

Supplementary file



Figure S1. PVA/dECM hydrogel with different treatment. From left to right: after being photocrosslinked, after being soaked sodium hydroxide, and after being soaked in calcium chloride.

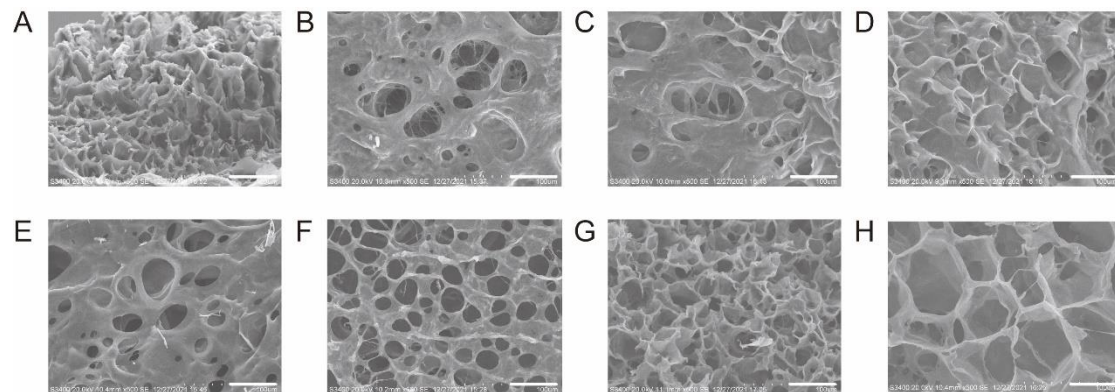


Figure S2. Scanning electron microscopy images. (A) Native meniscus. (B) The 20-10 PVA/dECM hydrogel group. (C) The 40-10 PVA/dECM hydrogel group. (D) The 120-10 PVA/dECM hydrogel group. (E) The control group. (F) The 20-20 PVA/dECM hydrogel group. (G) The 40-20 PVA/dECM hydrogel group. (H) The 120-20 PVA/dECM hydrogel group. Scale bar: 50 μm .

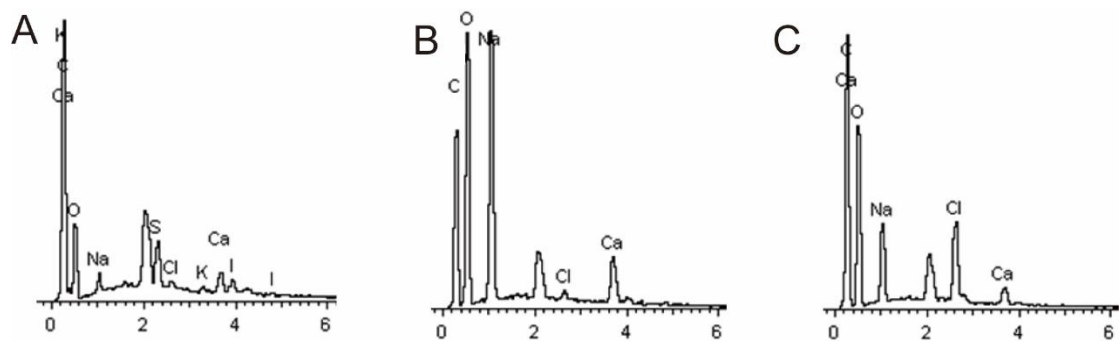


Figure S3. Surface element of the native meniscus (A), the PVA/dECM hydrogel group (B) and the control group (C).

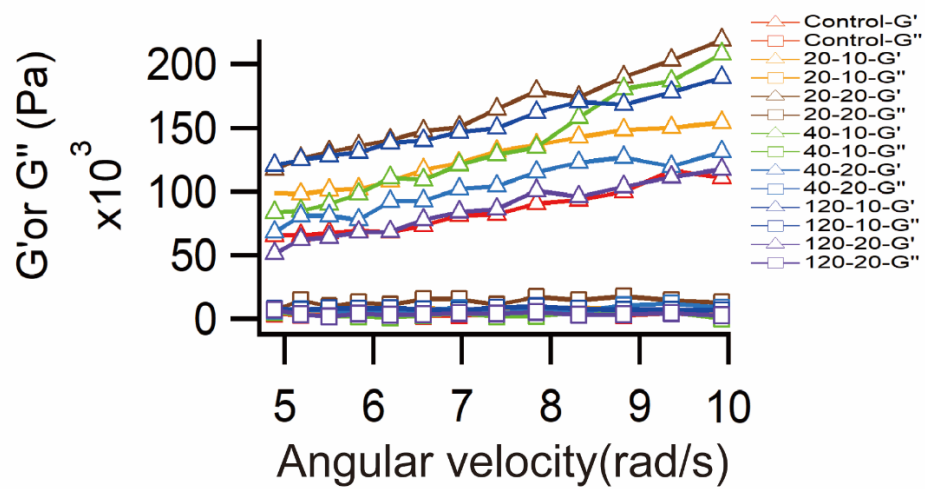


Figure S4. The relationship between frequency and pressure under fixed stress of all groups.

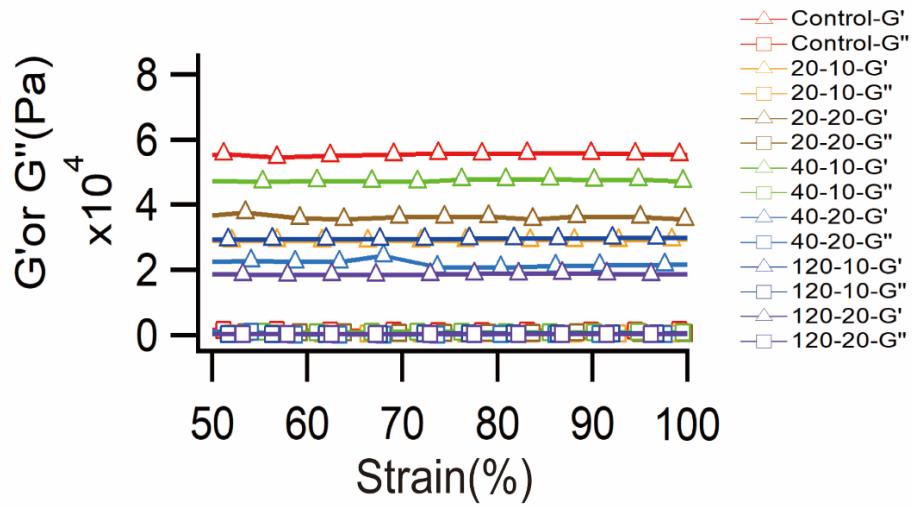


Figure S5. The relationship between stress and pressure under fixed frequency of all groups.

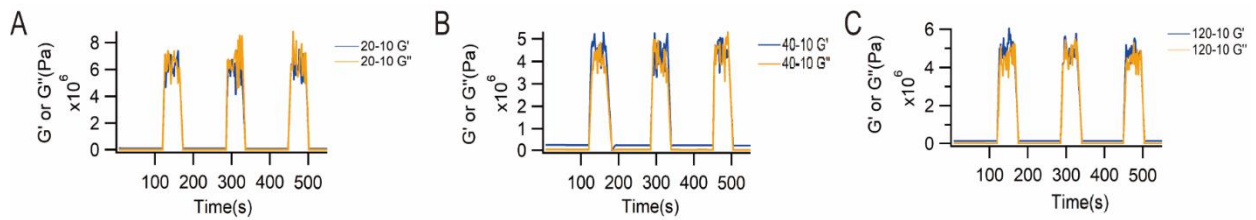


Figure S6. The shear-thinning experiments of the 20-10 (A), 40-10 (B), and 120-10 (C) PVA/dECM hydrogel group.

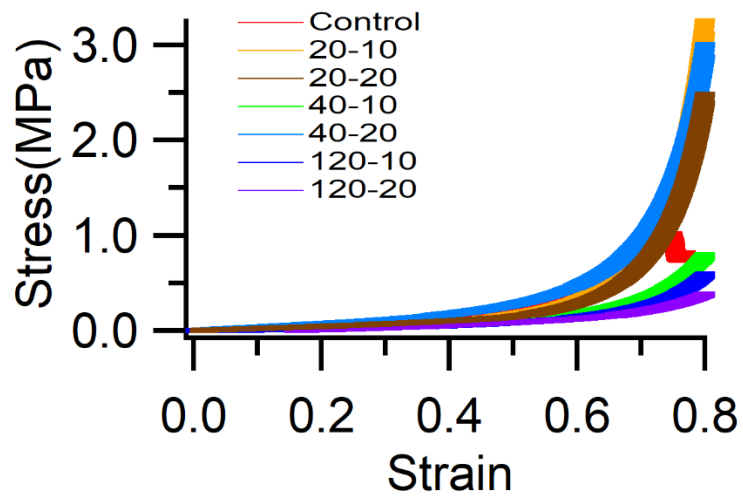


Figure S7. The uniaxial stress-strain curves under compression until 80% of height of all groups.

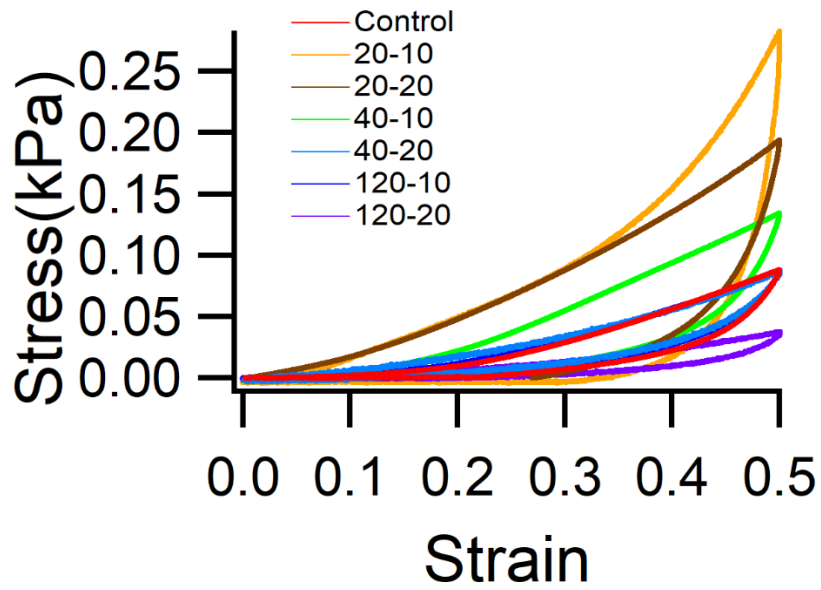


Figure S8. The Uniaxial compression-relaxation curves of PVA/Decm hydrogel groups and control group.

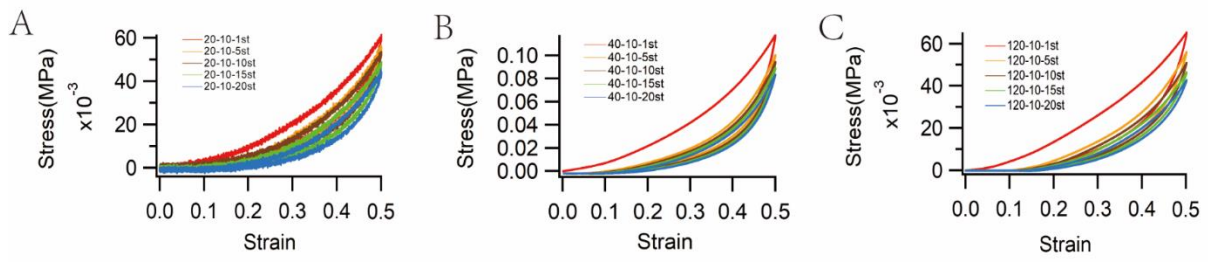


Figure S9. The compression-relaxation cycles of the 20-10 (A), 40-10 (B) and 120-10 (C) hydrogel group for 20 consecutive cycles without any wait time between each cycle.

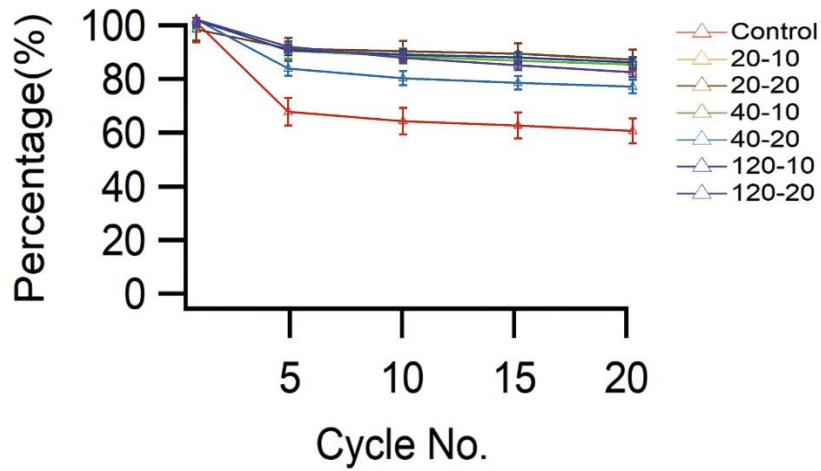


Figure S10. The normalized maximum compressive stress of all the hydrogel groups in the 20 cycles.

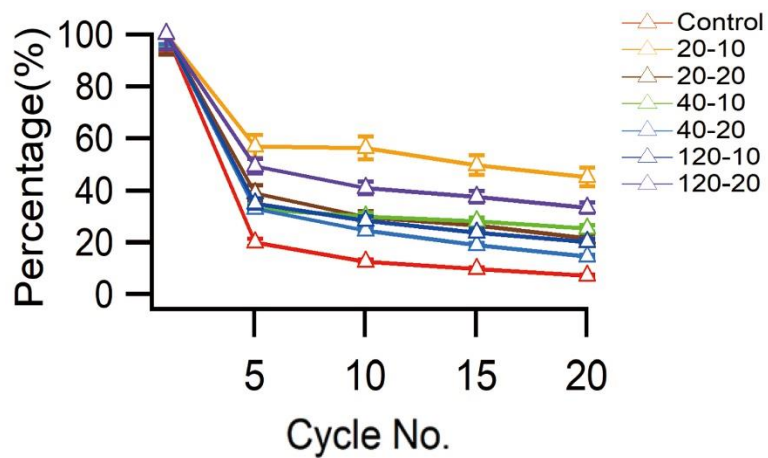


Figure S11. The dissipation energy of all the hydrogel groups in the 20 cycles.

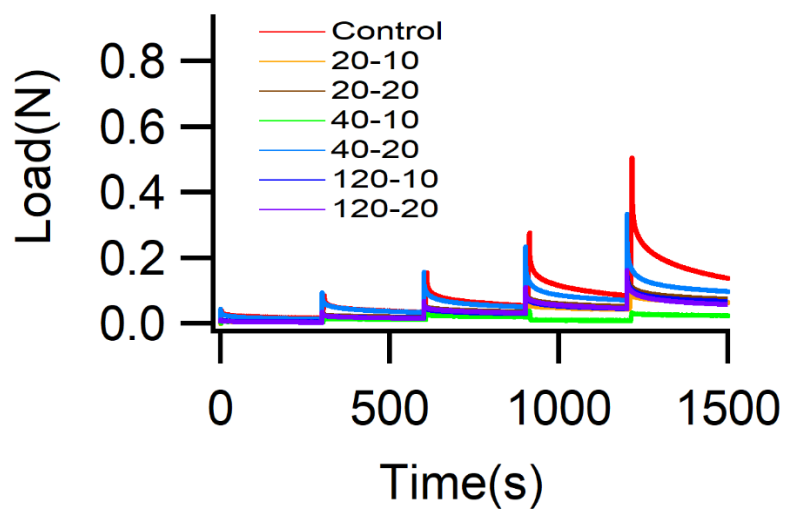


Figure S12. The stress-relaxation of all the hydrogel groups. The strain of each loading step increased 10% in the range of 0–50%.

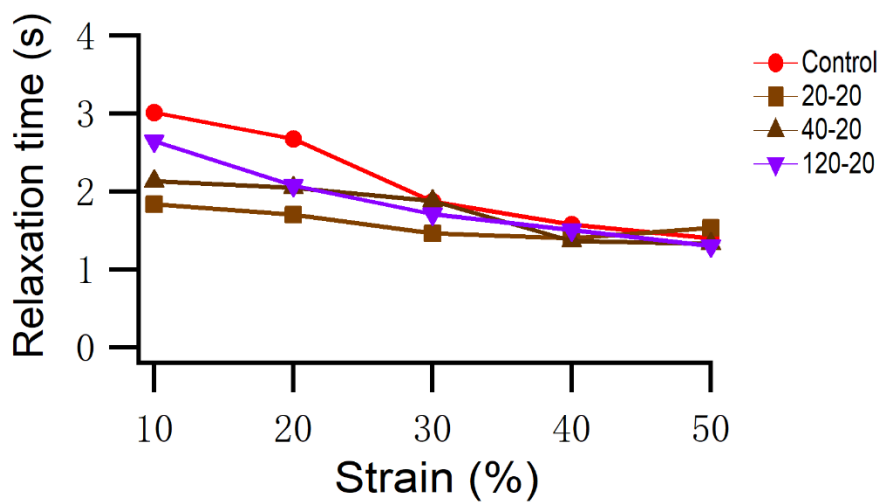


Figure S13. The results of relaxation time scale in the stress-relaxation of the hydrogel groups.



Figure S14. The general picture of meniscus defect.

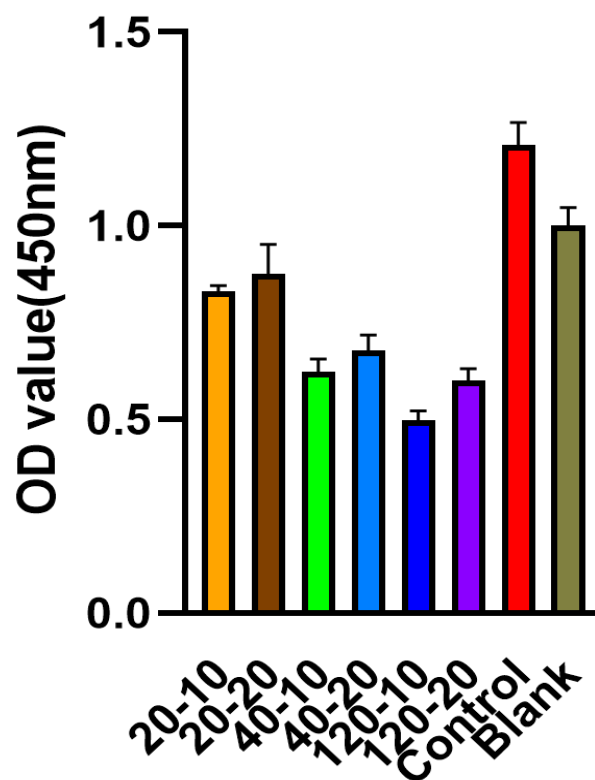


Figure S15. The relative cell vitality after culturing for 48 h.

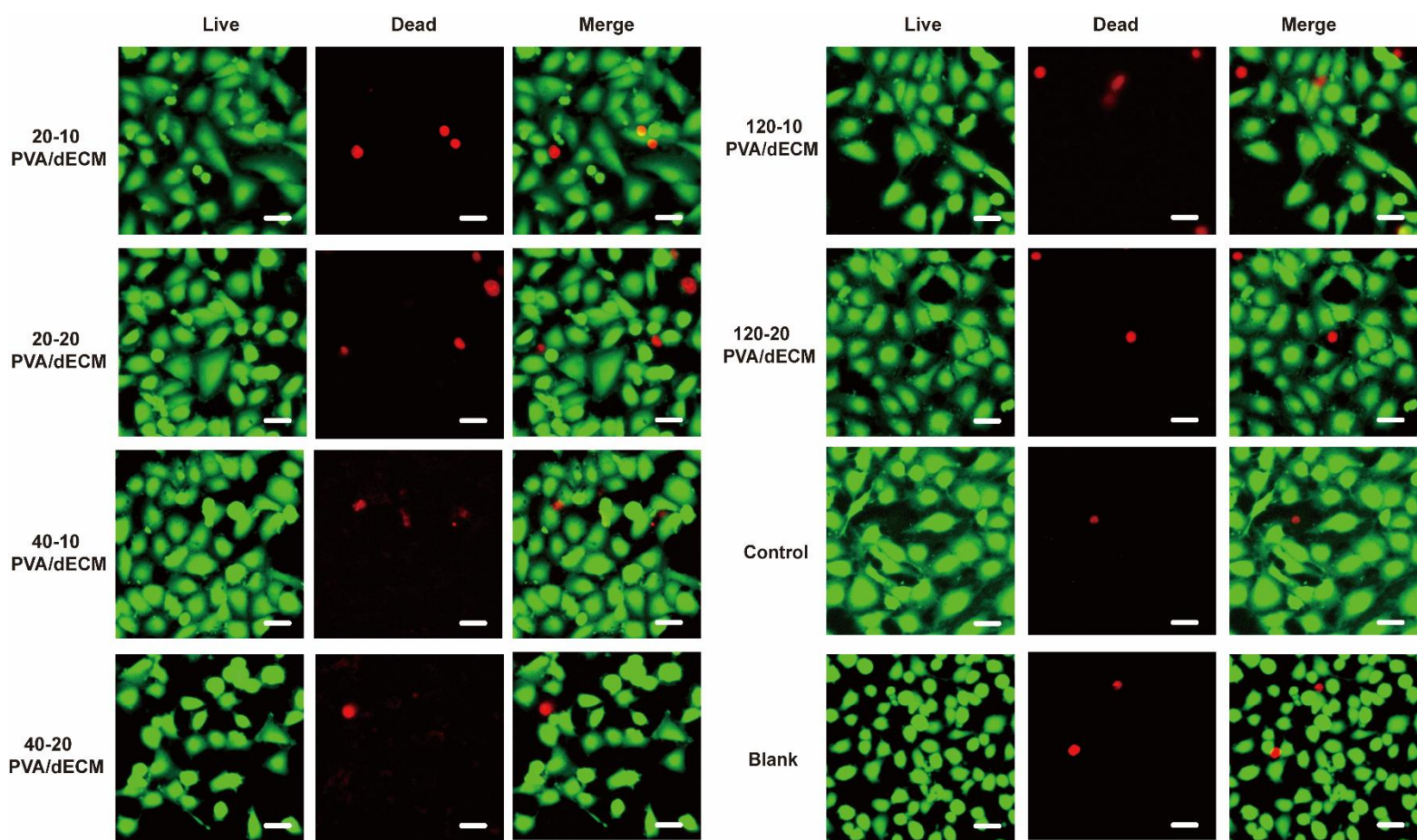


Figure S16. The Calcein/PI staining results of all groups (40× magnification; scale bar: 200 μm).

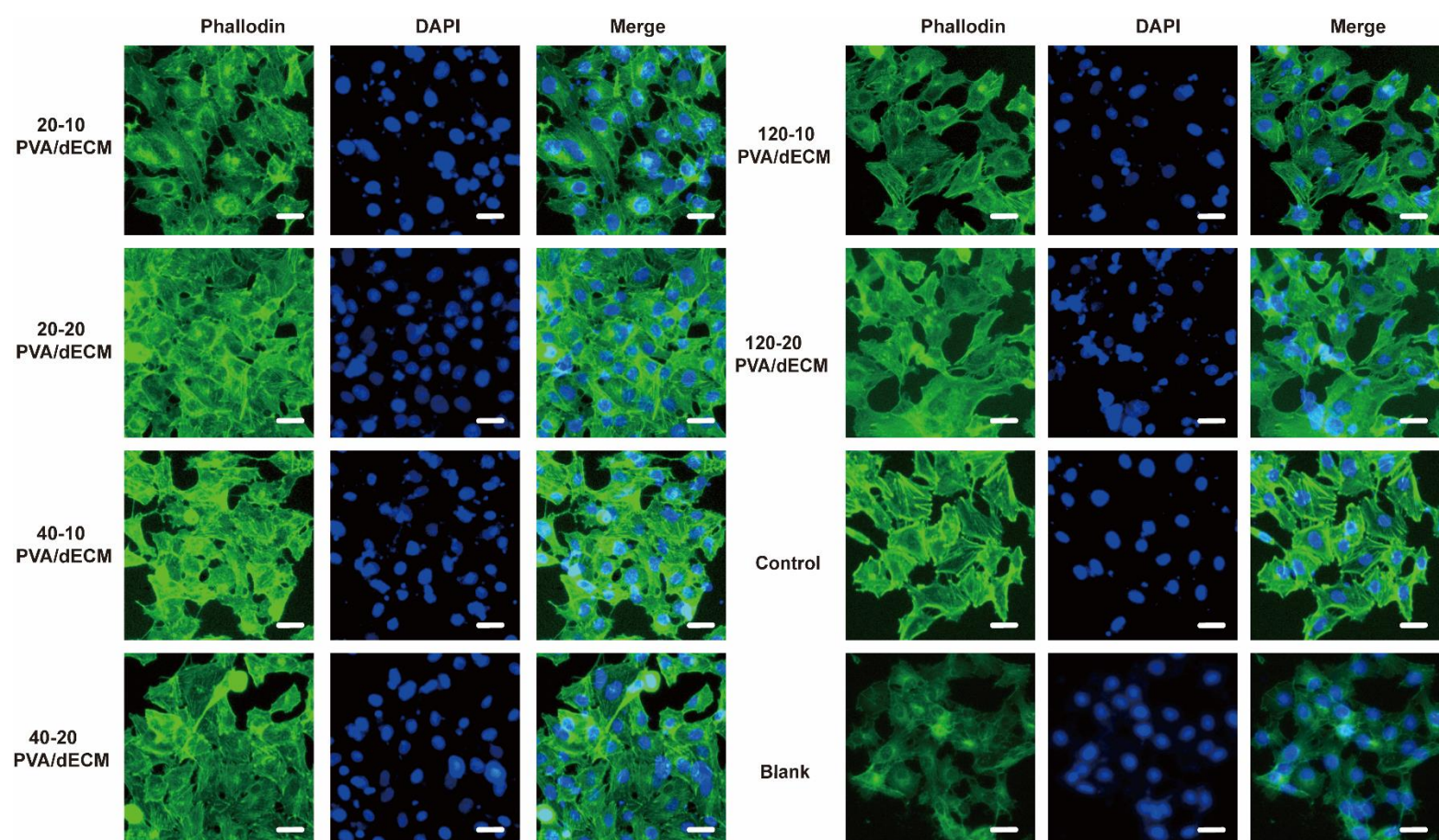


Figure S17. The results of Phalloidine/DAPI staining (100×magnification; scale bar: 100 μm).

Table S1. ICRS scoring system

Cartilage repair evaluation	Points
Degree of defect repair	
In level with surrounding cartilage	4
75% repair of defect depth	3
50% repair of defect depth	2
25% repair of defect depth	1
0% repair of defect depth	0
Integration to border zone	
Complete integration with surrounding cartilage	4
Demarcating border <1 mm	3
3/4 th of graft integrated, 1/4 th with a notable border > 1 mm width	2
1/2 of graft integrated with surrounding cartilage, 1/2 with a notable border >1 mm	1
From no contact to 1/4 th of graft integrated with surrounding cartilage	0
Macroscopic appearance	
Intact smooth surface	4
Fibrillated surface	3
Small, scattered fissures or cracks	2
Several, small or few but large fissures	1
Total degeneration of grafted area	0
Overall repair assessment	
Grade I: normal	12
Grade II: nearly normal	11-8
Grade III: abnormal	7-4
Grade IV: severely abnormal	3-1

Table S2. O'Driscoll scoring system

Histological evaluation	Points
Nature of the predominant tissue	
Cellular morphology	
Hyaline articular cartilage	4
Incompletely differentiated mesenchyme	2
Fibrous tissue or bone	0
Safranin O staining of the matrix	
Normal or nearly normal	3
Moderate	2
Slight	1
None	0

Structural characteristics	
Surface regularity	
Smooth and intact	3
Superficial horizontal lamination	2
Fissures – 25 to 100 per cent of thickness	1
Severe disruption, including fibrillation	0
Structural integrity	
Normal	2
Slight disruption, including cysts	1
Severe disintegration	0
Thickness	
100 % of normal adjacent cartilage	2
50-100% of normal cartilage	1
0-50% of normal cartilage	0
Bonding to adjacent cartilage	
Bonded at both ends of graft	2
Bonded at one end, or partially at both ends	1
Not bonded	0
Freedom from cellular changes of degeneration	
Hypocellularity	
Normal cellularity	3
Slight hypocellularity	2
Moderate hypocellularity	1
Severe hypocellularity	0
Chondrocyte clustering	
No clusters	2
<25% of the cells	1
25-100% of the cells	0
Freedom from degenerative changes in adjacent cartilage	
Normal cellularity, no clusters, no staining	3
Normal cellularity, mild clusters, moderate staining	2
Mild or moderate hypocellularity, slight staining	1
Severe hypocellularity, poor or no staining	0