

Figure S1. Effects of hydrogel degradation and stiffness on hiPSC-CM relaxation. **a** hiPSC-CMs in gelatin hydrogels with greater degradation rate (lower stiffness) showed significantly higher max relaxation velocity in comparison to 16kPa group. **b** 9 kPa group showed the greatest level of max relaxation stress among the 3 hydrogel groups. Relaxation stress is calculated based on displacement of the engineered tissues during CM relaxation and the hydrogel stiffness. One-way ANOVA test was used; **** $p < 0.0001$.

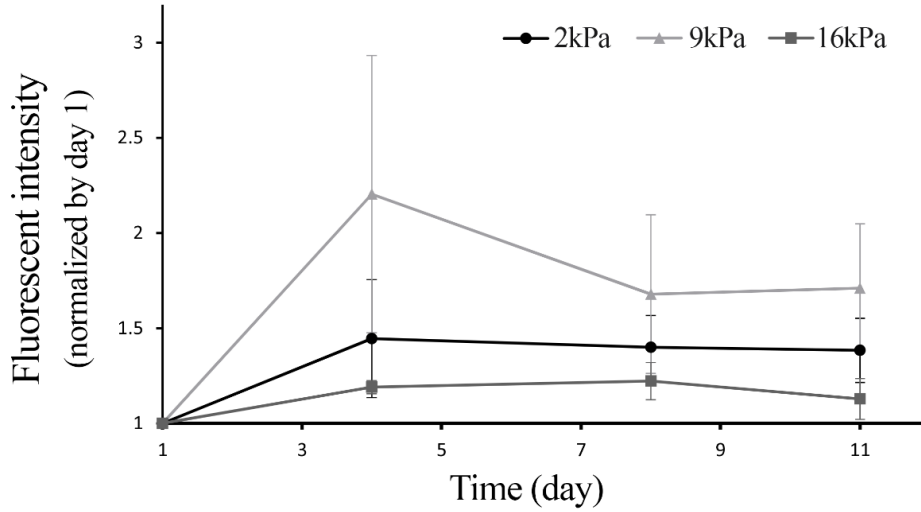


Figure S2. hiPSC-CM metabolic activity within the entire 2-week study period. AlamarBlue assay demonstrated an increase in hiPSC-CM metabolic activity in all three hydrogel groups, followed by a plateau.

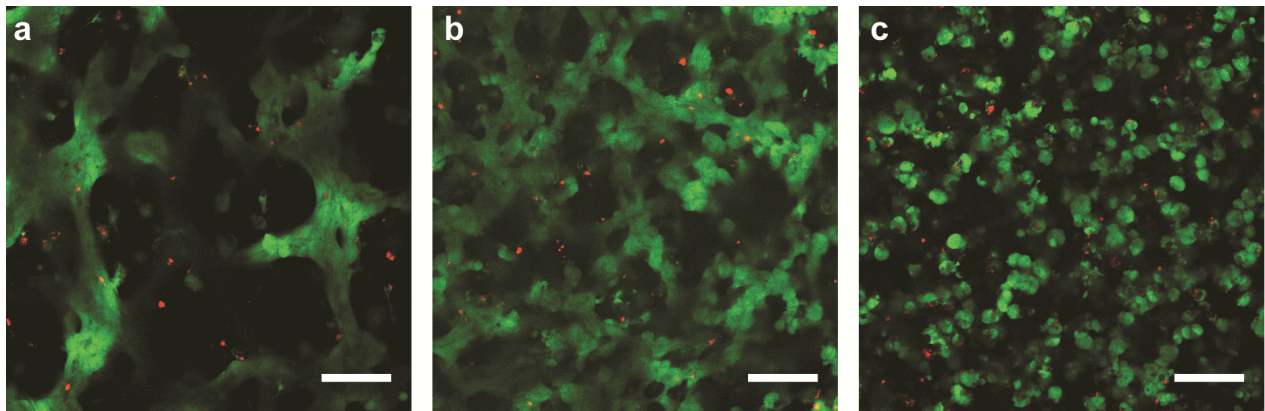


Figure S3. Live/Dead images from the central portion of the engineered constructs. **a** 2 kPa, **b** 9 kPa, **c** 16 kPa hydrogel group. Live/Dead images demonstrate that there is no additional cell death due to potential limited oxygen diffusion.

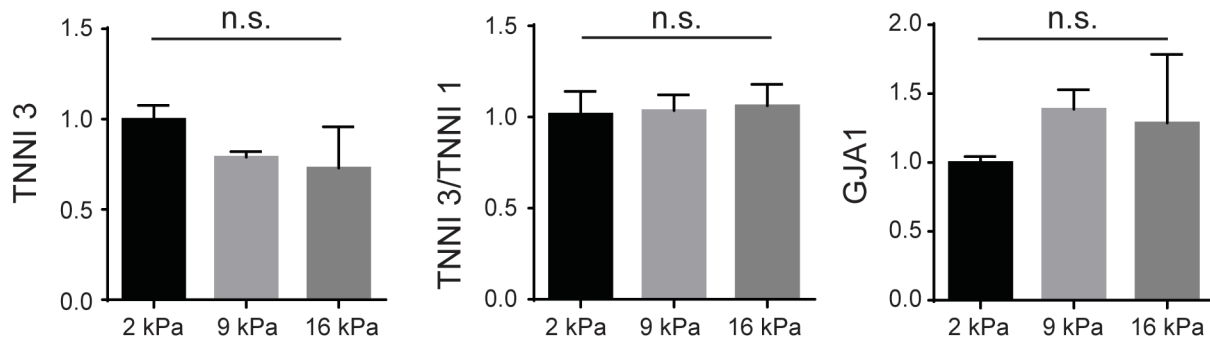


Figure S4. qRT-PCR analysis of the engineered cardiac constructs at day 7. mRNA level of maturation markers (TNNI3, TNNI3/TNNI1, GJA1) show no significant differences between three hydrogel groups.