nature portfolio

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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	Zetasizer Nano 8.01.4906 , Tecan SparkControl V2.2, LAS AF 3.3.0.10134, Olympus cellSens Dimension 4.1
Data analysis	GraphPad Prism 9.0 was used for figure making and statistical analysis. CVAT.ai online platform was used for EM data annotation ImageJ was used for confocal images analysis. Living Image® was used to analyze in vivo bioluminescence images. Inkscape was used for making the schematic in Fig. 1 and 4. SkyScan NRecon was used to reconstruct 3D CT image AMIDE was used for SPECT/CT image rendering, analysis and quantification. Perseus was used to analyze MS data.

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 relevant data from this study are available within the article, source data and supplementary documents.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender	N/A
Population characteristics	N/A
Recruitment	N/A
Ethics oversight	N/A

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	All experiments were chosen to have a minimum of n=3 sample sizes for statistical purposes. No statistical methods were used to pre-determine sample size. Detailed samples sizes can be found in the Methods section and figure captions.
Data exclusions	No data were excluded.
Replication	All experiment have been repeated at least 2-3 times to ensure reproducibility of the data.
Randomization	No randomization were implemented.
Blinding	For the SPECT/CT imaging the researchers were blinded from the lipids and formulations used and were also precluded from any preparation procedures of the samples.

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	alpha-mF4/80 488 Rat IgG2a,k clone:BM8, Ref# AB0000699 (AbLab, UBC)
Validation	The antibodies used are from the UBC AbLab (UBC Antibody – Protein Engineering – Biologics Core). For validation data please contact:https://ablab.ca/the-facility/

Eukaryotic cell lines

Policy information about cell lines and Sex and Gender in Research

Cell line source(s)	Huh 7 cells were intra-lab established cell line within UBC.
Authentication	Cell line were sequenced by UBC BRC sequencing core and had confirmed its genetic identity.
Mycoplasma contamination	Huh 7 cells were tested negative from mycoplasma contamination by the UBC BRC sequencing core facility.
Commonly misidentified lines (See ICLAC register)	Cells used were not commonly misidentified

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	CD-1 female mice, 6-8 weeks of age (Charles River Laboratories)
Wild animals	No wild animals were used.
Reporting on sex	Female
Field-collected samples	No field-collected samples were used.
Ethics oversight	All animal protocols (A22-0044, A20-0132) were approved by the Canadian Animal Care Committee and conducted in accordance with relevant UBC guidelines and regulations from modified barrier animal facility at UBC.

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