Surface Acoustic Waves Induced Micropatterning of Cells in Gelatin Methacryloyl (GelMA) Hydrogels

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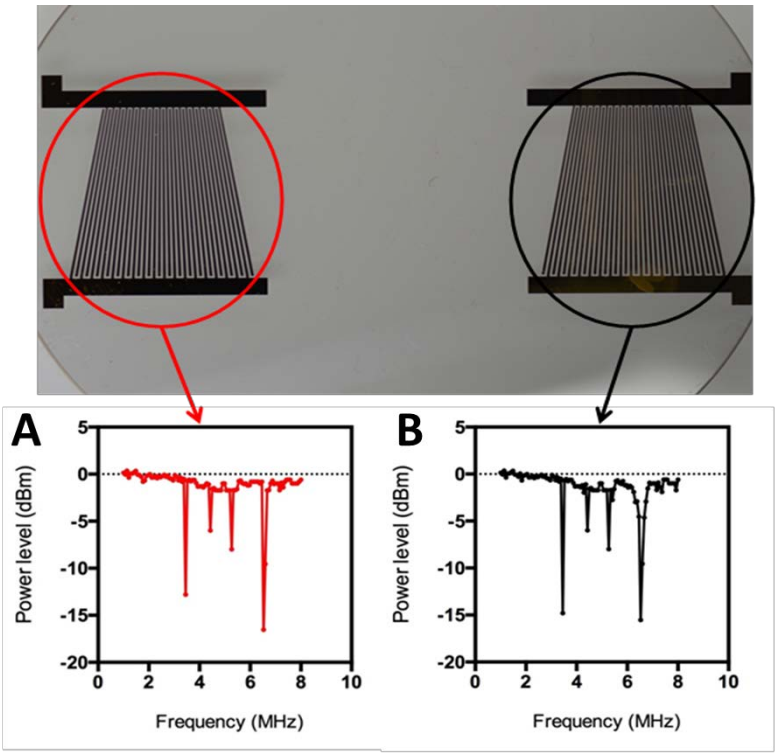
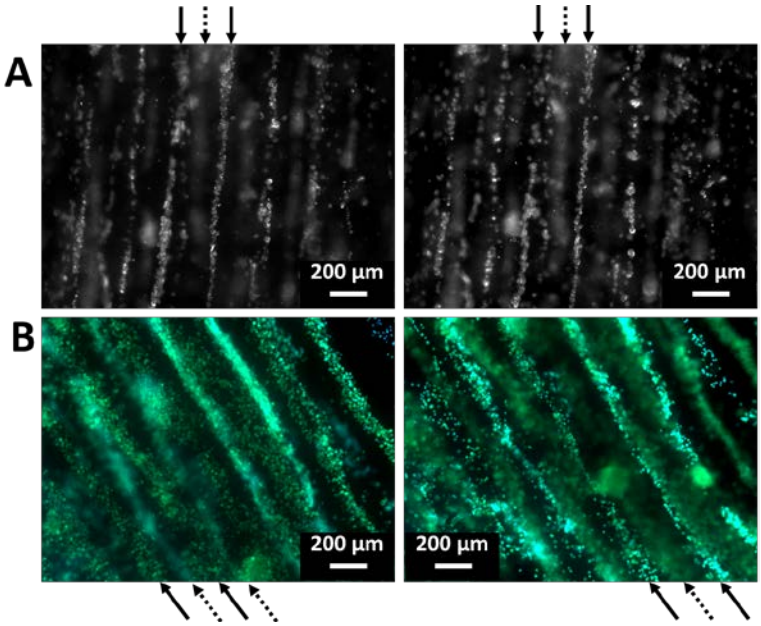
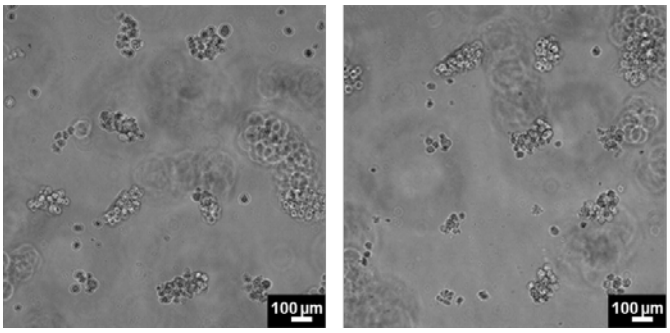
Supplementary data



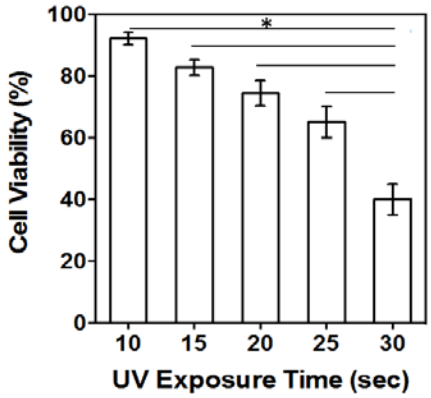
Supplementary Figure 1. Resonance frequencies observed from the excitation of SFIDTs at frequency range of 3MHz-8MHz, a) for one end of SFIDTs, b) for opposite designed SFIDTs at the other end showing a resemblance of resonance frequencies measured that is important for creating phase match at creating acoustic waves. The measurements show the resonance performance of the SAW transducer at four frequencies, 3.4MHz, 4.6MHz, 5.34MHz and 6.4MHz respectively using network analyser (n=3).



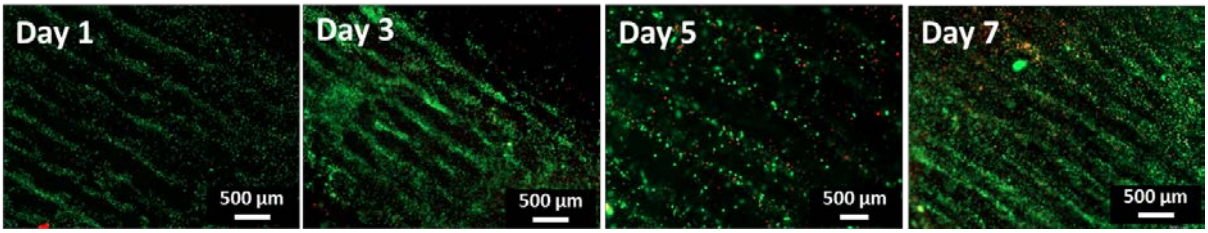
Supplementary Figure 2. Patterned lines of cells in different planes. Solid arrows show lines in the focused plane of the microscope, while dotted arrows indicate assembled lines in another plane corresponding to larger or smaller height (z-value). A) Bright field microscope pictures; B) F-actin/DAPI stained cells within the patterned lines.



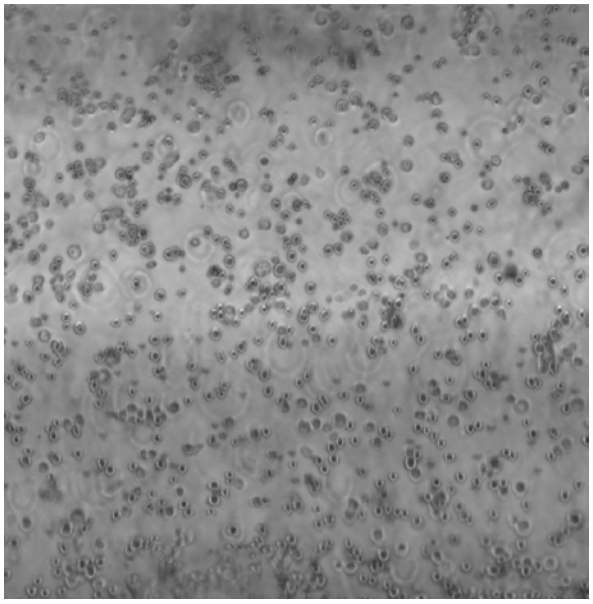
Supplementary Figure 3. Cardiac fibroblast cell patterns at 3.4MHz.



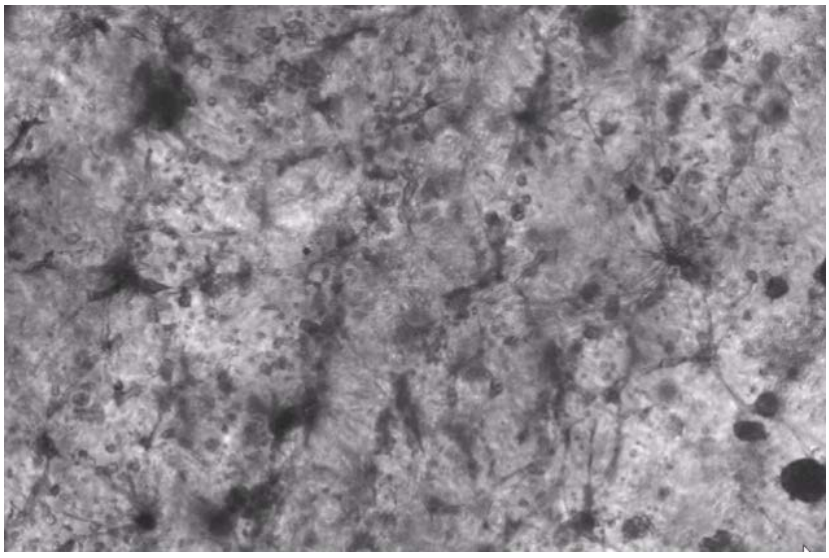
Supplementary Figure 4. Quantification of Live/dead assay of patterned cardiac fibroblasts in the 5% (w/v) GelMA hydrogel with various UV exposure times (* $P < 0.05$).



Supplementary Figure 5. Live/dead assay of patterned cardiac fibroblasts in the 5% (w/v) GelMA hydrogel on days 1, 3, 5, and 7. Live cells were stained with Calcein AM (green) and dead cells stained with ethidium homodimer (red).



Supplementary Movie 1. Experimental video demonstrating the influence of the acoustic radiation force created by the surface acoustic standing waves on the cardiac cells.



Supplementary Movie 2. Spontaneous beating of 3D cardiac tissue (10-day culture).