

Supporting Information

Tendon-Inspired Nanotopographic Scaffold for Tissue Regeneration in Rotator Cuff Injuries

Woochan Kim[†], Ga-Eon Kim[‡], Mohamed Attia Abdou[§], Sujin Kim[†], Daun Kim[†], Sunho Park[†],
Yang-Kyung Kim[§], Yonghyun Gwon[†], Sung-Eun Jeong[§], Myung-Sun Kim^{*.§}, Jangho Kim^{*.†}

[†] Department of Rural and Biosystems Engineering, Chonnam National University, 77,
Yongbong-ro, Buk-gu, Gwangju, 61186, Republic of Korea

[‡] Department of Pathology, Chonnam National University Hospital, 42, Jebong-ro, Dong-gu,
Gwangju, 61649, Republic of Korea

[§] Department of Orthopaedics, Chonnam National University Hospital, 42, Jebong-ro, Dong-
gu, Gwangju, 61649, Republic of Korea.

***Corresponding authors:** Correspondence should be addressed to Myung-Sun Kim (mskim@chonnam.ac.kr) or Jangho Kim (rain2000@jnu.ac.kr)

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Variables	Grade			
	0	1	2	3
Cell morphology	Inconspicuous elongated spindle-shaped nuclei with no obvious cytoplasm at light microscopy	Increased roundness: nucleus becomes more ovoid to round in shape without conspicuous cytoplasm	Increased roundness and size: the nucleus is round, slightly enlarged and a small amount of cytoplasm is visible	Nucleus is round, large with abundant cytoplasm and lacuna formation (chondroid change)
Ground substance	No stainable ground substance	Stainable mucin between fibers but bundles still discrete	Stainable mucin between fibers with loss of clear demarcation of bundles	Abundant mucin throughout with inconspicuous collagen staining
Collagen arrangement	Collagen arranged in tightly cohesive well-demarcated bundles with a smooth dense bright homogeneous polarization pattern with normal crimping	Diminished fiber polarization: separation of individual fibers with maintenance of demarcated bundles	Bundle changes: separation of fibers with loss of demarcation of bundles giving rise to expansion of the tissue overall and clear loss of normal polarization pattern	Marked separation of fibers with complete loss of architecture
Vascularity	Inconspicuous blood vessels coursing between bundles	Occasional cluster of capillaries, less than one per 10 high-power fields	1–2 clusters of capillaries per 10 high-power fields	Greater than two clusters per 10 high-power fields

Table S1. Histological evaluation grade (Bonar score) to assess cell morphology, ground substance, collagen arrangement, and vascularity of repaired tendon to bone interface.

Variables	Native tendon				Non-patch				Flat patch				Tendon patch			
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
Cell morphology	1	2	0	0	0	0	2	1	0	0	2	1	1	2	0	0
Ground substance	2	1	0	0	0	1	2	0	1	2	0	0	0	2	1	0
Collagen arrangement	2	1	0	0	0	0	2	1	0	0	1	2	2	1	0	0
Vascularity	2	1	0	0	0	0	1	2	0	0	1	2	1	1	1	0

Table S2. Distribution of histologic scores on repaired tendon to bone interface of chronic RC tear animal models using histological evaluation grades (Bonar score).

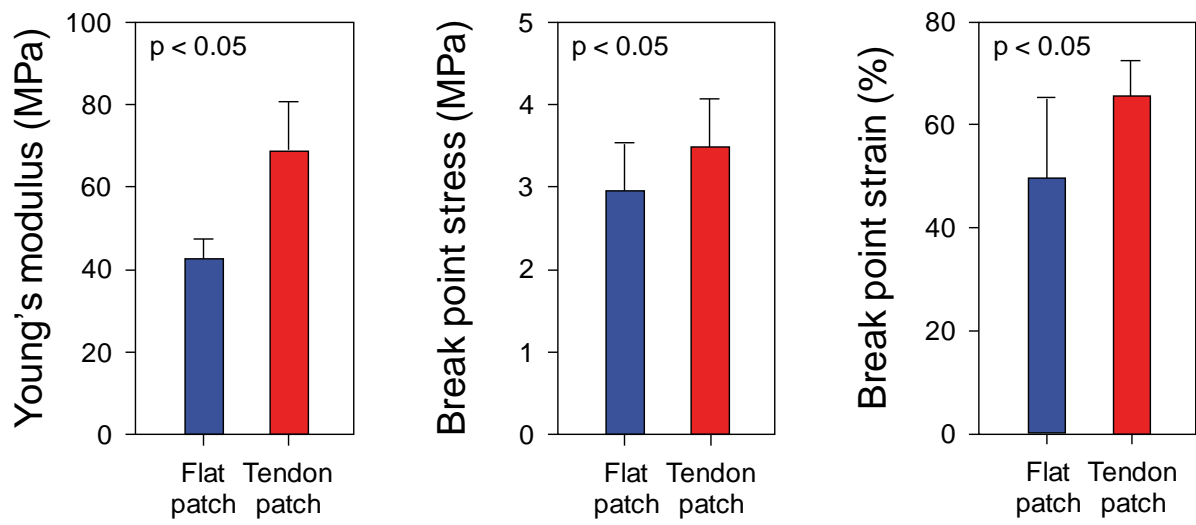


Figure S1. Young's modulus, break point stress, break point strain of the flat patch and tendon-inspired patch. The error bars represent the standard deviation about the mean (n=8).

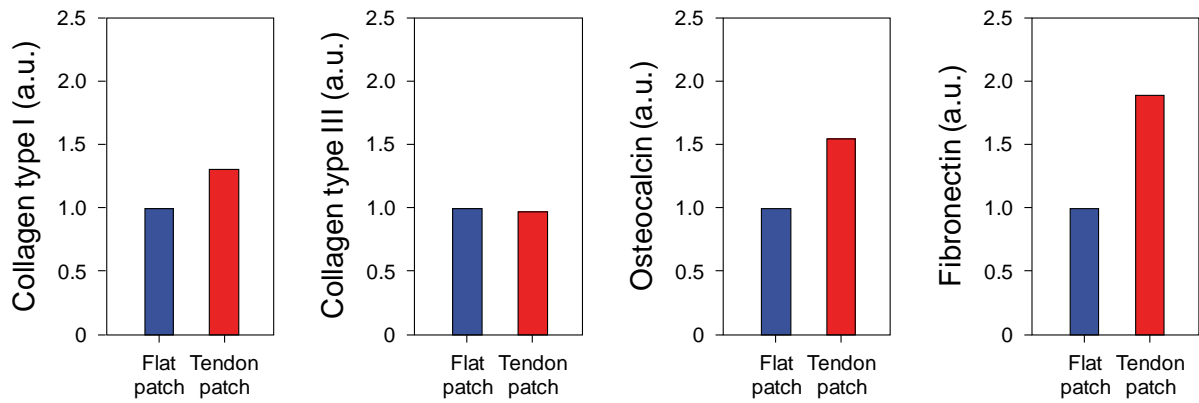


Figure S2. Quantification of the western blot band intensity. Western blot band intensity was used to measure expression differences of collagen type I, collagen type III, osteocalcin, and fibronectin on the flat and tendon-inspired patches. Quantification of the western blot band intensity was measured using ImageJ software.

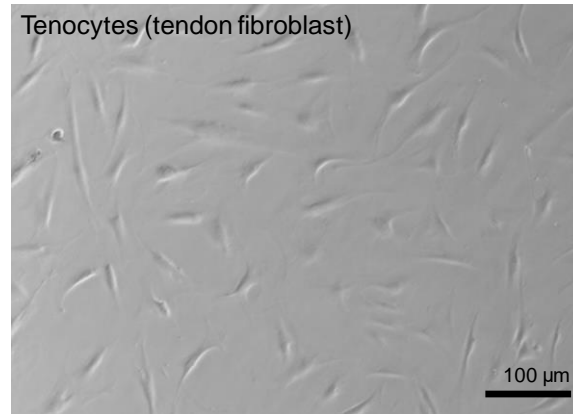


Figure S3. Image of the isolated human tenocytes. The tenocytes showed the spindle morphology with multiple long cytoplasmic processes forming cell–cell contacts.