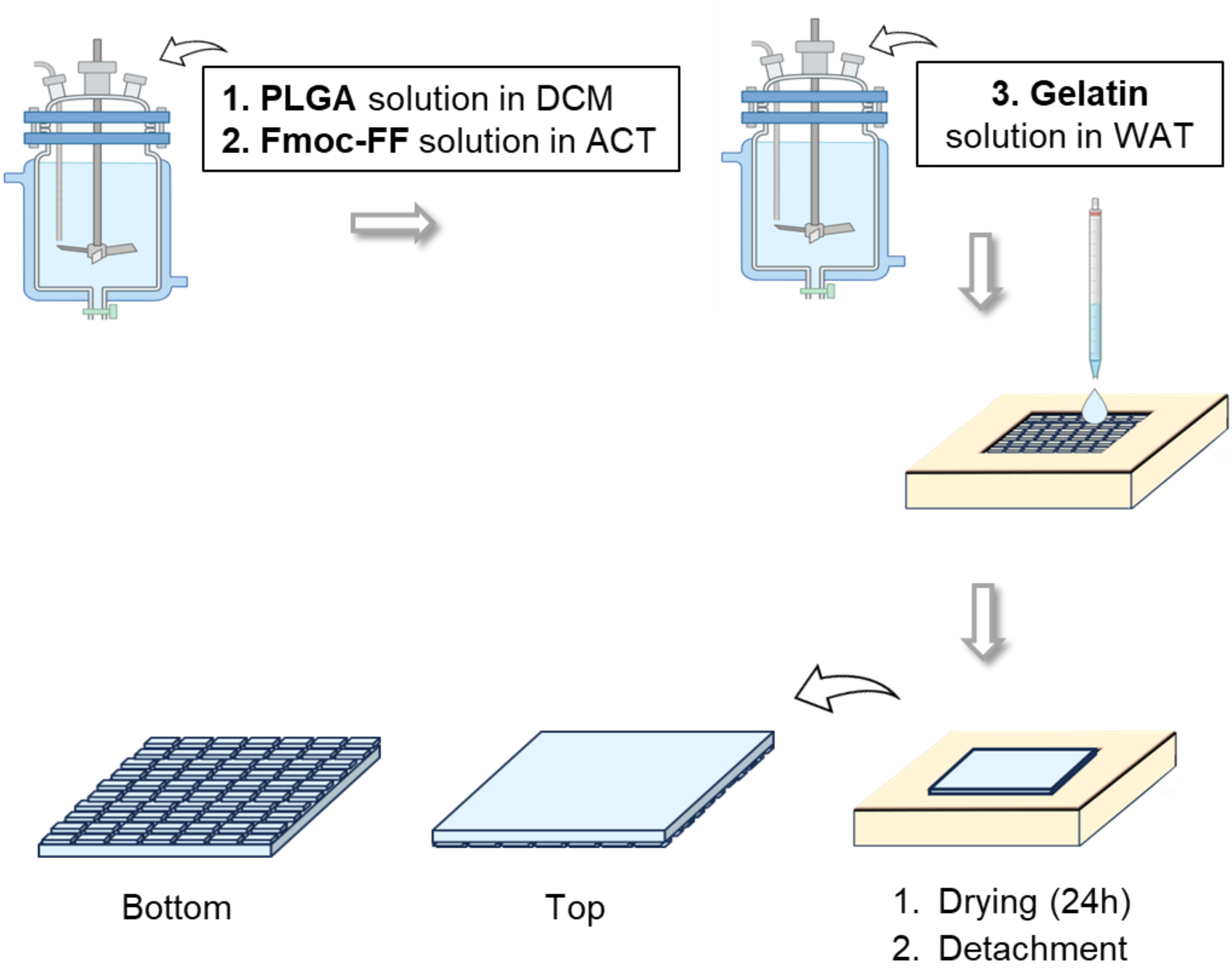


Figure S1. Schematic representation of the production process of a single microstructured membrane of PLGA/Gelatin/Fmoc-FF (m-PGF).

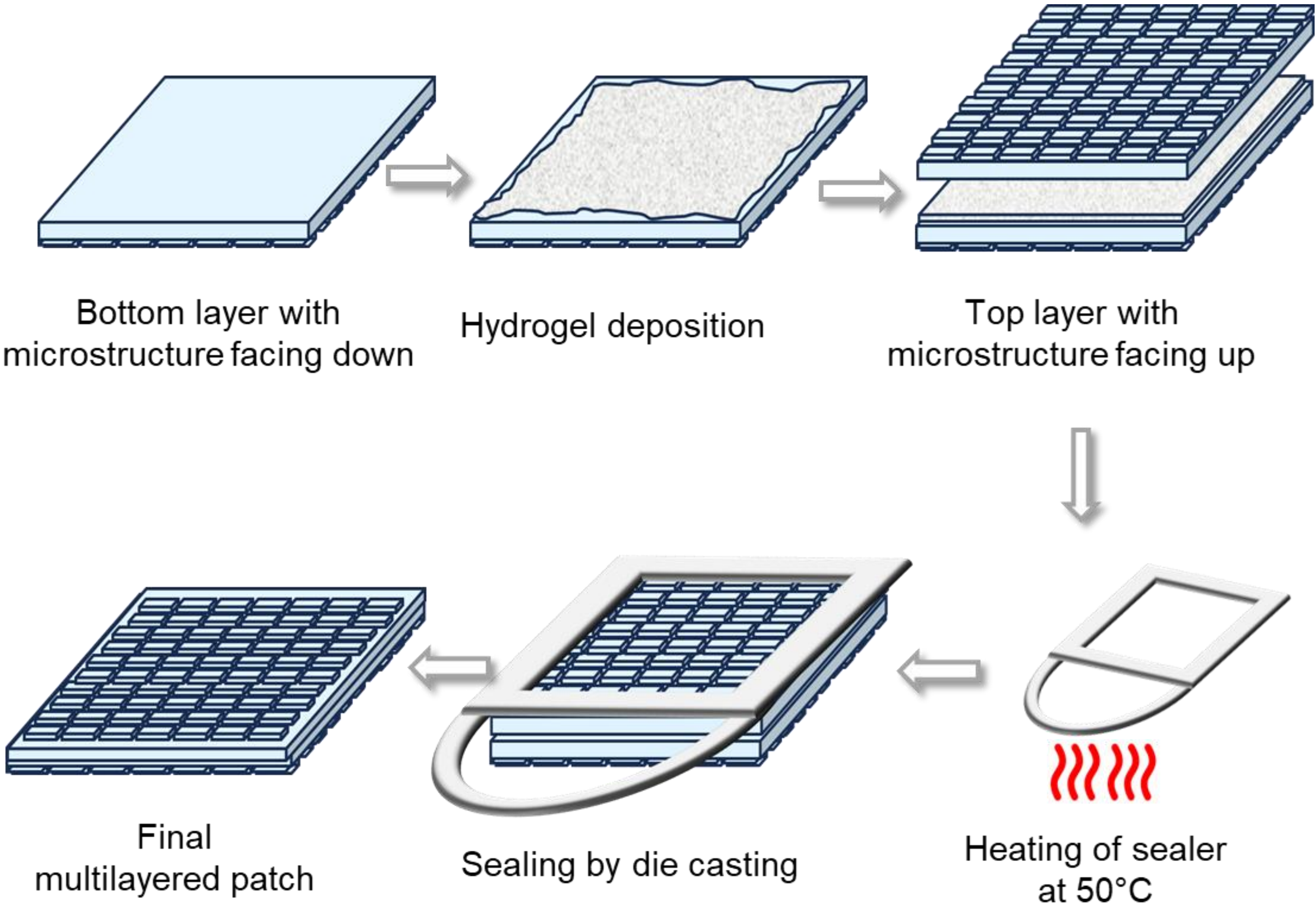
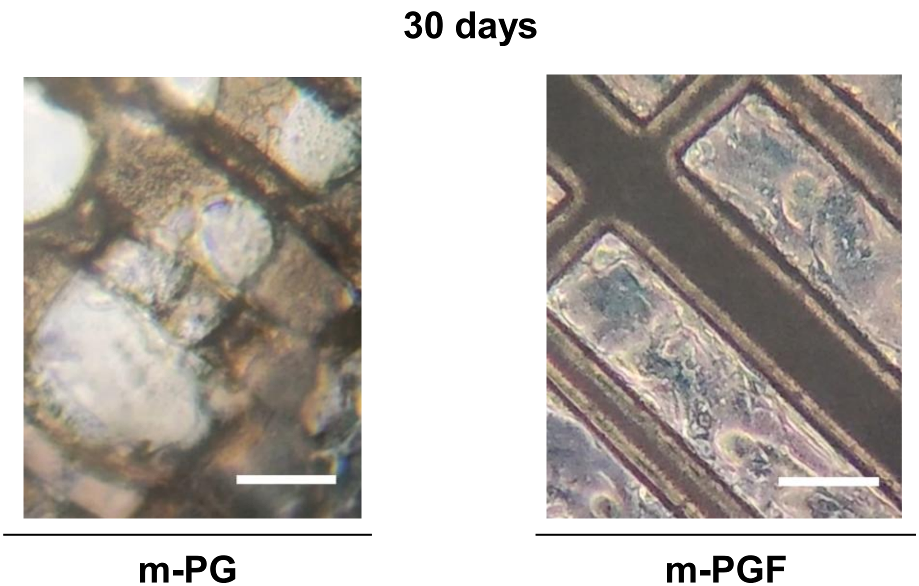


Figure S2. Schematic representation of the patch assembly.

Gene (Protein)	Forward primer sequences	Reverse primer sequences
	Homo sapiens	
KIT (KIT)	5’-CTTCCTTATGATCACAAATGGGAGTT-3’	5’-TCCAGCACCCAGGGTTTTC-3’
GATA4 (GATA binding protein 4)	5’-AGCCTGGCCTGTCATCTCACTA-3’	5’-GGCCAGACATCGCACTGACT-3’
MEF2C (Myocyte enhancer factor 2C)	5’-CCATCTGCCCTCAGTCAGTTG-3’	5’-AGGCAGGGAGAGATTTGAACTCT-3’
NKX2.5 (NK2 homeobox 5)	5’-CGCAGGCGCAGGTCTATGA-3’	5’-GCGTGGACGTGAGTTTCAGC-3’
UBC (Ubiquitin C)	5’-GTCGCAGTTCTTGTTTGTGGATC-3’	5’-GTCTTACCAGTCAGAGTCTTCACGAAG-3’

Table S1. Primer sequences used for qRT-PCR analysis.



Video S1. Phase-contrast videos showing hiPSC-CMs on m-PG and m-PGF 30 days post-seeding. Scale Bar: 20 μm.

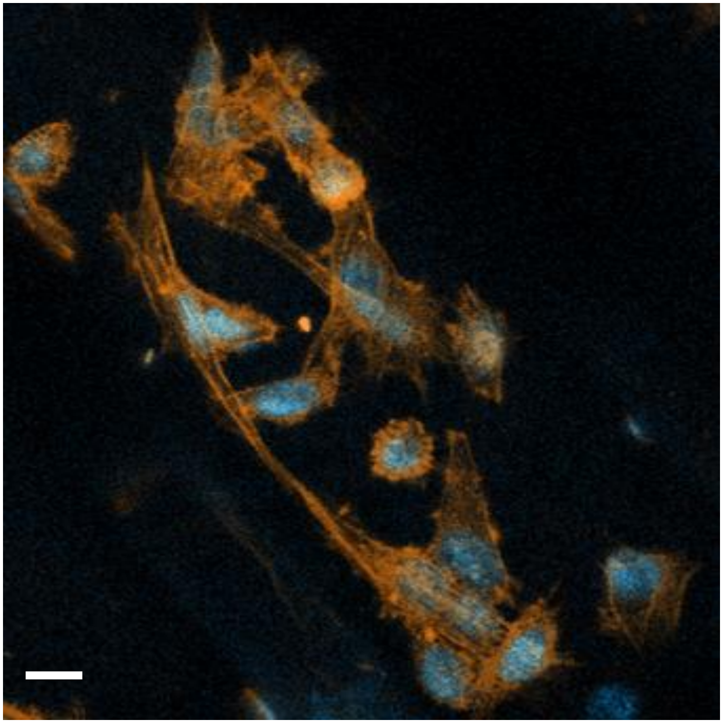


Figure S3. Representative fluorescence image of H9C2 cells cultured on the m-PGF patch for 5 days, stained with phalloidin (orange) to highlight cytoskeletal organization. Nuclei were stained with DAPI (blue). Scale bar: 20 μm.

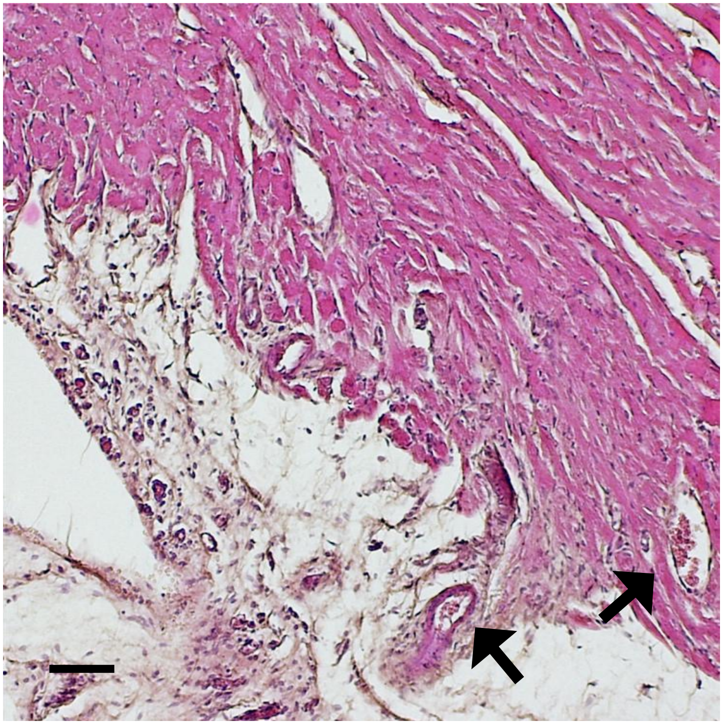


Figure S4. Representative micrographs of cardiac tissue stained with HE of I/R+PGF rats. Black arrows point functional vessels at the interface between myocardium and the patch. Bar: 50 µm.