

Reporting Summary

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Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

- ☐ ☒ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
- ☐ ☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- ☐ ☒ The statistical test(s) used AND whether they are one- or two-sided
Only common tests should be described solely by name; describe more complex techniques in the Methods section.
- ☐ ☒ A description of all covariates tested
- ☐ ☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
- ☐ ☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
- ☐ ☒ For null hypothesis testing, the test statistic (e.g. F , t , r) with confidence intervals, effect sizes, degrees of freedom and P value noted
Give P values as exact values whenever suitable.
- ☒ ☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
- ☒ ☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
- ☒ ☐ Estimates of effect sizes (e.g. Cohen's d , Pearson's r), indicating how they were calculated

Our web collection on [statistics for biologists](#) contains articles on many of the points above.

Software and code

Policy information about [availability of computer code](#)

Data collection	Image-pro Plus 6.0(Media Cybernetics, Rockville, MD)and FlowJo 10.0 software (Flow Jo LLC, Ashland, OR, USA) were used to collect data in this study.
Data analysis	Fluorescence images were analyzed using the LeicaSP8 (Advanced Fluorescence 4.0.0.11706). Statistical calculations were performed using GraphPad Prism 8 software. The Western blot were performed using chemiluminescence detection system (Chemidoc, Bio-Rad, XRS, Hercules, CA, USA). The histologic images were analyzed using image-pro Plus 6.0 (Media Cybernetics, Rockville, MD). The flow cytometric analysis was performed with FlowJo 10.0 software (Flow Jo LLC, Ashland, OR, USA).

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

All data needed to evaluate the conclusions in the paper are present in the paper and/or the Supplementary Information.

Human research participants

Policy information about [studies involving human research participants and Sex and Gender in Research](#).

Reporting on sex and gender

Population characteristics

Recruitment

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size

Data exclusions

Replication

Randomization

Blinding

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☐	☒ Antibodies
☐	☒ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☐	☒ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☐	☒ Flow cytometry
☒	☐ MRI-based neuroimaging

Antibodies

Antibodies used	Staining: Annexin A2 (ab189473, Abcam, Cambridge, UK), Annexin A4 (ab247624, Abcam, Cambridge, UK), cleaved caspase-3 (9661, Cell Signaling Technology), PROCR (bs-9506R, Bioss, Beijing, China), PDGF receptor- α (ab96569, Abcam, Cambridge, UK) Western Blot: cleaved caspase-3 (9661, Cell Signaling Technology) and caspase-3 (9662, Cell Signaling Technology) Flow Cytometry: PROCR (bs-9506R, Bioss, Beijing, China) and Fluor647-conjugated secondary antibodies (SA00014-9, Proteintech, Wuhan, China)
Validation	All antibodies were validated by testing the secondary antibodies in isolation. For immunohistochemistry, the appropriate cellular localization of the signal (membrane-bound, nuclear, cytoplasmic) was confirmed, and for western blotting, the correct size of the signal further validated the antibodies. Validation information for each of the antibodies used in the study can be found on the manufacturer's website.

Eukaryotic cell lines

Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s)	L929 (mouse fibroblast cell line) were purchased from Procell
Authentication	All cell lines were authenticated by the supplier using Short Tandem Repeat test.
Mycoplasma contamination	All cell lines tested were negative for mycoplasma contamination.
Commonly misidentified lines (See ICLAC register)	No commonly misidentified cell lines were used.

Animals and other research organisms

Policy information about [studies involving animals; ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals	Male Sprague-Dawley rats, aged 8 weeks, weighing 200–300 grams were obtained from the Fourth Military Medical University's Laboratory Animal Research Center. The rats were grouped and housed in a controlled environment with a 12-hour light-dark cycle, ambient temperature ranging from 18 to 22°C, and 50-70% humidity. They were provided with unrestricted access to food and water.
Wild animals	The study did not involve wild animals.
Reporting on sex	Findings apply to only male rats.
Field-collected samples	Samples were collected under room temperature.
Ethics oversight	This experimental protocol was approved by the Animal Care and Use Committee of Fourth Military Medical University (ethics approval number: 20220906) and complied with the Guide for the Care and Use of Laboratory Animals published by the National Institutes of Health (8th edition, 2011).

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Flow Cytometry

Plots

Confirm that:

- ☒ The axis labels state the marker and fluorochrome used (e.g. CD4-FITC).
- ☒ The axis scales are clearly visible. Include numbers along axes only for bottom left plot of group (a 'group' is an analysis of identical markers).
- ☒ All plots are contour plots with outliers or pseudocolor plots.
- ☒ A numerical value for number of cells or percentage (with statistics) is provided.

Methodology

Sample preparation

For flow cytometry analysis of tendon cells, tendons were harvested and minced with scissors, then enzymatically digested in CO₂-independent incubator shaker (Kuhner, ISF1-XC) with 1 mg/ml Collagenase I (Sigma-Aldrich, SCR103) and IV mixture (Sigma-Aldrich, C4-28-100MG) for 3 h at 37°C. After diluted with serum-free medium and centrifuged at 200 g for 10 min, the cell pellets were resuspended in ACK lysis buffer (ThermoFisher, NC9067514) to remove blood cells. Prior to staining, the cells suspended in FACS buffer comprised of PBS with 5% BSA (Sigma-Aldrich, SRE0096) were filtered through a 40 µm mesh.

Instrument

CytoFLEX, Beckman Coulter, Brea, CA, USA

Software

Flow Jo LLC, Ashland, OR, USA

Cell population abundance

According to the flow analysis results, 16.61% of the tendon cells were PROCR positive.

Gating strategy

According to PROCR-APC and SSC-H, we circle the positive gate according to the negative principle of blank tube, and then analyze the positive proportion of PROCR.

- ☒ Tick this box to confirm that a figure exemplifying the gating strategy is provided in the Supplementary Information.