Supplemental material

Fig. S1: A: Magnetic gelatin/β-CD/Fe3O4 hydrogel (diameter 10 mm, height 5 mm); B, C: pressure test procedure of magnetic gelatin/β-CD/Fe3O4 hydrogel, loading rate 5.00 mm/min; D: Deformation state after the pressure test of the magnetic gelatin/β-CD/Fe3O4 hydrogel; E: ordinary gelatin/β-CD hydrogel (diameter 10 mm, height 5 mm); F, G: ordinary gelatin/β-CD water. The pressure test of the gel, the loading rate was 5.00 mm/min; H: The deformation state after the pressure test of the ordinary gelatin/β-CD hydrogel.

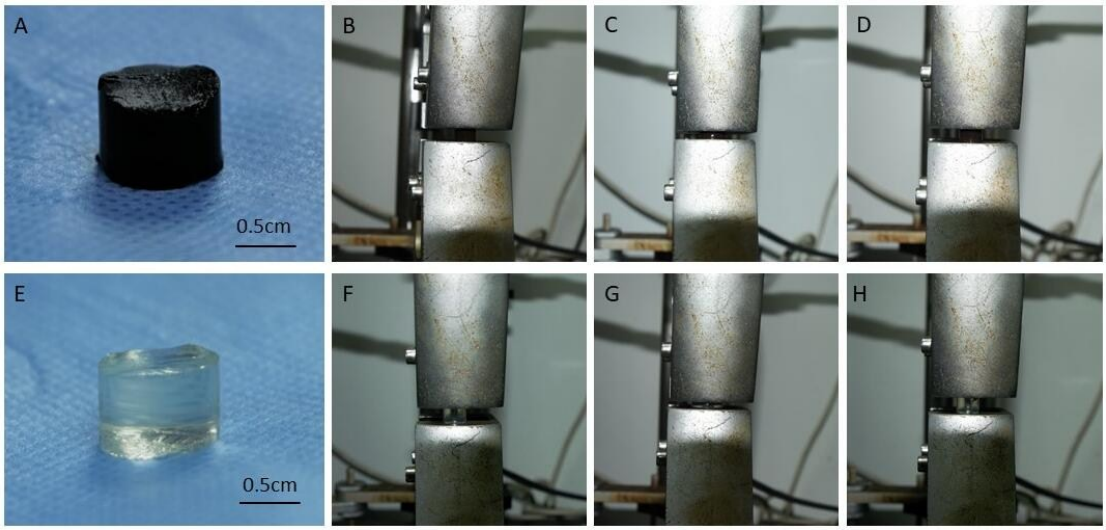

Fig. S2: A: Magnetic nanocomposite hydrogel; B: Still flowing at 30 s, gradually gelatinized; C: Tilt test conducted every 30 s to test its fluidity, and it stops flowing after 200 s, at which time it has already gelatinized; D: Ordinary hydrogel; E: At 30 s, it can still flow and gradually becomes glue; F: Tilt test conducted every 30 s to test its fluidity, and it stops flowing after 200 s, at which time it has become glue.

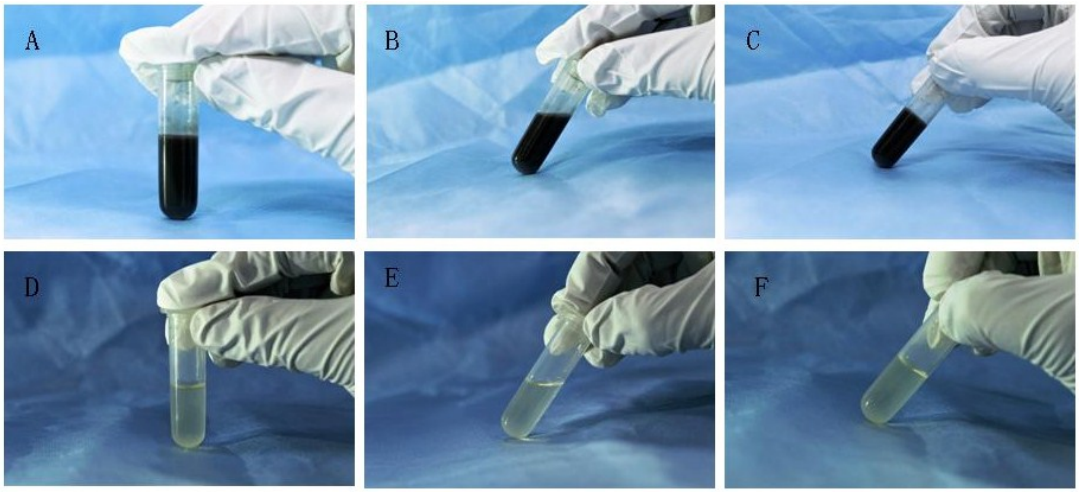

Fig. S3: A: BMSCs; B: BMSCs induced chondrocytes, and Toluidine blue staining confirmed that the rabbit BMSCs could be differentiated into chondrocytes, C: BMSCs; D: BMSCs induced adipocytes, and oil red O-staining confirmed that rabbit BMSCs induced differentiation into adipocytes.

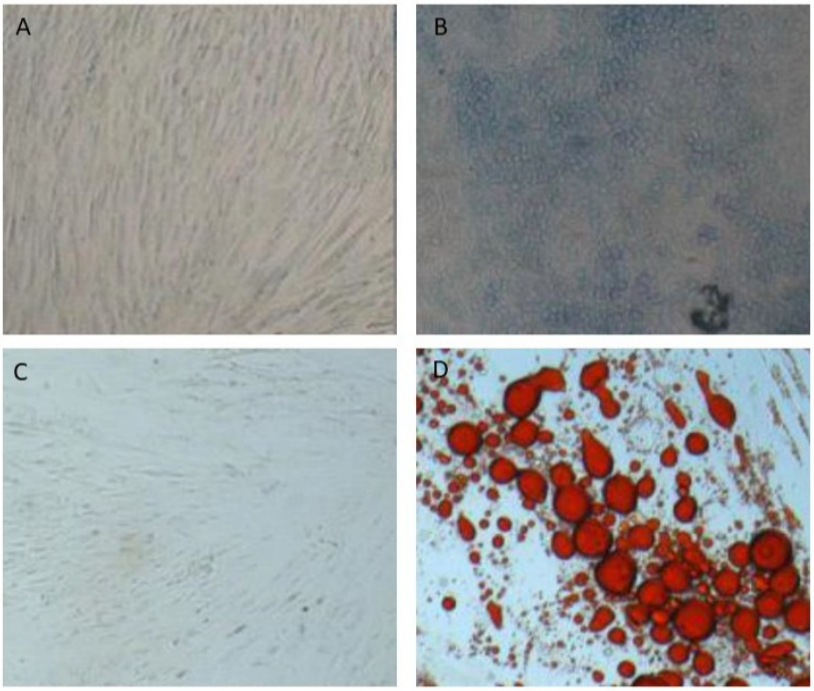

Fig. S4: A: Rabbit knee cartilage; B: Cartilage defect; C: Cartilage defect (diameter 5 mm, depth 5 mm, belonging to a large, deep area of defect); and D: Each group of samples was implanted into the defect site.

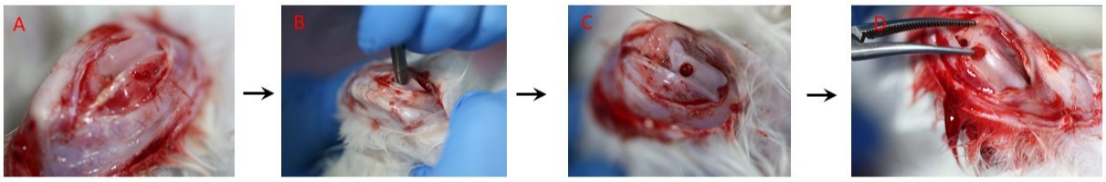

Table S1. International Cartilage Repair Society macroscopic evaluation of cartilage repair

Categories	Scores
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
No repair of defect depth	0
Integration to border zone	
Complete integration with surrounding cartilage	4
Demarcating border-1 mm	3
Three-quarters of graft integrated, one-quarter with a notable border-1 mm in width	2
One-half of graft integrated with surrounding cartilage, one-half with a notable border-1 mm	1
From no contact to one-quarter 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 large fissures	1
Total degeneration of grafted area	0
Overall repair assessment	
Grade I: normal	12
Grade II: nearly normal	8-11
Grade III: abnormal	4-7
Grade IV: severely abnormal	1-3

Table S2. The ICRS Visual Histological Assessment Scale

Features	Scores
Surface	
Smooth/continuous	3
Discontinuities/irregularities	0
Matrix	
Hyaline	3
Mixture: hyaline/fibrocartilage	2
Fibrocartilage	1
Fibrous tissue	0
Cell distribution	
Columnar	3
Mixed/columnar-clusters	2
Clusters	1
Individual cells/disorganized	0
Cell population viability	
Predominantly viable	2
Partially viable	1
<10% viable	0
Subchondral bone	
Normal	3
Increased remodeling	2
Bone necrosis/granulation tissue	1
Detached/fracture/callus at base	0
Cartilage mineralization (calcified cartilage)	
Normal	2
Abnormal/inappropriate location	0
Toluidine blue stain	
Normal	4
Slight reduction	3
Moderate reduction	2
Severe reduction	1
No staining	0
Percent toluidine blue in defect	
75–100%	4
50–75%	3
25–50%	2
0–25%	1
No toluidine blue staining	0
	Max 24