SUPPLEMENTAL INFORMATION

Title: 3D bioprinted material that recapitulates the perivascular bone marrow structure for sustained hematopoietic and cancer models.

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Supplemental Table 1

Bioink Name Designation:			0:2	1:2	2:2	4:0	4:1	4:2	6:0	6:1	6:2
Bioink Components (% w/v)		MC	0	1	2	4	4	4	6	6	6
		Alginate	2	2	2	0	1	2	0	1	2
Performance Criteria	**Rank**	**Weight**									
Extrudability	1	35%	0.00	0.35	0.35	0.35	0.70	1.05	0.35	0.35	0.70
Handleability	2	30%	0.00	0.00	0.00	0.00	0.30	0.90	0.00	0.30	0.90
Resolution and Fidelity	3	20%	0.00	0.00	0.00	0.20	0.40	0.40	0.20	0.40	0.40
Ease of Fabrication	4	15%	0.45	0.45	0.45	0.45	0.45	0.45	0.30	0.15	0.15
Overall Performance:			**0.45**	**0.80**	**0.80**	**1.00**	**1.85**	**2.80**	**0.85**	**1.20**	**2.15**

Table S1: A decision matrix was established to identify potential candidate methylcellulose (MC)-alginate bioink formulations. Bioinks were grouped based on low (**green**), medium (**red**), or high (**blue**) relative MC content, and compared using 4 arbitrarily-weighted performance criteria: extrudability, handleability, resolution and fidelity, and ease of fabrication. Performance of bioinks across these criteria was scored on a scale of 0 (**poor**) to 3 (**excellent**) and totaled to provide an overall performance score. Bioinks with the highest performance scores (**black arrows**) were considered to be most feasible for use and were selected for further study.

Supplemental Fig. 1

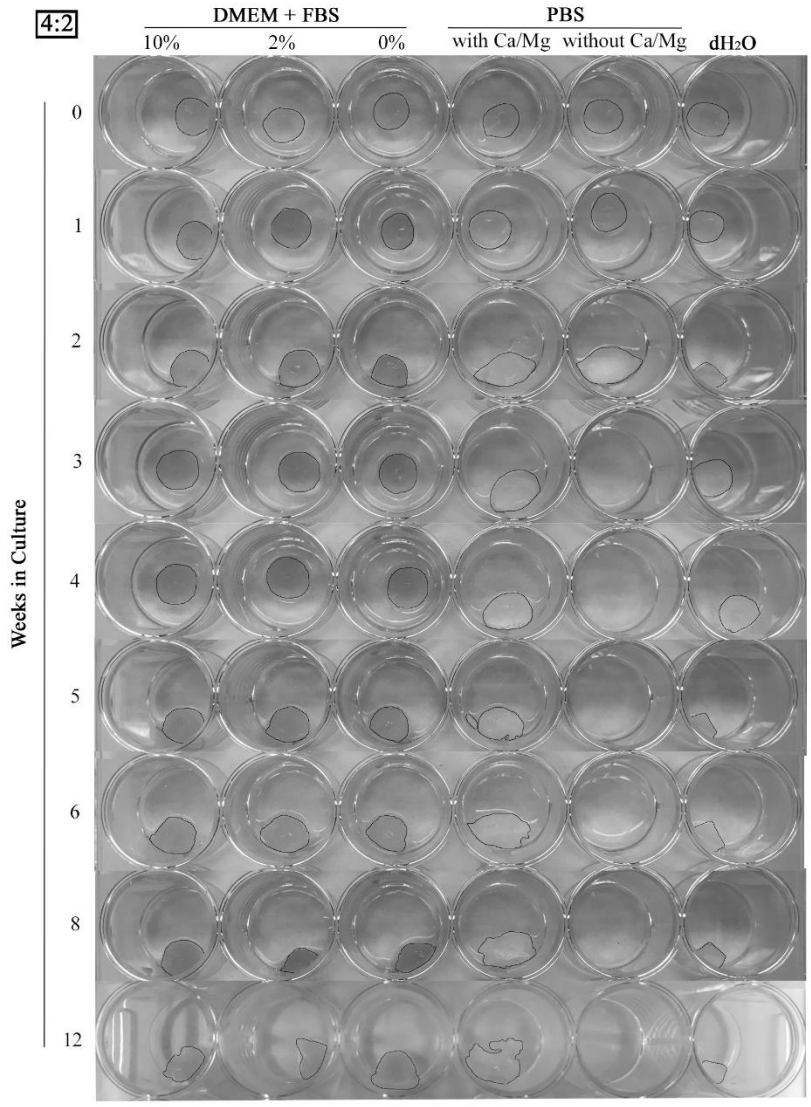

Figure S1. Visible degradation of 4:2 scaffolds in culture solutions. Images of 4:2 scaffolds were acquired weekly for 12 weeks (labeled left; weeks 7, 9, 10, 11 omitted). Scaffolds were cultured in DMEM with 10%, 2%, or 0% FBS, PBS with and without Ca^{2+} and Mg^{2+}, and deionized water (dH_2O) (labeled top).

Supplemental Fig. 2

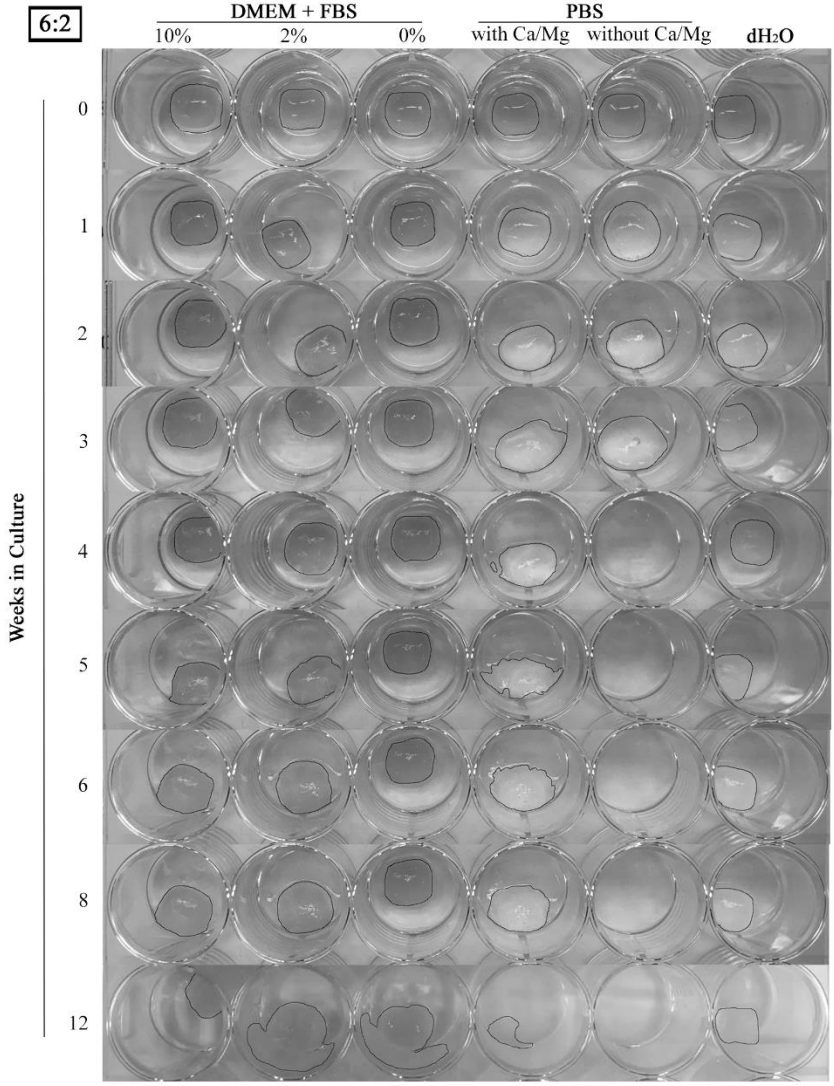

Figure S2. Visible degradation of 6:2 scaffolds in culture solutions. Images of 6:2 scaffolds were acquired weekly for 12 weeks (labeled left; weeks 7, 9, 10, 11 omitted). Scaffolds were cultured in DMEM with 10%, 2%, or 0% FBS, PBS with and without Ca^{2+} and Mg^{2+}, and deionized water (dH_2O) (labeled top).

Supplemental Fig. 3

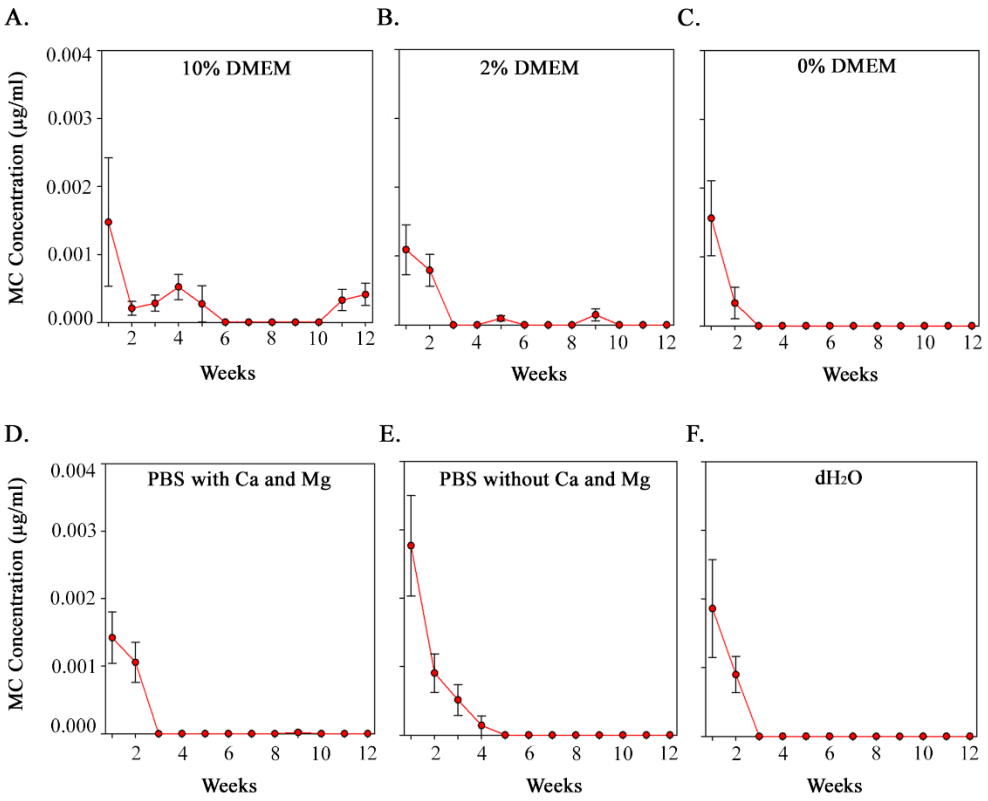

Figure S3. MC released from 4:2 scaffolds during long-term culture. The concentration of MC released from 4:2 scaffolds was measured weekly in culture solutions: DMEM containing (A) 10% FBS, (B) 2% FBS, or (C) 0% FBS, (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Data represents n=3 with at least 4 technical replicates.

Supplemental Fig. 4

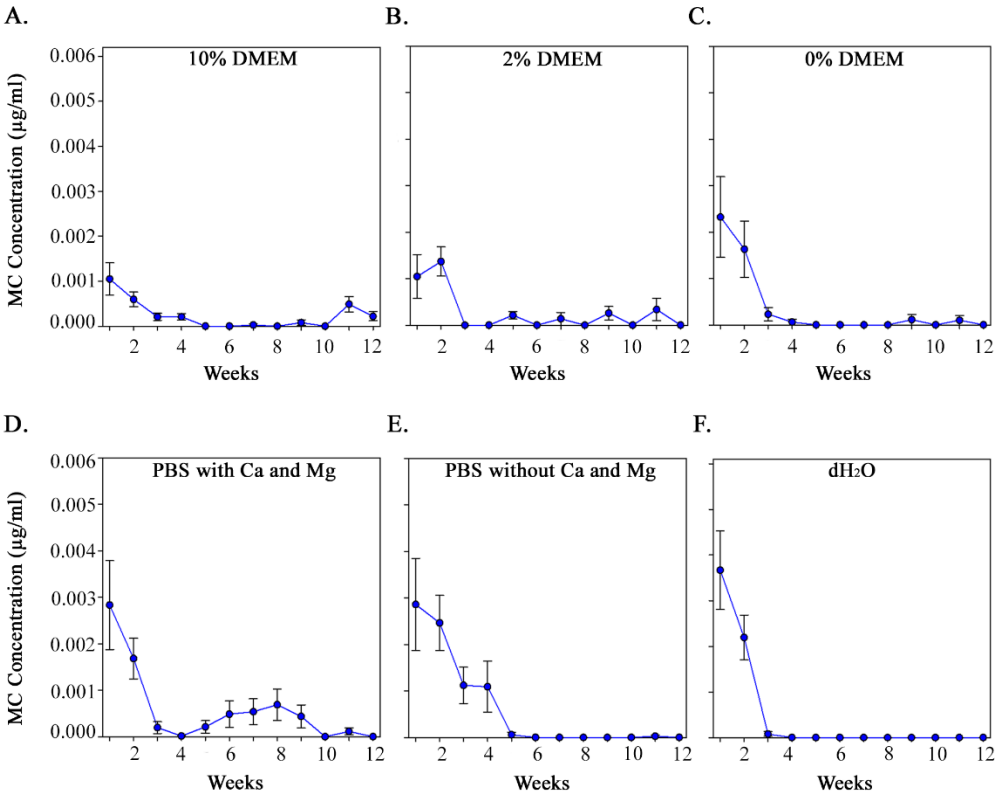

Figure S4. MC released from 6:2 scaffolds during long-term culture. The concentration of MC released from 4:2 scaffolds was measured weekly in culture solutions: DMEM containing (A) 10% FBS, (B) 2% FBS, or (C) 0% FBS, (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Data represents n=3 with at least 4 technical replicates.

Supplemental Fig. 5

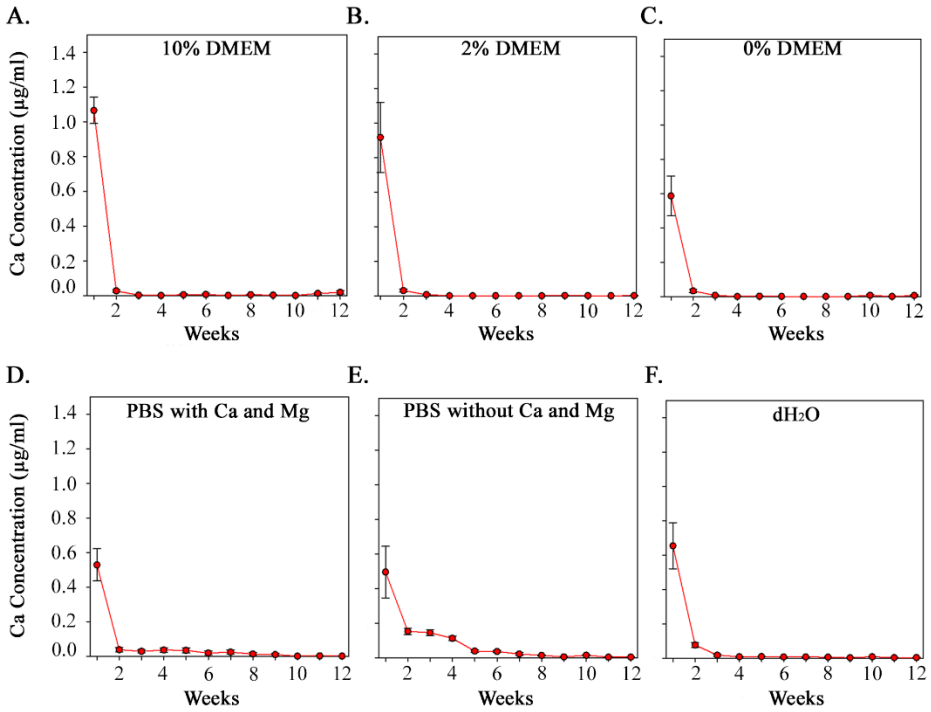

Figure S5. Alginate crosslink breakage in 4:2 scaffolds during long-term culture. Ca^{2+} in solution served as an indicator for alginate crosslink breakage in 4:2 scaffolds cultured in various solutions: DMEM containing (A) 10% FBS, (B) 2% FBS, or (C) 0% FBS, (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Data represents n=3 with at least 4 technical replicates.

Supplemental Fig. 6

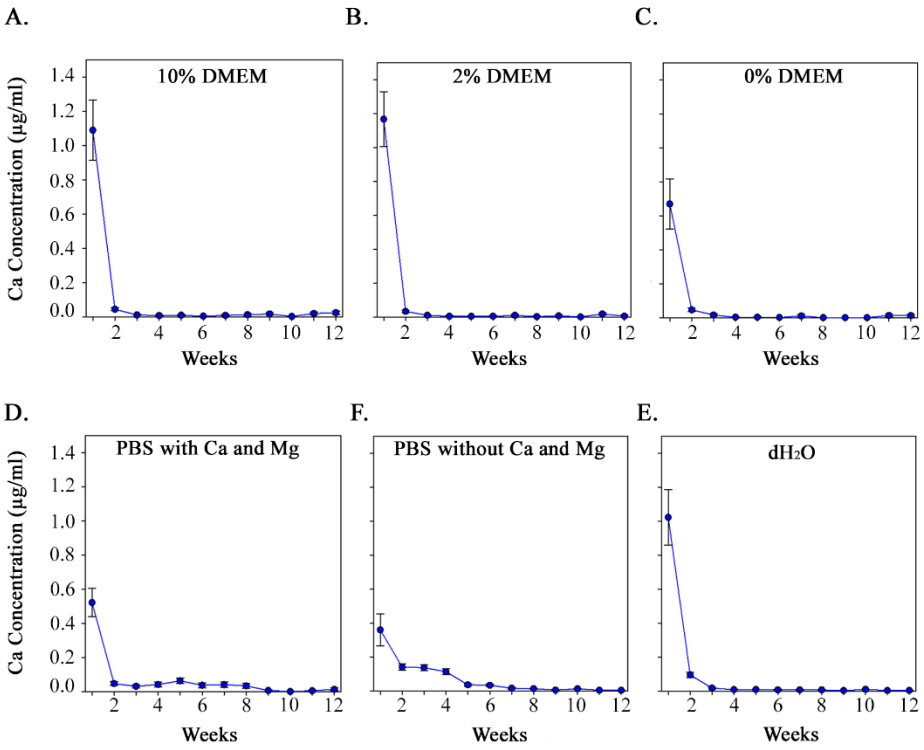

Figure S6. Alginate crosslink breakage in 6:2 scaffolds during long-term culture. Ca^{2+} in solution served as an indicator for alginate crosslink breakage in 4:2 scaffolds cultured in various solutions: DMEM containing (A) 10% FBS, (B) 2% FBS, or (C) 0% FBS, (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Data represents n=3 with at least 4 technical replicates.

Supplemental Fig. 7

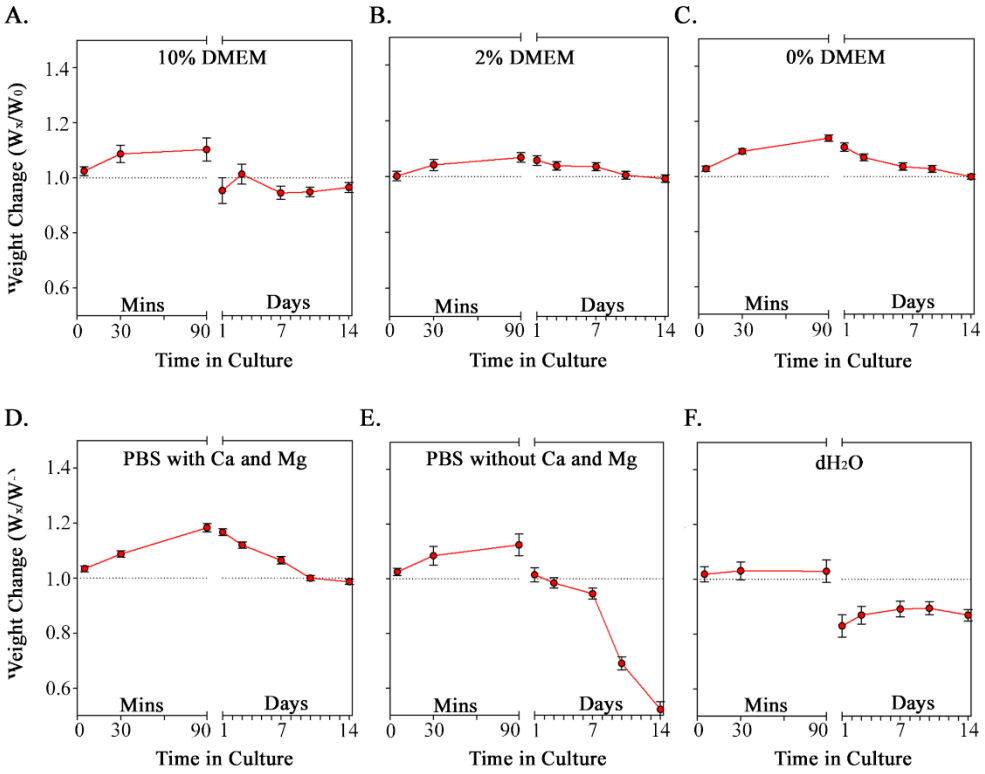

Figure S7. Weight fluctuation of 4:2 scaffolds during the first two weeks of culture. Weight of 4:2 scaffolds was measured at various times after printing (W_x) and normalized by initial weight (immediately after crosslinking, W_0) to yield a weight change ratio (W_x/W_0) for each scaffold. Scaffolds were cultured in Dulbecco's Modified Eagle Medium (DMEM) containing (A) 10%, (B) 2%, or (C) 0% fetal bovine serum (FBS), (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Dotted line indicates initial weight (W_0/W_0). Data represents n=4 with at least 3 technical replicates.

Supplemental Fig. 8

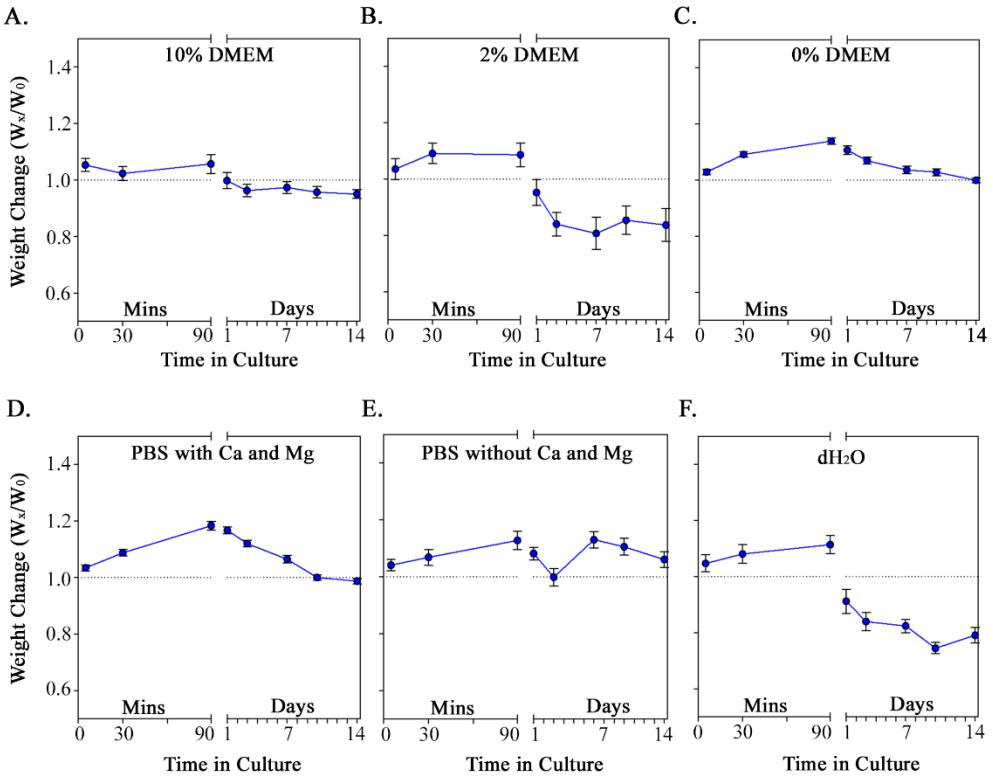

Figure S8. Weight fluctuation of 6:2 scaffolds during the first two weeks of culture. Weight of 4:2 scaffolds was measured at various times after printing (W_x) and normalized by initial weight (immediately after crosslinking, W_0) to yield a weight change ratio (W_x/W_0) for each scaffold. Scaffolds were cultured in Dulbecco's Modified Eagle Medium (DMEM) containing (A) 10%, (B) 2%, or (C) 0% fetal bovine serum (FBS), (D) PBS with Ca^{2+} and Mg^{2+}, (E) PBS without Ca^{2+} and Mg^{2+}, and (F) deionized water (dH_2O). Dotted line indicates initial weight (W_0/W_0). Data represents n=4 with at least 3 technical replicates.