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Supplementary Figures: 8

Supplementary Tables: 0

Supplementary Videos: 0

Reporting Checklist for Nature Neuroscience

This checklist is used to ensure good reporting standards and to improve the reproducibility of published results. For more information, please read Reporting Life Sciences Research.

Please note that in the event of publication, it is mandatory that authors include all relevant methodological and statistical information in the manuscript.

Statistics reporting, by figure

- Please specify the following information for each panel reporting quantitative data, and where each item is reported (section, e.g. Results, & paragraph number).
- Each figure legend should ideally contain an exact sample size (n) for each experimental group/condition, where n is an exact number and not a range, a clear definition of how n is defined (for example x cells from x slices from x animals from x litters, collected over x days), a description of the statistical test used, the results of the tests, any descriptive statistics and clearly defined error bars if applicable.
- For any experiments using custom statistics, please indicate the test used and stats obtained for each experiment.
- Each figure legend should include a statement of how many times the experiment shown was replicated in the lab; the details of sample collection should be sufficiently clear so that the replicability of the experiment is obvious to the reader.
- For experiments reported in the text but not in the figures, please use the paragraph number instead of the figure number.

Note: Mean and standard deviation are not appropriate on small samples, and plotting independent data points is usually more informative. When technical replicates are reported, error and significance measures reflect the experimental variability and not the variability of the biological process; it is misleading not to state this clearly.

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
example	1a	one-way ANOVA	Fig. legend	9, 9, 10, 15	mice from at least 3 litters/group	Methods para 8	error bars are mean +/- SEM	Fig. legend	p = 0.044	Fig. legend	F(3, 36) = 2.97	Fig. legend
example	results, para 6	unpaired t-test	Results para 6	15	slices from 10 mice	Results para 6	error bars are mean +/- SEM	Results para 6	p = 0.0006	Results para 6	t(28) = 2.808	Results para 6
+ -	1f	Repeated Measures ANOVA	Figure, legend	25, 17	mice	Figure, legend	error bars are mean +/- SEM	legend	p = 0.0003	Figure, legend	F(1,40) = 16.0102	legend

		TEST USED		n			DESCRIPTIVE STATS (AVERAGE, VARIANCE)		P VALUE		DEGREES OF FREEDOM & F/t/z/R/ETC VALUE	
	FIGURE NUMBER	WHICH TEST?	SECTION & PARAGRAPH #	EXACT VALUE	DEFINED?	SECTION & PARAGRAPH #	REPORTED?	SECTION & PARAGRAPH #	EXACT VALUE	SECTION & PARAGRAPH #	VALUE	SECTION & PARAGRAPH #
+ -	2e	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.12	legend	t(21) = 1.198	legend
+ -	2f	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.0499	legend	t(19) = 1.730	legend
+ -	2f	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.0397	legend	t(19) = 1.855	legend
+ -	3b	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.0225	legend	t(19) = 2.146	legend
+ -	3b	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.0295	legend	t(21) = 1.996	legend
+ -	3b	one-tailed t-test	legend	12, 12	mice	legend	error bars are mean +/- SEM	legend	p = 0.0059	legend	t(17) = 2.819	legend
+ -	4c	ANOVA	legend	8, 7, 6, 6	mice	legend	error bars are mean +/- SEM	legend	p = 0.0102	legend	F(3) = 4.7432	legend
+ -	5b	Repeated measures ANOVA	legend	6, 5	rats	legend	error bars are mean +/- SEM	legend	p = 0.0354	legend	F(1,9) = 6.113	legend
+ -	5j	one-tailed t-test	legend	6, 5	rats	legend	error bars are mean +/- SEM	legend	p = 0.0446	legend	t(6) = 2.000	legend
+ -	5j	one-tailed t-test	legend	6, 5	rats	legend	error bars are mean +/- SEM	legend	p = 0.0196	legend	t(6) = 2.594	legend
+ -	5i	one-tailed t-test	legend	6, 5	rats	legend	error bars are mean +/- SEM	legend	p = 0.0384	legend	t(7)=2.099	legend
+ -	7e	one-tailed t-test	legend	10, 11	mice	legend	error bars are mean +/- SEM	legend	p = 0.0347	legend	t(19)=1.925	legend
+ -	7f	one-tailed t-test	legend	10, 11	mice	legend	error bars are mean +/- SEM	legend	p = 0.0460	legend	t(16)=-1.791	legend
+ -	8c	ANOVA	legend	10, 11, 5, 5	mice	legend	error bars are mean +/- SEM	legend	p = 0.0037	legend	F(3) = 5.7157	legend
+ -	8d	Bivariate Pearson correlation	legend	84	measurements (4 time points, 21 mice)	legend	scatter plot	figure	p < 0.0001	legend	rho = 0.665	legend
+ -	S3	one-tailed t-test	legend	6, 5	mice	legend	error bars are mean +/- SEM	figure	p = 0.0196	legend	t(6) = 2.594	legend
+ -	S6	Repeated measures ANOVA	legend	10, 11	mice	legend	error bars are mean +/- SEM	legend	p = 0.0304	legend	F(1,19) = 5.472	legend
+ -	5e	two-tailed t-test	legend	6, 5	rats	legend	error bars are mean +/- SEM	legend	p = 0.3724	legend	t(6) = 0.960	legend
+ -	6b	Spearman's rank correlation	Results Paragraph 9	10, 11	mice	Results Paragraph 9	3D plot	figure	p = 0.0062	Results Paragraph 9	rho = -0.5766	Results Paragraph 9
+ -	6b	one-tailed t-test	Results Paragraph 9	10, 11	mice	Results Paragraph 9	3D plot	figure	p = 0.0480	Results Paragraph 9	t(14)=1.79	Results Paragraph 9
+ -	S5	Wilcoxon rank sum	Results Paragraph 9	10, 11	mice	Results Paragraph 9	heatmap	figure	p = 0.0136	Results Paragraph 9	chi^2 = 6.086	Results Paragraph 9

+ -	Results Paragraph 9	Spearman's rank correlation	Results Paragraph 9	10, 11	mice	Results Paragraph 9			p = 0.0380	Results Paragraph 9	rho = 0.4555	Results Paragraph 9

Representative figures

1. Are any representative images shown (including Western blots and immunohistochemistry/staining) in the paper?

   If so, what figure(s)?

   Figure 2b-d, Figure 3c, Figure 4d, Figure 5f,g

2. For each representative image, is there a clear statement of how many times this experiment was successfully repeated and a discussion of any limitations in repeatability?

   If so, where is this reported (section, paragraph #)?

   Yes, associated figure legends describe n values for each experiment.

Statistics and general methods

1. Is there a justification of the sample size?

   If so, how was it justified?

   Where (section, paragraph #)?

   Even if no sample size calculation was performed, authors should report why the sample size is adequate to measure their effect size.

   Sample size estimates were based upon historical data and needed to be substantial enough to account for intra-animal variability on behavioral tasks. With a conservative 25% effect size, an alpha of 0.05 and power of 80% yields a sample size of 16 mice/group, which in our initial experiment (figure 1f) was more than sufficient to account for behavioral variability as the effect size as the effect was closer to 40%.

2. Are statistical tests justified as appropriate for every figure?

   Where (section, paragraph #)?

   Yes, in methods, statistics section

   a. If there is a section summarizing the statistical methods in the methods, is the statistical test for each experiment clearly defined?

      Yes

   b. Do the data meet the assumptions of the specific statistical test you chose (e.g. normality for a parametric test)?

      Where is this described (section, paragraph #)?

      Yes, in methods, statistics section

   c. Is there any estimate of variance within each group of data?

      Is the variance similar between groups that are being statistically compared?

      Where is this described (section, paragraph #)?

      No

   d. Are tests specified as one- or two-sided?

      Yes

   e. Are there adjustments for multiple comparisons?

      Yes

3. Are criteria for excluding data points reported? Was this criterion established prior to data collection? Where is this described (section, paragraph #)?	Yes, One animal was excluded from the study due to evidence of incomplete C5 lesion with labeled corticospinal axons present at and below the level of the injury, as described in the methods section, 1st paragraph. No individual data points were excluded.
4. Define the method of randomization used to assign subjects (or samples) to the experimental groups and to collect and process data. If no randomization was used, state so. Where does this appear (section, paragraph #)?	Mice were assigned to groups based on genotype, or randomly selected (independent of ear tag number, behavioral performance) for sham or C3 secondary lesion groups (fig. 4). Rats were randomly selected for mouse control IgG or Ryk monoclonal IgG treatment. Appears in appropriate paragraphs in methods section.
5. Is a statement of the extent to which investigator knew the group allocation during the experiment and in assessing outcome included? If no blinding was done, state so. Where (section, paragraph #)?	Yes, described in methods, paragraph 1.
6. For experiments in live vertebrates, is a statement of compliance with ethical guidelines/regulations included? Where (section, paragraph #)?	Yes, described in methods, paragraph 1.
7. Is the species of the animals used reported? Where (section, paragraph #)?	Yes, described in methods and throughout the text as appropriate.
8. Is the strain of the animals (including background strains of KO/ transgenic animals used) reported? Where (section, paragraph #)?	Yes, described in methods, paragraph 2.
9. Is the sex of the animals/subjects used reported? Where (section, paragraph #)?	Yes, described in methods under surgical procedures paragraphs.
10. Is the age of the animals/subjects reported? Where (section, paragraph #)?	Yes, average ± sem age of mice is reported in experimental timelines in appropriate figures. Rats are reported by weight range.
11. For animals housed in a vivarium, is the light/dark cycle reported? Where (section, paragraph #)?	Yes, described in methods, paragraph 1.
12. For animals housed in a vivarium, is the housing group (i.e. number of animals per cage) reported? Where (section, paragraph #)?	Group and single housing described in methods, paragraph 1.
13. For behavioral experiments, is the time of day reported (e.g. light or dark cycle)? Where (section, paragraph #)?	Yes, described in methods, paragraph 1.

14. Is the previous history of the animals/subjects (e.g. prior drug administration, surgery, behavioral testing) reported?

    Where (section, paragraph #)?

Yes, described in methods and in experimental timelines in appropriate figures.

    a. If multiple behavioral tests were conducted in the same group of animals, is this reported?

       Where (section, paragraph #)?

Yes, described in methods, behavioral testing paragraph.

15. If any animals/subjects were excluded from analysis, is this reported?

    Where (section, paragraph #)?

Yes, One animal was excluded from the study due to evidence of incomplete C5 lesion with labeled corticospinal axons present at and below the level of the injury, as described in the methods section, 1st paragraph.

    a. How were the criteria for exclusion defined?

       Where is this described (section, paragraph #)?

Anatomical evidence of uninjured axons bypassing the lesion site. Described in methods, paragraph 1.

    b. Specify reasons for any discrepancy between the number of animals at the beginning and end of the study.

       Where is this described (section, paragraph #)?

Animals were utilized for different experiments, such as secondary injury that would preclude use for some analyses (ie. histology). Timelines in figures illustrate experimental plans.

Reagents

1. Have antibodies been validated for use in the system under study (assay and species)?

Yes

    a. Is antibody catalog number given?

       Where does this appear (section, paragraph #)?

catalog numbers and RRID numbers are given in methods, paragraphs 9 and 10.

    b. Where were the validation data reported (citation, supplementary information, Antibodypedia)?

       Where does this appear (section, paragraph #)?

Supplementary figure 2

2. Cell line identity

    a. Are any cell lines used in this paper listed in the database of commonly misidentified cell lines maintained by ICLAC and NCBI Biosample?

       Where (section, paragraph #)?

No

    b. If yes, include in the Methods section a scientific justification of their use--indicate here in which section and paragraph the justification can be found.

c. For each cell line, include in the Methods section a statement that specifies:
- the source of the cell lines
- have the cell lines been authenticated? If so, by which method?
- have the cell lines been tested for mycoplasma contamination?

Where (section, paragraph #)?

Data deposition

Data deposition in a public repository is mandatory for:

a. Protein, DNA and RNA sequences
b. Macromolecular structures
c. Crystallographic data for small molecules
d. Microarray data

Deposition is strongly recommended for many other datasets for which structured public repositories exist; more details on our data policy are available here. We encourage the provision of other source data in supplementary information or in unstructured repositories such as Figshare and Dryad.

We encourage publication of Data Descriptors (see Scientific Data) to maximize data reuse.

1. Are accession codes for deposit dates provided?

   Where (section, paragraph #)?

N/A

Computer code/software

Any custom algorithm/software that is central to the methods must be supplied by the authors in a usable and readable form for readers at the time of publication. However, referees may ask for this information at any time during the review process.

1. Identify all custom software or scripts that were required to conduct the study and where in the procedures each was used.

N/A

2. If computer code was used to generate results that are central to the paper's conclusions, include a statement in the Methods section under "**Code availability**" to indicate whether and how the code can be accessed. Include version information as necessary and any restrictions on availability.

Human subjects

1. Which IRB approved the protocol?

   Where is this stated (section, paragraph #)?

2. Is demographic information on all subjects provided?

   Where (section, paragraph #)?

3. Is the number of human subjects, their age and sex clearly defined?

   Where (section, paragraph #)?

4. Are the inclusion and exclusion criteria (if any) clearly specified?

   Where (section, paragraph #)?

5. How well were the groups matched?

   Where is this information described (section, paragraph #)?

6. Is a statement included confirming that informed consent was obtained from all subjects?

   Where (section, paragraph #)?

7. For publication of patient photos, is a statement included confirming that consent to publish was obtained?

   Where (section, paragraph #)?

fMRI studies

For papers reporting functional imaging (fMRI) results please ensure that these minimal reporting guidelines are met and that all this information is clearly provided in the methods:

1. Were any subjects scanned but then rejected for the analysis after the data was collected?

   a. If yes, is the number rejected and reasons for rejection described?

      Where (section, paragraph #)?

2. Is the number of blocks, trials or experimental units per session and/or subjects specified?

   Where (section, paragraph #)?

3. Is the length of each trial and interval between trials specified?

4. Is a blocked, event-related, or mixed design being used? If applicable, please specify the block length or how the event-related or mixed design was optimized.

5. Is the task design clearly described?

   Where (section, paragraph #)?

6. How was behavioral performance measured?

7. Is an ANOVA or factorial design being used?

8. For data acquisition, is a whole brain scan used?

   If not, state area of acquisition.

   a. How was this region determined?

9. Is the field strength (in Tesla) of the MRI system stated?

   a. Is the pulse sequence type (gradient/spin echo, EPI/spiral) stated?

   b. Are the field-of-view, matrix size, slice thickness, and TE/TR/flip angle clearly stated?

10. Are the software and specific parameters (model/functions, smoothing kernel size if applicable, etc.) used for data processing and pre-processing clearly stated?

11. Is the coordinate space for the anatomical/functional imaging data clearly defined as subject/native space or standardized stereotaxic space, e.g., original Talairach, MNI305, ICBM152, etc? Where (section, paragraph #)?

12. If there was data normalization/standardization to a specific space template, are the type of transformation (linear vs. nonlinear) used and image types being transformed clearly described? Where (section, paragraph #)?

13. How were anatomical locations determined, e.g., via an automated labeling algorithm (AAL), standardized coordinate database (Talairach daemon), probabilistic atlases, etc.?

14. Were any additional regressors (behavioral covariates, motion etc) used?

15. Is the contrast construction clearly defined?

16. Is a mixed/random effects or fixed inference used?

   a. If fixed effects inference used, is this justified?

17. Were repeated measures used (multiple measurements per subject)?

   a. If so, are the method to account for within subject correlation and the assumptions made about variance clearly stated?

18. If the threshold used for inference and visualization in figures varies, is this clearly stated?

19. Are statistical inferences corrected for multiple comparisons?

a. If not, is this labeled as uncorrected?

20. Are the results based on an ROI (region of interest) analysis?

a. If so, is the rationale clearly described?

b. How were the ROI's defined (functional vs anatomical localization)?

21. Is there correction for multiple comparisons within each voxel?

22. For cluster-wise significance, is the cluster-defining threshold and the corrected significance level defined?

Additional comments

Additional Comments