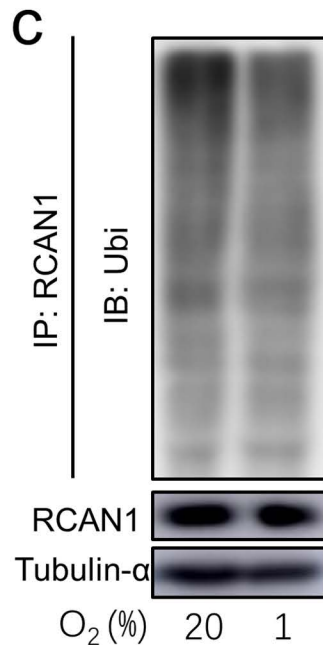
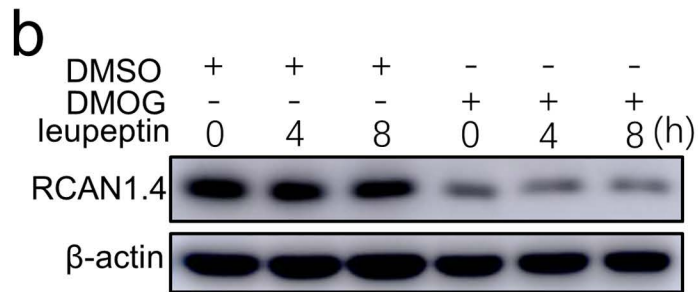
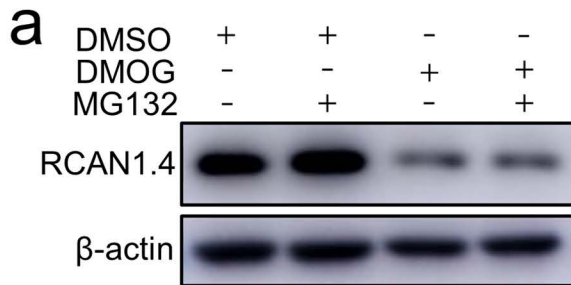


Supplemental Figure legends

Supplemental Figure 1

(a) RCAN1.4 was not reversed in human NP cells by blocking the proteasome (MG132, a proteasome inhibitor) or (b) lysosomal (leupeptin, a lysosome inhibitor) pathway. (c) Downregulation of RCAN1.4 in human NP cells was not dependent on ubiquitination degradation pathway under hypoxia.



Supplemental Table 1. Patients' Clinical Characteristics

Characteristic	Control Group	Study Group
Number	28	24
Age (yr)	39.36(22-57)	56.74 (35-69)
Sex(male/female)	13/15	12/12
Grade I / II	11	
Grade III	17	
Grade IV		14
Grade V		10

Supplemental Table 2 Primer sequences

Gene	Stream	Sequence
Rat Sox9	Forward	5'-GGAATGTTTCAGCAGCCAAT-3'
	Reverse	5'-TGGTGTCTGAGAGGCACAG-3'
Rat Col2a1	Forward	5'-CTGGAAGCTGGTGAAAGG-3'
	Reverse	5'-GGCCTGGATAACCTCTGTGA-3'
Rat RCAN1	Forward	5'-TGTGGCAAACGGTGATGTCT-3'
	Reverse	5'-CAGACAGGGGGTTGCTGAAG-3'
Rat NFATc1	Reverse	5'-AATAACCAGCCCCGTCCAAG-3'
	Reverse	5'-GGTCAGAGCTGGCTCAAAGT-3'
Rat MMP13	Forward	5'-ACTGAGAGGCTCCGAGAAATG-3'
	Reverse	5'-GAACCCCGCATCTTGGCTT-3'
Rat β -actin	Forward	5'-CTATGAGGGTTACGCGCTCC-3'
	Reverse	5'-ATGTCACGCACGATTTCCCT-3'
Human SOX9	Forward	5'-AAGGACCACCCGGATTACAAG-3'
	Reverse	5'-GTTGGGGGAGATGTGCGTC-3'
Human Col2a1	Forward	5'-GCTCCTGCCGTTTCGCTG-3'
	Reverse	5'-ATTATACCTCTGCCATCCTGC-3'
Human RCAN1.1	Forward	5'-TGGAGCTTCATTGACTGCGA-3'
	Reverse	5'-ACGTCCTAAAGAGGGACTCA-3'
Human RCAN1.4	Forward	5'-TTAGCTCCCTGATTGCCTGT-3'
	Reverse	5'-AAAGGTGATGTCCTTGTCATACG-3'
Human MMP13	Forward	5'-TCGGCCACTCCTTAGGTCTT-3'
	Reverse	5'-AAGTGGCTTTTGCCGGTGTA-3'
Human MMP3	Forward	5'-CACTCACAGACCTGACTCGG-3'
	Reverse	5'-GAGTCAGGGGGAGGTCCATA-3'
Human Aggrecan	Forward	5'-CTTCCGCTGGTCAGATGGAC-3'
	Reverse	5'-CGTTTGTAGGTGGTGGCTGT-3'
Human β -actin	Forward	5'-TGGAACGGTGAAGGTGACAG-3'
	Reverse	5'-AACACGCATCTCATATTTGGAA-3'

Supplemental Table 3 Histological score of degenerative discs

Histological score of degenerative discs
<i>I. Cellularity of the anulusfibrosus</i>
Grade:
1. Fibroblasts comprise more than 75% of the cells
2. Neither fibroblasts nor chondrocytes comprise more than 75% of the cells
3. Chondrocytes comprise more than 75% of the cells
<i>II. Morphology of the anulusfibrosus</i>
Grade:
1. Well-organized collagen lamellae without ruptured or serpentinefibers
2. Inward bulging, ruptured or serpentine fibers in less than one third of the annulus
3. Inward bulging, ruptured or serpentine fibers in more than one third of the annulus
<i>III. Border between the anulusfibrosus and nucleus pulposus</i>
Grade:
1. Normal, without any interruption
2. Minimal interruption
3. Moderate or severe interruption
<i>IV. Cellularity of the nucleus pulposus</i>
Grade:
1. Normal cellularity with stellar shaped nuclear cells evenly distributed throughout the nucleus
2. Slight decrease in the number of cells with some clustering
3. Moderate or severe decrease (>50%) in the number of cells with all the remaining cells clustered and separated by dense areas of proteoglycans
<i>V. Morphology of the nucleus pulposus</i>
Grade:
1. Round, comprising at least half of the disc area in mid sagittal sections
2. Rounded or irregularly shaped, comprising one quarter to half of the disc area in mid sagittal sections
3. Irregularly shaped, comprising less than one quarter of the disc area in mid sagittal sections