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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 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	-Software built in the microscope for image acquisition (OLYMPUS FLUOVIEW 4.2a). - Fusion Solo, Vilber Lourmat for western blots (Fusion CAPT Advance).
Data analysis	-Fiji (2.1.0/1.52s). -Excel (16.16.27). -MATLAB (R2014b). -UNStat (v2.0). -GraphPad Prism 8 (8.4.3 (471)).

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 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

The data that support the findings of this study are available within the paper and its Supplementary Information files. Source data are provided with this paper.
Links of publicly available datasets used in this work:
https://flybase.org/

https://m.ensembl.org/index.html

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	No sample size tests were included in our analysis. Sample sizes are based on positive and negative controls were statistically significant differences were detected. Death Index studies: Sample size was selected according to the statistical significance in controls (UASlacZ and UASp35). Scaling studies: Sample sizes were selected according to previous publications (Wartlick et al, 2011). Cell Competition studies and Clone Sizes: Sample sizes were selected according to previous publications (Rhiner et al 2010 and Merino et al, 2015). Note that the sample sizes chosen are equal or above the typical sample sizes used in the field of developmental biology.
Data exclusions	As a pre-established criteria we did not included in our analysis damaged samples/tissues.
Replication	Micrographs and western blots are representative from a set of at least 2 independent experimental rounds and were in all cases reproducible.
Randomization	Flies of the same genetic background were kept separate and each experiment was carried out on discs obtained from randomly chosen fly larvae of the appropriate genetic background and developmental stage. Our study does not explore the impact of different treatments on subjects, nor did it require sampling individuals that belong to different groups from large populations. As such randomization is not strictly relevant to our analysis.
Blinding	Our analysis did not involve quantifying the impact of treatments on different groups, as such blinding was not necessary. Quantification was performed using the same methodology for all samples. Furthermore, the quantifications in all experiments were performed at the absence of information regarding the genetic background or developmental stage of 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
☒	☐ Human research participants
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

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

Antibodies

Antibodies used	1. Mouse monoclonal anti-Ptc, Developmental Studies Hybridoma Bank https://dshb.biology.uiowa.edu (Apa 1-s, AB_528441).Myeloma Strain, NP-3. 2. Mouse monoclonal anti-Wg, Developmental Studies Hybridoma Bank https://dshb.biology.uiowa.edu (4D4-s, AB_528512). Myeloma Strain, Ag8. 3. Mouse monoclonal anti-Dlg, Developmental Studies Hybridoma Bank https://dshb.biology.uiowa.edu (4F3-s, AB_528203). Myeloma Strain, P3 x 63 Ag8.653. 4. Rabbit polyclonal anti-Cleaved Caspase-3, Cell Signaling Technology, #9661, Cleaved Caspase-3 (Asp175) Antibody.

5. Rabbit polyclonal anti-ACTIVE JNK, Promega, #V7931 Anti-ACTIVE® JNK pAb.
6. Rabbit monoclonal anti-Pmad, Abcam, #ab52903, Anti-Smad3 (phospho S423 + S425) antibody (clone: EP823Y).
7. Nanobody monoclonal anti-RFP-Booster. Chromotek, rba647n-100. Lot: 90107001SAT2.
8. Nanobody monoclonal anti-GFP-Booster. Chromotek, gba647n-100. Lot: 61004002SAT2.
9. Mouse monoclonal anti-GFP. Roche. #11814460001. (clones: 7.1 and 13.1).
10. Rabbit polyclonal anti-mCherry. ThermoFisher SCIENTIFIC. #PA5-34974.
11. Mouse monoclonal anti-HRP. ThermoFisher SCIENTIFIC. #MA5-15367. (clone: 3A5C6)
12. Guinea Pig polyclonal anti-Hid. Kindly provided by Hyung Don Ryoo, Deparment of Cell Biology, New York University School of Medicine (Ryoo et al, 2004).
13. ImmunoPure Goat anti-mouse IgG (H+L) HRP conjugated (#31430, Thermo Fisher Scientific).
14. ImmunoPure Goat anti-rabbit IgG (H+L) HRP conjugated (#31460, Thermo Fisher Scientific).

Validation

1. Mouse monoclonal anti-Pt (Positive Tested Species Reactivity: Drosophila, Lizard)(Recommended Applications:Immunofluorescence, Immunohistochemistry, Immunoprecipitation, Western Blot)
Subcellular localization of the segment polarity protein patched suggests an interaction with the wingless reception complex in Drosophila embryos.Guerrero I Development (Cambridge, England) 120.4 (1994 Apr): 987-98.
2. Mouse monoclonal anti-Wg (Positive Tested Species Reactivity: Chicken, Drosophila, Lizard, Mouse, Planaria)(Recommended Applications: Immunofluorescence, Immunohistochemistry, Immunoprecipitation, Western Blot).
Antagonistic interactions between wingless and decapentaplegic responsible for dorsal-ventral pattern in the Drosophila Leg.
Cohen SM Science (New York, N.Y.) 273.5280 (1996 Sep 6): 1373-7.
3. Mouse monoclonal anti-Dlg (Positive Tested Species Reactivity: Drosophila) (Recommended Applications: Immunohistochemistry, Immunoprecipitation, Western Blot).
Regulation of postsynaptic structure and protein localization by the Rho-type guanine nucleotide exchange factor dPix.
Goodman CS Neuron 32.3 (2001 Nov 8): 415-24.
4. Rabbit polyclonal anti-Cleaved Caspase-3. (Reactivity: Mus musculus (House mouse) Homo sapiens (Human) Rattus norvegicus (Rat) Drosophila melanogaster (Fruit fly). (Applications: WB, IHC, IF, ICC).¨
Defective neurogenesis in citron kinase knockout mice by altered cytokinesis and massive apoptosis. F Di Cunto, et. al. Neuron, (1):115-27, 2000.
5. Rabbit polyclonal anti-ACTIVE JNK. (Immunogen: Immunogen: Dually phosphorylated Thr/Pro/Tyr region (pTPpY) derived from the catalytic core of the active form of JNK kinase, which corresponds to Thr183 and Tyr185 of the mammalian JNK2 enzyme) (Use for Western blotting, immunocytochemistry and Immunohistochemistry).
Rei Watanabe et al. J Immunol. 2010 May 1;184(9):4801-9. Regulatory B cells (B10 cells) have a suppressive role in murine lupus: CD19 and B10 cell deficiency exacerbates systemic autoimmunity.
6. Rabbit monoclonal anti-Pmad. (Species: Human, Mouse, Drosophila melanogaster)(Applications: Dot, ICC/IF, IHC-P and WB).
Ebeid DE et al. Pim1 maintains telomere length in mouse cardiomyocytes by inhibiting TGFß signalling. Cardiovasc Res 117:201-211 (2021).
7. Nanobody monoclonal anti-RFP-Booster. (Specificity: mRFP, mCherry, mRFPruby, mPlum) (Applications: Immunofluorescence (IF), Immunohistochemistry (IHC), Immunocytochemistry (ICC), Wide-field fluorescence and confocal microscopy, super-resolution microscopy (SRM), light-sheet microscopy, Cleared tissue, organ, and animal imaging). Validated by Chromotek.
8. Nanobody monoclonal anti-GFP-Booster. (Specificity: CFP, eGFP, AcGFP, mClover (Clover A206K), eYFP, Venus and more GFP derivatives) (Applications: Applications: Immunofluorescence (IF): Immunohistochemistry (IHC), Immunocytochemistry (ICC), Wide-field fluorescence and confocal microscopy, super-resolution microscopy (SRM), light-sheet microscopy).
Cleared tissue, organ, and animal imaging. Validated by Chromotek.
9. Mouse monoclonal anti-GFP. (Specificity: Mixture of two high-affinity monoclonal antibodies selected for their performance in detection of GFP and GFP fusion proteins) (Applications: Immunoprecipitation, Western blots, Immunostaining).
Chi C Wong et al. Blood, 118(16), 4305-4312 (2011-08-02
10. Rabbit polyclonal anti-mCherry. (Immunogen: Recombinant fragment contains a sequence corresponding to a region within amino acids 1 and 236 of mCherry) (Applications: WB, IHC, ICC, IF, IP, ChIP, PLA).
Bishal Basak et al. Biol Open. 2021 Mar 18;10(3):bio057422. Interdomain interactions regulate the localization of a lipid transfer protein at ER-PM contact sites
11. Mouse monoclonal anti-HRP. (Immunogen: Purified recombinant fragment of HRP expressed in E. Coli) (Applications: WB).
12. Guinea Pig anti-Hid. (Ryoo et al, 2004). (Validated in Drosopohila).
13. ImmunoPure Goat anti-mouse IgG (H+L) HRP conjugated.(Applications: Western Blot (WB), Immunohistochemistry (IHC), Immunocytochemistry (ICC/IF), ELISA, Immunoprecipitation (IP).
Bumetanide et al. Front Mol Neurosci. 2019 Feb 5;12:12. Bumetanide Prevents Brain Trauma-Induced Depressive-Like Behavior.
14. ImmunoPure Goat anti-rabbit IgG (H+L) HRP conjugated. (Applications: Western Blot (WB), Immunohistochemistry (IHC), Immunocytochemistry (ICC/IF), ELISA, Immunoprecipitation (IP).
Bumetanide et al. Front Mol Neurosci. 2019 Feb 5;12:12. Bumetanide Prevents Brain Trauma-Induced Depressive-Like Behavior.

Animals and other organisms

Policy information about studies involving animals; ARRIVE guidelines recommended for reporting animal research

Laboratory animals

Males and Females from Drosophila melanogaster were used for all the analysis in our work. All the experiments have been performed on wing discs of different sizes of posterior compartment (microns) (Specified in all the experiments (Figures) and methodology). The genotypes used are detailed in Supplementary Information.

	For the Immunoprecipitation studies, Drosophila third instar larvae were used. (See methods)
Wild animals	This study did not involve wild animals.
Field-collected samples	This study did not involve samples collected from the field.
Ethics oversight	This study did not require Ethics and Animal protection directives.

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