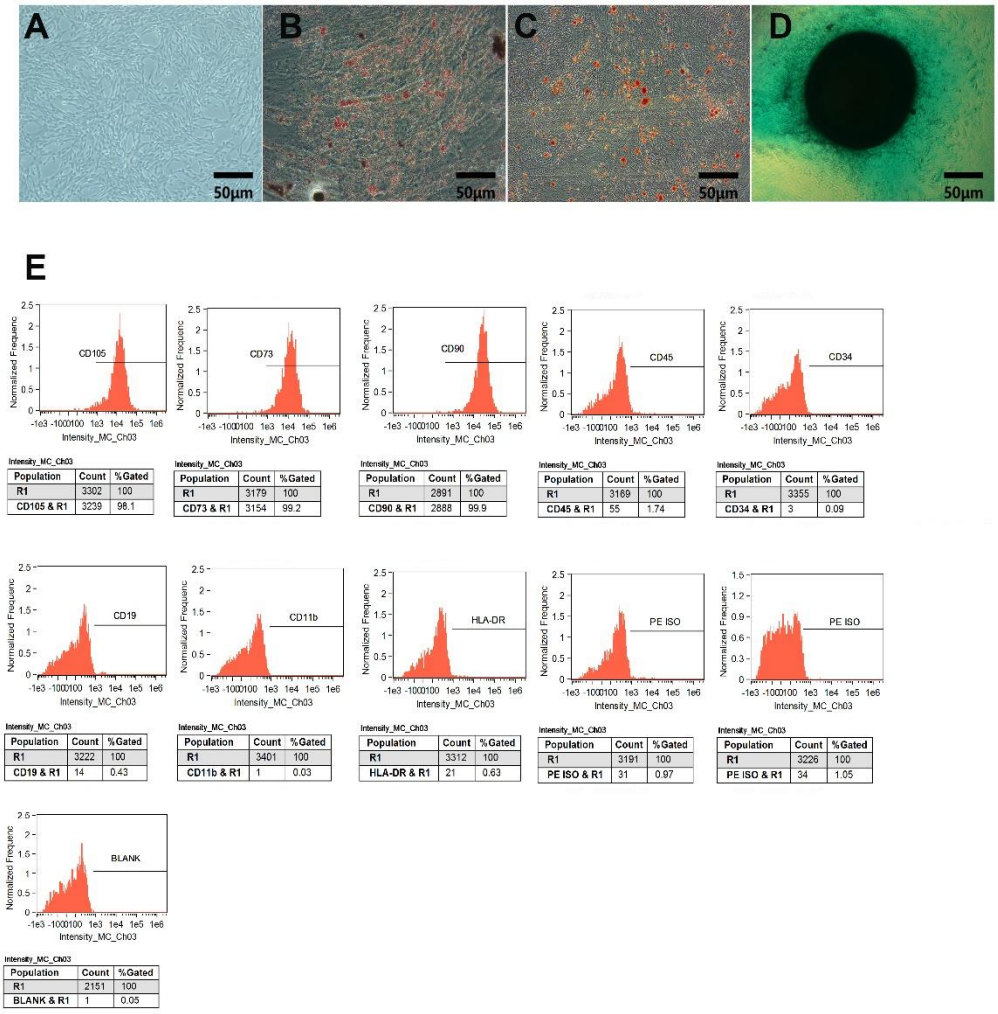


Population	Count	%Gated
R1	3302	100
CD105 & R1	3239	98.1

Population	Count	%Gated
R1	3179	100
CD73 & R1	3154	99.2

Population	Count	%Gated
R1	2891	100
CD90 & R1	2888	99.9

Population	Count	%Gated
R1	3169	100
CD45 & R1	55	1.74

Population	Count	%Gated
R1	3355	100
CD34 & R1	3	0.09

Population	Count	%Gated
R1	3222	100
CD19 & R1	14	0.43

Population	Count	%Gated
R1	3401	100
CD11b & R1	1	0.03

Population	Count	%Gated
R1	3312	100
HLA-DR & R1	21	0.63

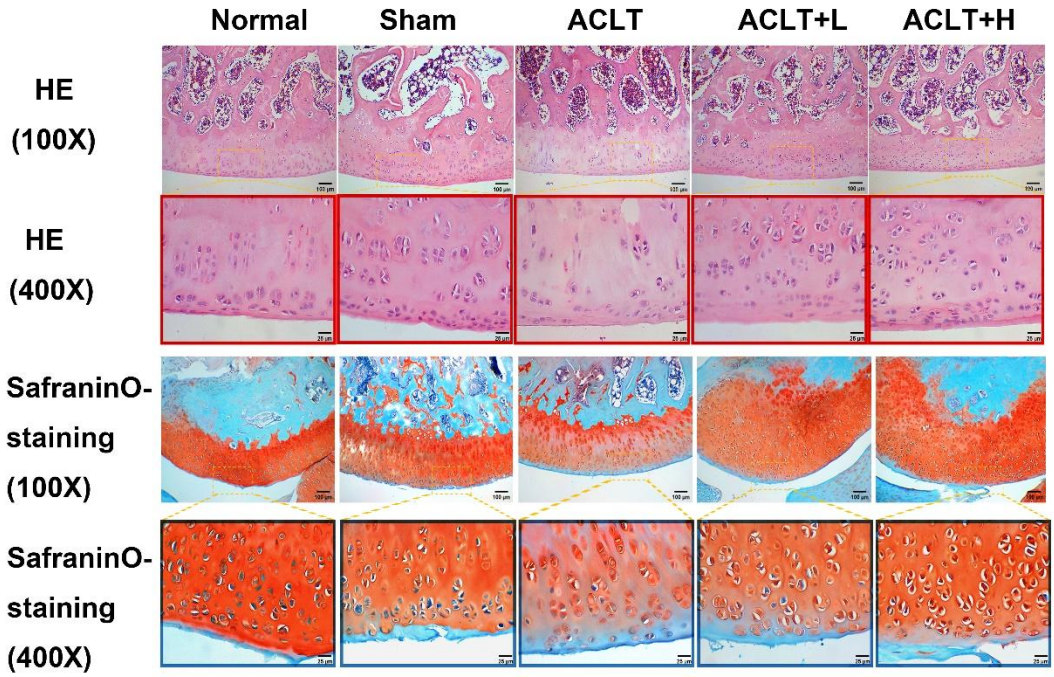
Population	Count	%Gated
R1	3191	100
PE ISO & R1	31	0.97

Population	Count	%Gated
R1	3226	100
PE ISO & R1	34	1.05

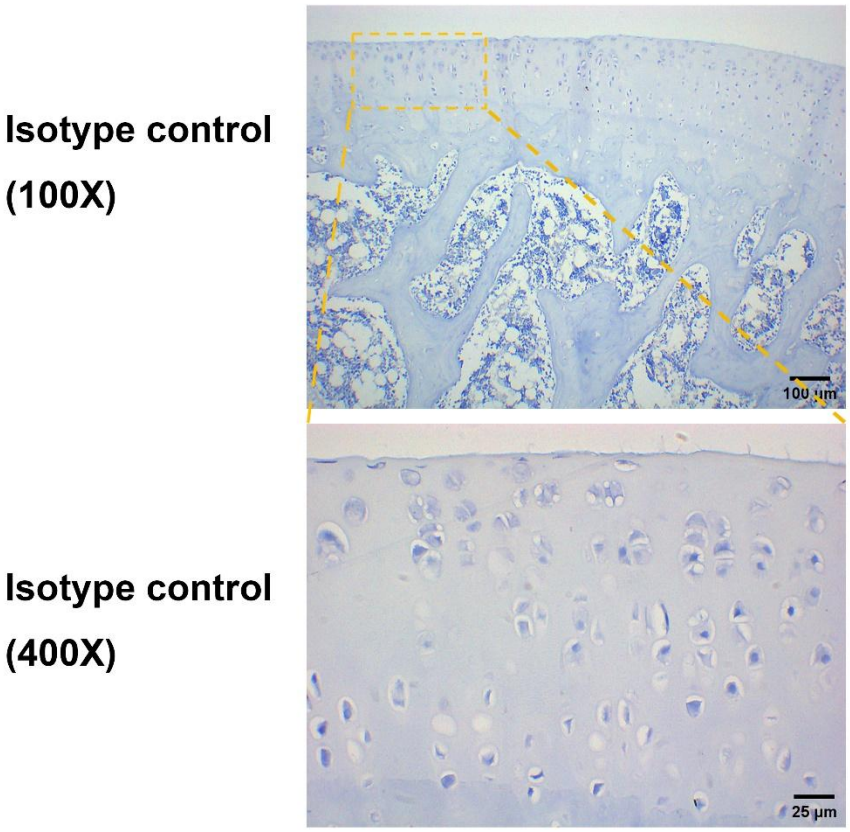
Population	Count	%Gated
R1	2151	100
BLANK & R1	1	0.05

Supplementary 1. Characterization of UC-MSCs. Isolated primary UC-MSCs were cultured to passage 5 and then characterized for their surface markers and multipotent differentiation capacity. (A) The morphology and (B) the phenotypes of induced differentiation were visualized by staining with Oil Red O for adipogenesis (scale bars =50 μm), (C) Alizarin Red for osteogenesis, and (D) Alcian blue for chondrogenesis (scale bars = 100 μm) as indicated, respectively. Multiple differentiation capacity of UC-MSCs was determined with different induction media as described in Methods. (E) A typical expression pattern of surface markers for MSCs was determined by flow cytometry with high positive expression of CD105, CD90, and CD73 (> 98%), and

negative expression of CD19, CD34, CD14, CD45, and human leukocyte antigen-DR (< 2% positive).



Supplementary 2. Comparisons of the structure of the different group articular cartilage tissues according to the hematoxylin and eosin staining and safranin O/fast green staining (100×, 400×). (A) and (B) were the result of cartilage tissues, respectively, by hematoxylin and eosin staining, and (C) and (D) were safranin O and fast green staining (100 ×, 400×).



Supplementary 3. Immunohistochemical staining of articular cartilage by rabbit IgG1 isotype control (100×, 400×).

Table 2. OARSI scores

Group	OARSI Scores
Normal	0.00 ± 0.00^{d}
Sham	0.00 ± 0.00^{d}
ACTL	5.50 ± 0.24^{a}
ACTL+L	4.50 ± 0.24^{b}
ACTL+H	3.17 ± 0.23^{c}

Supplementary 4. International Association for Osteoarthritis Research (OARSI) Grading System (28) score for the experimental animal.