

Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see [Authors & Referees](#) and the [Editorial Policy Checklist](#).

Statistical parameters

When statistical analyses are reported, confirm that the following items are present in the relevant location (e.g. 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
- ☐ ☒ An indication of 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 statistics 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
- ☐ ☒ Clearly defined error bars
State explicitly what error bars represent (e.g. SD, SE, CI)

Our web collection on [statistics for biologists](#) may be useful.

Software and code

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

Data collection

No software was used

Data analysis

No software was used

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/reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research [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 list of figures that have associated raw data
- A description of any restrictions on data availability

All the data will be available as raw data

Field-specific reporting

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

☒ Life sciences ☐ Behavioural & social sciences

For a reference copy of the document with all sections, see [nature.com/authors/policies/ReportingSummary-flat.pdf](https://www.nature.com/authors/policies/ReportingSummary-flat.pdf)

Life sciences

Study design

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

Sample size	Mouse sample sized was estimated by pilot experiments that showed trends of effects and their sizes. In most cases, an n=5 was the minimal amount used, only where effect size was large an n=3 yielded significant results. Human sample size See Methods, chapter "human cohorts". We determined the minimal number of participants according to the plasma apelin variability published by Castan-Laurell et al. (Eur. J. Endocrinol., 2009) We calculated a sample size of 17 participants per group to detect a minimal difference of 0.1ng/ml in apelin concentration between the groups assuming alpha = 0.05, beta = 0.90, SD within each group = 0.02.
Data exclusions	Because animals are gaed, mice were excluded for poor body condition (e.g.weight loose, important injuries). Exclusion crieria were pre-established before the study.
Replication	All replications were successful.
Randomization	Mice were randomly allocated to groups. To insure randomization, we weighted animals and distributed them equally in the different groups.
Blinding	All the treatements and the fonctionnal experiments were done by blinded investigators

Materials & experimental systems

Policy information about [availability of materials](#)

n/a	Involved in the study
☐	☒ Unique materials
☐	☒ Antibodies
☐	☒ Eukaryotic cell lines
☐	☒ Research animals
☐	☒ Human research participants

Unique materials

Obtaining unique materials All unique materials are available

Antibodies

Antibodies used See Methods, chapter "western blotting" and "immunohistology". All the antibody used are commercial and validated excepted for apelin antibody which has been validated by incubation overnight with the antigenic peptide as demonstrated in Supplementary Figure 1g.

Validation *Describe the validation of each primary antibody for the species and application, noting any validation statements on the manufacturer's website, relevant citations, antibody profiles in online databases, or data provided in the manuscript.*

Eukaryotic cell lines

Policy information about [cell lines](#)

Cell line source(s)	See Methods , chapter "Human cell culture". The human cells are provided by EuroMyobank.
Authentication	The cell lines have been described in Mamchaoui, K. et al. Immortalized pathological human myoblasts: towards a universal tool for the study of neuromuscular disorders. Skeletal muscle 1,6 34, doi:10.1186/2044-5040-1-34 (2011)
Mycoplasma contamination	All the cell lines have been monthly tested for contamination specially for Mycoplasma by DAPI labelling and qPCR.

Commonly misidentified lines
(See [ICLAC](#) register)

Name any commonly misidentified cell lines used in the study and provide a rationale for their use.

Research animals

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Animals/animal-derived materials

Mus musculus, C57Bl6/j background, male, aged from 3 to 24 month old

Human research participants

Policy information about [studies involving human research participants](#)

Population characteristics

All the characteristics of the human cohort are listed online MAPT: NCT00672685
LIFE-P: NCT00116194

Method-specific reporting

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ Magnetic resonance imaging