Table S1. Information of volunteers

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Number** | **Gender** | **Age (years)** | **Diagnosis** | **Segment** | **Pfirrmann grade** | **Operation Method** |
| Case 1 | Male | 23 | Idiopathic scoliosis | T12-L1 | Ⅰ | Open operation |
| Case 2 | Female | 35 | Lumbar disc herniation | L4-L5 | Ⅱ | Endoscopic excision disc |
| Case 3 | Female | 46 | Lumbar disc herniation | L4-L5 | Ⅲ | Endoscopic excision disc |
| Case 4 | Female | 22 | Spinal trauma | T12-L1 | Ⅰ | Open operation |
| Case 5 | Female | 35 | Lumbar disc herniation | L5-S1 | Ⅳ | Endoscopic excision disc |
| Case 6 | Male | 28 | Lumbar disc herniation | L4-L5 | Ⅱ | Endoscopic excision disc |
| Case 7 | Female | 55 | Lumbar disc herniation | L4-L5 | Ⅳ | Open operation |
| Case 8 | Female | 41 | Lumbar disc herniation | L5-S1 | Ⅲ | Endoscopic excision disc |
| Case 9 | Male | 27 | Idiopathic scoliosis | T11-T12 | Ⅰ | Open operation |
| Case 10 | Male | 40 | Lumbar disc herniation | L2-L3 | Ⅲ | Endoscopic excision disc |
| Case 11 | Male | 42 | Lumbar disc herniation | L4-L5 | Ⅱ | Endoscopic excision disc |
| Case 12 | Male | 40 | Lumbar disc herniation | L3-L4 | Ⅳ | Endoscopic excision disc |
| Case 13 | Male | 37 | Spinal trauma | L1-L2 | Ⅰ | Open operation |
| Case 14 | Female | 23 | Lumbar disc herniation | L4-L5 | Ⅲ | Endoscopic excision disc |
| Case 15 | Male | 17 | Idiopathic scoliosis | L1-L2 | Ⅰ | Open operation |
| Case 16 | Female | 20 | Lumbar disc herniation | L4-L5 | Ⅱ | Endoscopic excision disc |
| Case 17 | Male | 37 | Lumbar disc herniation | L4-L5 | Ⅳ | Endoscopic excision disc |
| Case 18 | Male | 28 | Lumbar disc herniation | L5-S1 | Ⅲ | Endoscopic excision disc |
| Case 19 | Female | 22 | Lumbar disc herniation | L5-S1 | Ⅱ | Endoscopic excision disc |
| Case 20 | Male | 65 | Lumbar disc herniation | L4-L5 | Ⅳ | Open operation |

Table S2. Information for antibodies

|  |  |  |  |
| --- | --- | --- | --- |
| **Antibodies** | **Source** | **Catalog** | **Dilution ratio** |
| anti-TLR9 | abcam | ab134368 | 1:3000 |
| anti-NF-κB | abcam | ab207297 | 1:2000 |
| anti-NLRP3 | abcam | ab263899 | 1:3000 |
| anti-ASC | abcam | ab150368 | 1:3000 |
| anti-caspase-1 | Cell Signaling Technology | 3866S | 1:3000 |
| anti-cleaved caspase-1 | Cell Signaling Technology | 4199S | 1:3000 |
| anti-GSDMD | Cell Signaling Technology | 97558S | 1:3000 |
| anti-cleaved GSDMD | Cell Signaling Technology | 37349 | 1:3000 |
| anti-GAPDH | abcam | ab8245 | 1:2000 |
| Goat Anti-Rabbit IgG H&L (HRP) | abcam | ab205718 | 1:5000 |
| Goat Anti-Mouse IgG H&L (HRP) | abcam | ab97023 | 1:5000 |

Table S3. Table of materials for western blotting

|  |  |  |
| --- | --- | --- |
| **Reagent** | **Source** | **Catalog** |
| Polyvinylidene fluoride membrane (PVDF) | Servicebio | G6015 |
| RIPA Buffer | Servicebio | G2002 |
| SDS-PAGE Sample Prep Kit | Pierce | 89888 |
| Phosphatase inhibitor | Servicebio | G2007 |

Table S4. Primers used in this study

|  |  |  |
| --- | --- | --- |
| **Gene Name** | **Forward Primer** | **Reverse Primer** |
| si-TLR9 | 5'-AGCTTAACCTGTCCTTCAATTAC-3' | 5'-AAUUGAAGGACAGGUUAAGCU-3' |
| si-Scrambled | 5'-CUUAACCUGUCCUUCAAUUAC-3' | 5'-CUGCAAAUACUAGAUGUAAGC-3' |
| Human-TLR9 | 5'-ACTGGCTGTTCCTGAAGTCTGTG-3' | 5'-CAGGTTTAGCTCTTCCAGGGTG-3' |
| Human-GAPDH | 5'-GGAAGCTTGTCATCAATGGAAATC-3' | 5'-TGATGACCCTTTTGGCTCCC-3' |
| Human-MT-ND1 | 5'-TCCTAATGCTTACCGAACGAAA-3' | 5'-ATGGTAGATGTGGCGGGTTT-3' |
| Human-MT-ND2 | 5'-GTATTTCCTCACGCAAGCAACC-3' | 5'-CTCTGGGACTCAGAAGTGAAAGG-3' |

Table S5. The parameters of radiography images

|  |  |  |  |
| --- | --- | --- | --- |
| **X-ray (UltraFocus DXA, Faxitron)** | | | |
| Exposure | 50 mAs | Penetration power | 48 kV |
| **MRI (BioSpec70/20USR, Bruker)** | | | |
| Time-to-repetition | 3000 | Flip angle | 90 |
| Time-to-echo | 40 | Field of view | 60×20 |
| Number of Excitation | 5 | Matrix | 300×100 |

Table S6. Information of assays/instruments/software used in this study

|  |  |  |  |
| --- | --- | --- | --- |
| **Methods** | **Critical commercial kit/Instruments** | **Source** | **Catalog** |
| Tyramide signal  amplification immunofluorescence | Cy3 TSA Fluorescence System Kit | ApexBio | K1051 |
| siRNA | Lipofectamine 8000 Kit | Beyotime | C0533 |
| RNA reverse transcription | SweScript RT I First Strand cDNA Synthesis Kit | Servicebio | G3330 |
| General PCR | 2×Fast Pfus PCR Master Mix | Servicebio | G3305 |
| RT-PCR | 2 × SYBR Green qPCR Master Mix (None ROX) | Servicebio | G3320 |
| Cytoplasmic ROS | H2DCFDA | Invitrogen | D399 |
| Mitochondrial ROS | MitoSOX™ Red Mitochondrial Superoxide Indicator Kit | Invitrogen | M36008 |
| Mitochondrial membrane potential | MitoProbe™ JC-1 Assay Kit | Invitrogen | M34152 |
| Mitochondrial quality test | Mito-Tracker Red CMXRos Assay Kit | Invitrogen | M7512 |
| mPTP | Mitochondrial Permeability Transition Pore Assay Kit | Beyotime | C2009S |
| NPC viability assay | Calcein AM/PI Kit | Beyotime | C2015S |
| human IL-1β | IL-1β humanELISA Kit | Invitrogen | KAC1211 |
| Cytoplasm DNA and total DNA extraction | NE-PERTM Nuclear and Cytoplasmic Extraction Reagents kit | Thermo Scientific | 78833 |
| Proximity ligation assy | Duolink® In situ PLA® Kit | SigmaAldrich | DUO94104 |
| Flow cytometer | FACSCablibur flow cytometer | BD Biosciences |  |
| Microscope | Eclipse 80i | Nikon |  |
| Transmission electron microscope | HT7800 | Hitachi |  |