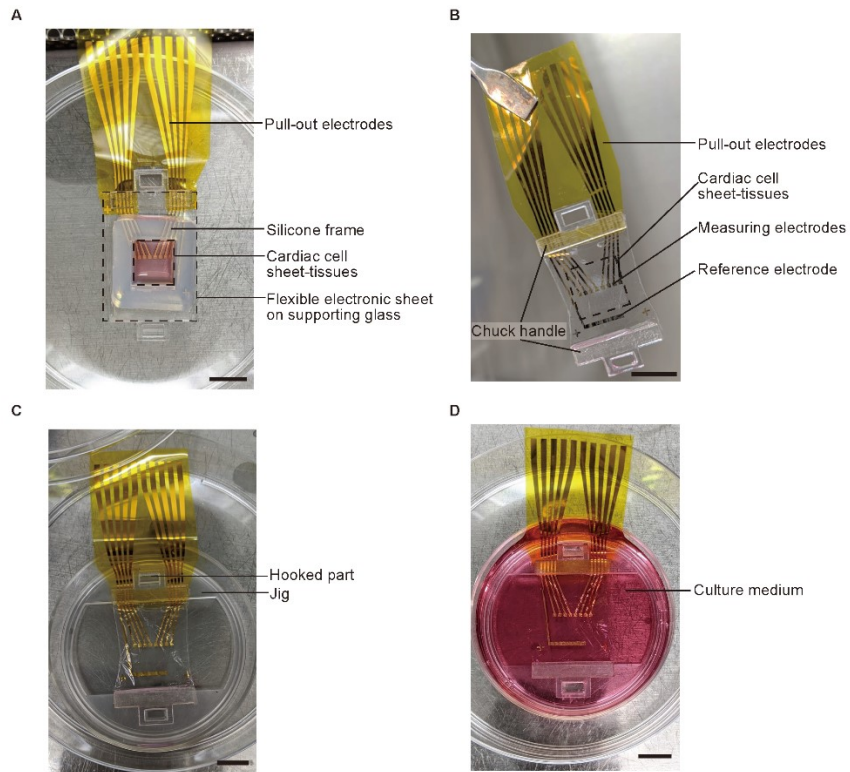


Fig.S9 Culture of cardiac cell sheet-tissues formed on flexible electronics. **A**, Forming the cardiac cell sheet tissues inside the silicone frame. **B**, after peeled off from supporting glass. **C**, fixing handles to the jig. **D**, culturing the cardiac cell sheet-tissues with maintaining the natural length of flexible electronics sheet.(scale bar: 10 mm)

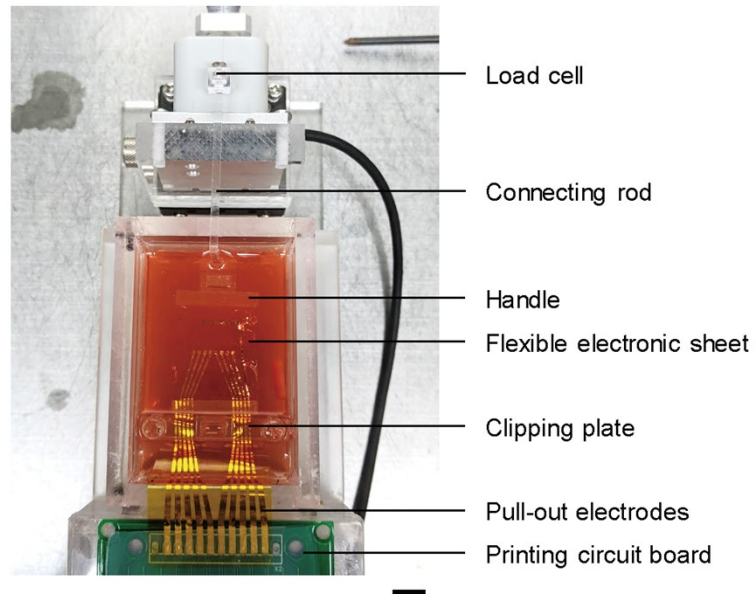


Fig.S10 Installing the measuring samples to simultaneous measurement system.
(scale bar, 10 mm)

Table S1 Comparison of EMW calculation results due to differences in the choice of extracellular potential waveform

Parameter	Before	E-4031(+)
Mean EMW_{CH1}	127.5 ms	8.6 ms
Mean EMW_{CH2}	113.6 ms	6.5 ms