nature research

Corresponding Author: Thomas A. Reh

Date: May 31st, 2017

Life Sciences Reporting Summary

Nature Research wishes to improve the reproducibility of the work we publish. This form is published with all life science papers and is intended to promote consistency and transparency in reporting. All life sciences submissions use this form; while some list items might not apply to an individual manuscript, all fields must be completed for clarity.

For further information on the points included in this form, see Reporting Life Sciences Research. For further information on Nature Research policies, including our data availability policy, see Authors & Referees and the Editorial Policy Checklist.

Experimental design

1. Sample size

Describe how sample size was determined. The sample size was chosen based on pilot studies for >80% power (R).

2. Data exclusions

Describe any data exclusions. No data points were excluded from analysis.

3. Replication

Describe whether the experimental findings were reliably reproduced. All attempts at replication were successful.

4. Randomization

Describe how samples/organisms/participants were allocated into experimental groups. Animals were randomly assigned to groups.

5. Blinding

Describe whether the investigators were blinded to group allocation during data collection and/or analysis. Investigators were blinded to treatment condition for all cell counts.

Note: all studies involving animals and/or human research participants must disclose whether blinding and randomization were used.

6. Statistical parameters

For all figures and tables that use statistical methods, confirm that the following items are present in relevant figure legends (or the Methods section if additional space is needed).

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement (animals, litters, cultures, etc.)
☐	☒ A description of how samples were collected, noting whether measurements were taken from distinct samples or whether the same sample was measured repeatedly.
☐	☒ A statement indicating how many times each experiment was replicated
☐	☒ The statistical test(s) used and whether they are one- or two-sided (note: only common tests should be described solely by name; more complex techniques should be described in the Methods section)
☐	☒ A description of any assumptions or corrections, such as an adjustment for multiple comparisons
☐	☒ The test results (e.g. *p* values) given as exact values whenever possible and with confidence intervals noted
☐	☒ A summary of the descriptive statistics, including central tendency (e.g. median, mean) and variation (e.g. standard deviation, interquartile range)
☐	☒ Clearly defined error bars

See the web collection on statistics for biologists for further resources and guidance.

Software

Policy information about availability of computer code

7. Software

Describe the software used to analyze the data in this study. All statistics were performed on Prism GraphPad 5, or with R, version 3.2.3 "Wooden Christmas Tree". The Shapiro-Wilks test (R) or Kolmogorov-

Smirnov test (Prism) were used to determine normality.

For all studies, we encourage code deposition in a community repository (e.g. GitHub). Authors must make computer code available to editors and reviewers upon request. The *Nature Methods* guidance for providing algorithms and software for publication may be useful for any submission.

Materials and reagents

Policy information about availability of materials

8. Materials availability

Indicate whether there are restrictions on availability of unique materials or if these materials are only available for distribution by a for-profit company.

All materials used in the study are available from the companies referenced in the text. A few reagents have restricted availability as they were gifts from the labs that generated them. They have been referenced in the text as well and are: Cabp5 primary rabbit antibody from Dr. F. Haeseleer, and the cChIP reagents from R. David Hawkins

9. Antibodies

Describe the antibodies used and how they were validated for use in the system under study (i.e. assay and species).

For validation we consulted the Labome database of antibody validation and/or supplier's catalog information or specific references (given).

rabbit anti-Histone H3 (Cell Signaling, D1H2; 9715S) produced with synthetic peptide corresponding to the carboxy-terminal sequence of human histone H3. Validated with Western blot showing band of predicted molecular weight. Used in 253 prior studies. Lot: 20

rabbit anti-H3K27ac (Abcam, ab4729) Lot GR104852-1, Raised against synthetic peptide aa 1-100. Validated with Western blot and Chromatin IP. Used in 193 prior studies.

rabbit anti-Cabp5 (gift from Dr. F. Haeseleer, 1:500) polyclonal antibody UW89, raised against bacterially expressed CaBP5. Controls described in Haeseleer et al, 2000; J Biol Chem 275,1246-1260: "Negative controls for immunolabeling studies included each of the following steps: omission of primary antibody; incubation in preimmune sera at matching dilutions from rabbits used for polyclonal production; and adsorbed controls using purified CaBP1 (for UW72) or CaBP5 (UW89) (600 nM final concentration) to abolish immunolabeling."
rabbit anti-Pax6 (Convance, 1:300, PRB-278P) Antibody was generated against the peptide derived from the C-terminus of the mouse Pax-6 protein. Validated with Western blot for predicted size. Used in 42 prior studies. lot: D14BF00330.
rabbit anti-PSD95 (Abcam, 1:100, 18258) Raised against synthetic peptide 50-150 of mouse Psd95. Used in 39 prior studies. Detects band of 85 kD predicted molecular weight. lot: 366549

rabbit anti-Sox9 (Millipore, 1:300; AB5535) Used in 86 prior reports. Validated in knockout mouse (Vong et al, Molecular Brain 8:25 2015) lot: 2757163.

mouse anti-CtBP2 (BD Biosciences, 1:500; 612044) Raised to specific peptide (aa361-445), shows single band of 48kDa on Western blot. Used in 32 prior studies, including recent 2016 report in EMBO J where antibody was validated in a knockout mouse for the gene (Maxeiner et al, 2016; EMBO J. 2016 May 17;35(10):1098-114).

mouse anti-HuC/D (Invitrogen, A21271); used in 283 prior publications; validated with IHC ELISA and Western blot lot: 1037291.

chicken anti-GFP (Abcam, 13970); Raised against fill-length GFP protein; validated with Western blot giving a single band of predicted molecular weight; used in 670 prior publications. lot: GR393362-1.

goat anti-Otx2 (R&D Systems, 1:100; BAF1979) Raised against recombinant human Otx2; validated with Western blot, giving single band of predicted molecular weight; 9 prior citations; lot: KRS0316041.

10. Eukaryotic cell lines

a. State the source of each eukaryotic cell line used. N/A

b. Describe the method of cell line authentication used. N/A

c. Report whether the cell lines were tested for mycoplasma contamination. N/A

d. If any of the cell lines used in the paper are listed in the database of commonly misidentified cell lines maintained by ICLAC, provide a scientific rationale for their use. N/A

Animals and human research participants

Policy information about studies involving animals; when reporting animal research, follow the ARRIVE guidelines

11. Description of research animals

Provide details on animals and/or animal-derived materials used in the study.

All mice were housed at the University of Washington and treated with protocols approved by the University of Washington's Institutional Animal Care and Use Committee. Mice expressed cre-recombinase under one of two different promoters (Rlbp-CreER from Dr. E. Levine (Vanderbilt University) and Glast-CreER from Jackson Labs) and mice with Rosa-Flox-stop-tTA (Jackson labs) have been previously described. tetO-mAscl1-ires-GFP mice were a gift from Dr. M. Nakafuku (University of Cincinnati). Grm6-tdTomato mice have been previous described [Kerschensteiner et al, Nature, 2009]. Adult mice of both sexes were used for this study and analyzed together in their respective treatment groups.

Policy information about studies involving human research participants

12. Description of human research participants

Describe the covariate-relevant population characteristics of the human research participants.

N/A

Thomas A. Reh