

Supporting Information for

A Customizable ^{32}P Hydrogel Applicator for Brachytherapy of Skin Hemangioma Based on Machine Learning and 3D-Printing

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Table S1 Different ratio of monomer and crosslinker hydrogel precursor formulations.

	AAm	MBA/PEGDA	I2959	H₂O
Different ratio of monomer	5 g	0.2 mg MBA	2.5 mg	10 g
	10 g			
	15 g			
	20 g			
Different type of crosslinker	10 g	1.3 μ mol PEGDA Mn~200	2.5 mg	10 g
		1.3 μ mol PEGDA Mn~700		
		1.3 μ mol PEGDA Mn~2000		
		1.3 μ mol PEGDA Mn~5000		
		1.3 μ mol MBA		
Different ratio of crosslinker	10 g	0 mg MBA	2.5 mg	10 g
		0.02 mg MBA		
		0.1 mg MBA		
		0.2 mg MBA		
		0.5 mg MBA		
		1 mg MBA		
		2 mg MBA		
		6 mg MBA		
		20 mg MBA		
		100 mg MBA		
		200 mg MBA		

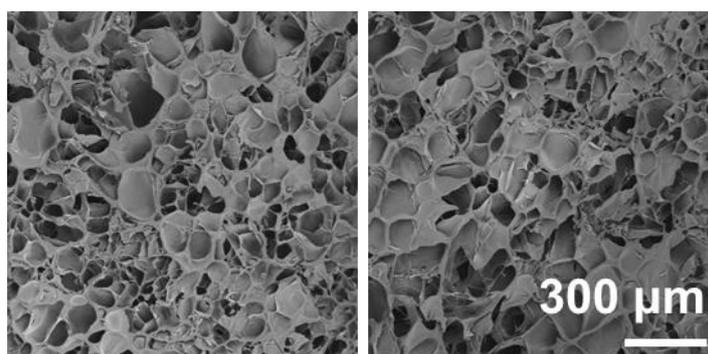


Fig. S1 SEM images of HG.

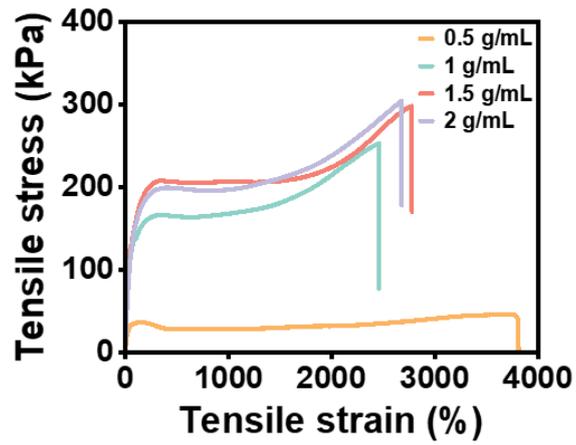


Fig. S2 The stress-stretch curves of hydrogel of different ratio of monomer.

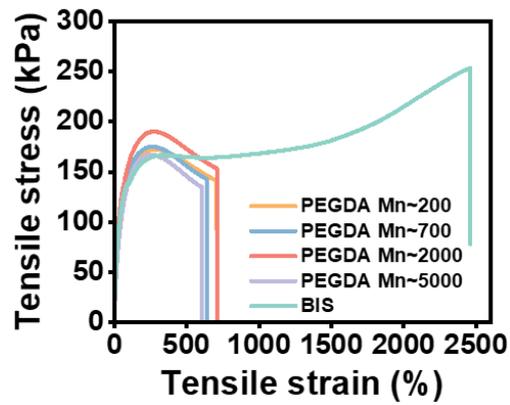


Fig. S3 The stress-stretch curves of hydrogel of different crosslinker.

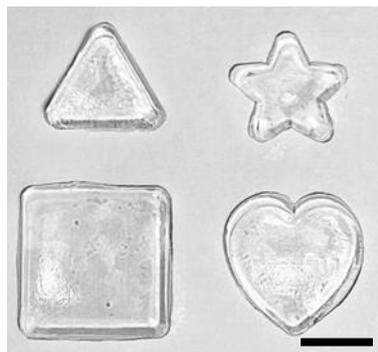


Fig. S4 HG in different shapes (scale bar, 5 mm).

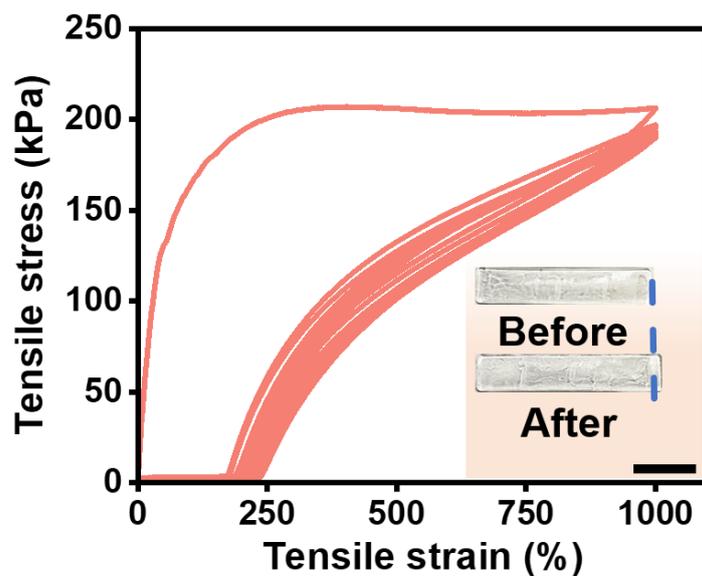


Fig. S5 The continuous 10 times tensile cyclic loading–unloading curves of HG (scale bars 20 mm).

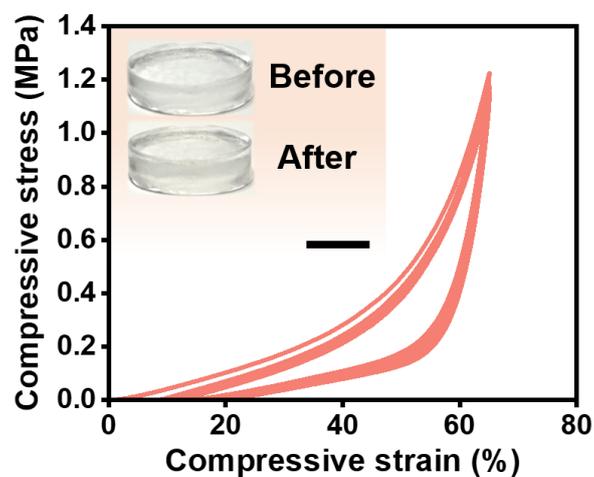


Fig. S6 The continuous 10 times compressive cyclic loading–unloading curves of HG (scale bars 10 mm).



Fig. S7 The HG cured from the precursor solution stored for different condition (from left to right: 25°C, 25°C in the dark, and 4°C in the dark) (scale bar, 10 mm).

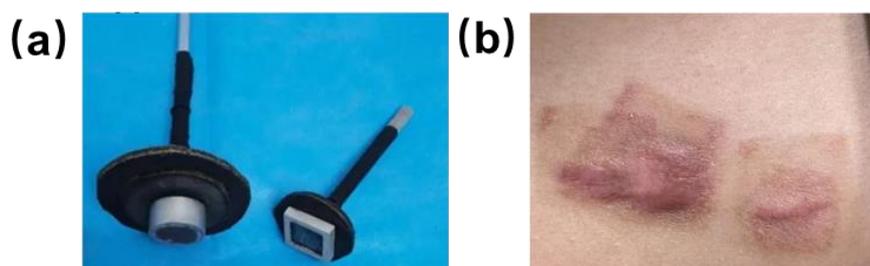
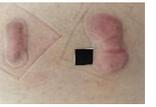


Fig. S8 (a) Commercial ^{90}Sr -based applicators.

(b) Normal skin damage caused by excessive exposure of ^{90}Sr .

Table S2 Photos of different cases, areas recognized by the algorithm, and 3D printing time required as calculated by the slicing software.

	Case 1	Case 2	Case 3	Case 4	Case 5
Lesion					
Area (cm ²)	11.23	6.87	31.08	9.07	9.86
3D printing time (min)	3.6	3	6	3.6	3.6

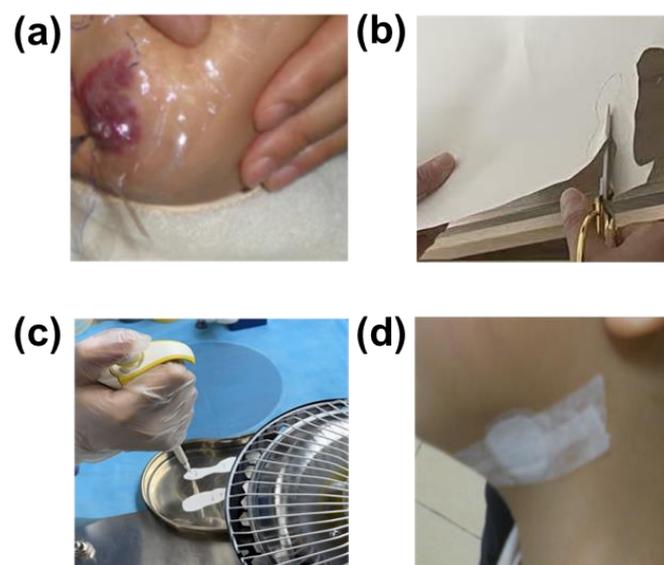


Fig. S9 Preparation process of filter paper applicator. a) Drawing the outline of the lesion area. b) Preparing the ^{32}P filter paper carrier. c) Dripping ^{32}P solution, drying and sealing. d) Using of ^{32}P filter paper applicator.

Table S3 The images of different radioactivity P-HGs was detected by autoradiography (scale bars 20 mm).

RAG					
Radioactivity (MBq/cm²)	3.7	1.85	0.925	0.37	0

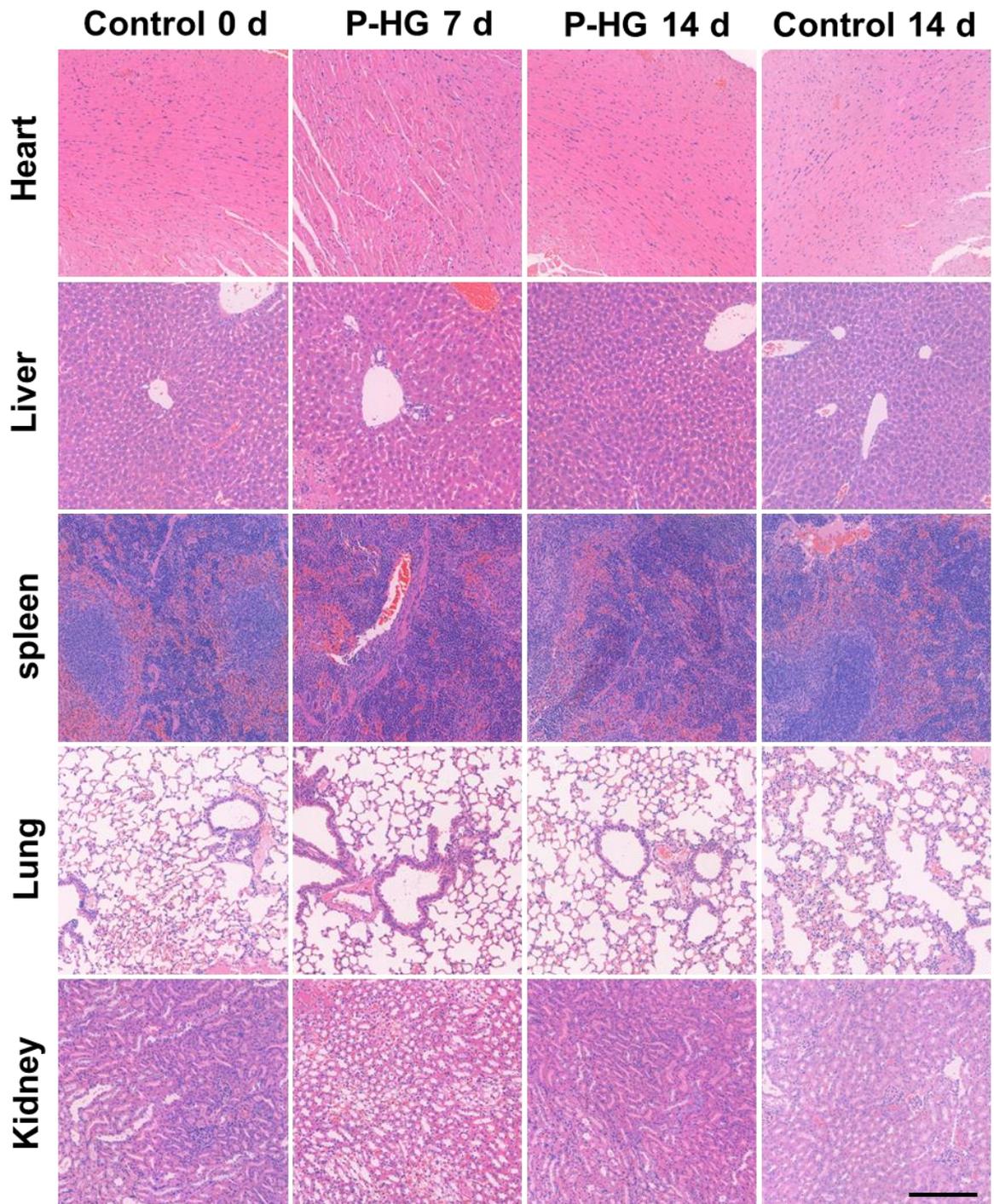


Fig. S10 Images of H&E slices from hearts, livers, spleens, lungs and kidneys of mice (scale bars 100 μm).