nature portfolio

Corresponding author(s): *Double-anonymous peer review submissions: write DAPR and your manuscript number here instead of author names.*

Last updated by author(s): *YYYY-MM-DD*

Reporting Summary

Nature Portfolio 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 Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

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	Microsoft Excel Version 16
Data analysis	Graphpad Prism version 10

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 are available upon request

Research involving human participants, their data, or biological material

Policy information about studies with human participants or human data. See also policy information about sex, gender (identity/presentation), and sexual orientation and race, ethnicity and racism.

Reporting on sex and gender	For cells obtained from humans, both male and female volunteers were used. For mouse experiments, obesity and atherosclerosis studies were conducted on male animals. Cellular experiments involving bone marrow derived macrophages were performed on cells isolated from both male and female animals.
Reporting on race, ethnicity, or other socially relevant groupings	For TRIB3 genotyping, peripheral blood cells were obtained from a commercial source that provided information on their ethnicity
Population characteristics	The population comprised of adults of all age ranges
Recruitment	The peripheral blood cells were obtained from a commercial source for genotyping. For functional studies, volunteers provided blood following informed consent.
Ethics oversight	Queen Mary University of London

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	Sample sizes were determined by power calculations for all in vivo experiments
Data exclusions	No data were excluded
Replication	All in vitro experiments were replicated in at least three independent experiments.
Randomization	Animals were randomly allocated to groups to receive bone marrow cells from either WT or TRIB3 KO mice. Similarly, in the obesity model, lean and obese mice were randomized to recieve either vehicle or PBA.
Blinding	Investigators were blinded during data analysis.

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
☒	☐ Plants

Methods

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

Antibodies

Antibodies used	F4/80 Invitrogen 14-480-82

Antibodies used	Mac-2 (Galectin-3) Biolegend 125402 Anti-Actin, α-Smooth Muscle Sigma A2547-.2ML TRIB3 Invitrogen PA5-114501 Rab27a Abcam ab55667 ATF4 Cell Signaling Technology 11815 Xbp1s Abcam ab37152
Validation	F4/80 - Mouse; WB, IHC, IF, FCM; This Antibody was verified by Relative expression to ensure that the antibody binds to the antigen stated. Mac-2: Mouse/Human; FC, ICC, WB, IHC; Verified for indicated applications Sm-actin: Human, mouse, rat; IHC, IF, WB TRIB3: Human, mouse, rat; IHC, WB Rab27a: Human, mouse, rat; IP, WB, IHC, IF; Knockout validated ATF4: Human, mouse, rat; WB, IP, IF XBP1: Human, mouse, rat; ICC, IHC, WB

Eukaryotic cell lines

Policy information about cell lines and Sex and Gender in Research

Cell line source(s)	THP1 cells were obtained from ATCC
Authentication	The cell lines were not authentiacted
Mycoplasma contamination	Mycoplasma test negative
Commonly misidentified lines (See ICLAC register)	*Name any commonly misidentified cell lines used in the study and provide a rationale for their use.*

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	Mice were used in the study. Age and sex of the mice are reported in the methods or figure legends
Wild animals	The study did not involve wild animals
Reporting on sex	Atherosclerosis and obesity studies were conducted on male mice. Experiments involving bone marrow macrophages were conducted on cells obtained from both male and female mice.
Field-collected samples	The study did not involve sample collected from the field.
Ethics oversight	Home Office, UK

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

Plants

Seed stocks	*Report on the source of all seed stocks or other plant material used. If applicable, state the seed stock centre and catalogue number. If plant specimens were collected from the field, describe the collection location, date and sampling procedures.*
Novel plant genotypes	*Describe the methods by which all novel plant genotypes were produced. This includes those generated by transgenic approaches, gene editing, chemical/radiation-based mutagenesis and hybridization. For transgenic lines, describe the transformation method, the number of independent lines analyzed and the generation upon which experiments were performed. For gene-edited lines, describe the editor used, the endogenous sequence targeted for editing, the targeting guide RNA sequence (if applicable) and how the editor was applied.*
Authentication	*Describe any authentication procedures for each seed stock used or novel genotype generated. Describe any experiments used to assess the effect of a mutation and, where applicable, how potential secondary effects (e.g. second site T-DNA insertions, mosiacism, off-target gene editing) were examined.*

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	Peritoneal lavage cells were immunolabeled with indicated antibodies
Instrument	BD FACS Aria, BD LSR II,
Software	FlowJo
Cell population abundance	*Describe the abundance of the relevant cell populations within post-sort fractions, providing details on the purity of the samples and how it was determined.*
Gating strategy	FSC SSC gates were used to identify non-debris population. FSC-H vs FSC-A plots were used for elimination of doublets. Positive population were gated based on isotype antibody control staining.

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