**Materials Design Analysis Reporting (MDAR)**

**Checklist for Authors**

The [MDAR framework](https://osf.io/xfpn4/) establishes a minimum set of requirements in transparent reporting mainly applicable to studies in the life sciences.

*eLife* asks authors to **provide detailed information within their article** to facilitate the interpretation and replication of their work. Authors can also upload supporting materials to comply with relevant reporting guidelines for health-related research (see [EQUATOR Network](http://www.equator-network.org/%20)), life science research (see the [BioSharing Information Resource](http://biosharing.org/)), or animal research (see the [ARRIVE Guidelines](http://www.plosbiology.org/article/info%3Adoi/10.1371/journal.pbio.1000412) and the [STRANGE Framework](https://doi.org/10.1038/d41586-020-01751-5); for details, see *eLife*’s [Journal Policies](https://reviewer.elifesciences.org/author-guide/journal-policies)). Where applicable, authors should refer to any relevant reporting standards materials in this form.

For all that apply, please note **where in the article** the information is provided. Please note that we also collect information about data availability and ethics in the submission form.

**Materials:**

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| **Newly created materials** | **Indicate where provided: section/figure legend** | **N/A** |
| The manuscript includes a dedicated "materials availability statement" providing transparent disclosure about availability of newly created materials including details on how materials can be accessed and describing any restrictions on access. | All data and materials supporting the findings are included within this manuscript and its supplementary information. |  |
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| **Antibodies** | **Indicate where provided: section/figure legend** | **N/A** |
| For commercial reagents, provide supplier name, catalogue number and [RRID](https://scicrunch.org/resources), if available. | Phospho-GSK-3 alpha (Ser21) (36E9) Rabbit mAb:Cell Signaling Technology, Cat# 9316, RRID: AB\_659836Phospho-GSK-3 beta (Ser9) (D3A4) Rabbit mAb:Cell Signaling Technology, Cat# 9322, RRID: AB\_2115196GSK-3alpha/beta (D75D3) XP Rabbit mAb:Cell Signaling Technology, Cat# 5676, RRID: AB\_10547140Phospho-CRMP2 (Thr514) Rabbit mAb: Abcam, Cat# ab62478, RRID: AB\_942229CRMP2 antibody: Cell Signaling Technology, Cat# 9393, RRID: AB\_2094339detyrosinated tubulin rabbit antibody:Millipore, Cat# AB3201, RRID: AB\_177350βIII-tubulin mAb:Covance, Cat# MMS-435P, RRID: AB\_2313773Phospho-Stat3 (Tyr705) (D3A7) XP Rabbit mAb:Cell Signaling Technology, Cat# 9145, RRID: AB\_2491009GAP43 antibody:Invitrogen, custom-made antibody5-HT (Serotonin) Goat Antibody:ImmunoStar, Cat# 20079, RRID: AB\_5722625-HT (Serotonin) Rabbit Antibody:ImmunoStar, Cat# 20080, RRID: AB\_572263GFP goat Antibody:Novus, Cat# NB100-1770, RRID: AB\_10128178Anti-NeuN antibody [EPR12763]:Abcam, Cat# ab177487, RRID: AB\_2532109GFAP goat Antibody: Abcam, Cat# ab7260, RRID: AB\_305808Monoclonal Anti-Chondroitin Sulfate antibody produced in mouse:Sigma-Aldrich Cat# C8035, RRID:AB\_476879Information concerning antibodies is also provided in Materials and methods section. |  |
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| **DNA and RNA sequences** | **Indicate where provided: section/figure legend** | **N/A** |
| Short novel DNA or RNA including primers, probes: Sequences should be included or deposited in a public repository. |  | x |
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| **Cell materials** | **Indicate where provided: section/figure legend** | **N/A** |
| Cell lines: Provide species information, strain. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID. | Human embryonic kidney 293 cells were used for preparation of AAV2, described in Materials and methods section. |  |
| Primary cultures: Provide species, strain, sex of origin, genetic modification status.  | Primary retinal cultures from mice: Male and female mice (2-3 months old) were used, as described in Materials and methods section. Genotypes: wt C57BL/6, Pten f/f: C57BL/6;129/J-TgH(Pten-flox)Primary human retinal cultures.  |  |
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| **Experimental animals** | **Indicate where provided: section/figure legend** | **N/A** |
| Laboratory animals or Model organisms: Provide species, strain, sex, age, genetic modification status. Provide accession number in repository OR supplier name, catalog number, clone number, OR RRID. | Male and female mice (2-3 months old) were used, as described in Materials and methods section. Genotypes: wt mice with C57BL/6 or C57BL/6,129/Ola(B6CF1) background, and Pten f/f: C57BL/6;129/J-TgH(Pten-flox), as described in Materials and methods section. |  |
| Animal observed in or captured from the field: Provide species, sex, and age where possible. |  | x |
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| **Plants and microbes** | **Indicate where provided: section/figure legend** | **N/A** |
| Plants: provide species and strain, ecotype and cultivar where relevant, unique accession number if available, and source (including location for collected wild specimens). |  | x |
| Microbes: provide species and strain, unique accession number if available, and source. |  | x |
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| **Human research participants** | **Indicate where provided: section/figure legend) or state if these demographics were not collected** | **N/A** |
| If collected and within the bounds of privacy constraints report on age, sex, gender and ethnicity for all study participants. |  | **x** |

**Design:**

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| **Study protocol** | **Indicate where provided: section/figure legend** | **N/A** |
| If the study protocol has been pre-registered, provide DOI. For clinical trials, provide the trial registration number OR cite DOI. |  | x |
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| **Laboratory protocol** | **Indicate where provided: section/figure legend** | **N/A** |
| Provide DOI OR other citation details if detailed step-by-step protocols are available. |  | x |
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| **Experimental study design (statistics details) \*** |
| **For in vivo studies: State whether and how the following have been done** | **Indicate where provided: section/figure legend. If it could have been done, but was not, write “not done”** | **N/A** |
| Sample size determination | Prior to the start of experiments, sample size determination was performed by Power analysis using the G\*Power 3.1.7 Software. Method: F tests - ANOVA: Fixed effects, omnibus, one-way.This information is also provided in the Materials and methods section. |  |
| Randomisation | Before the start of the experiment, individual vials containing DMAPT or vehicle (DMSO) stock solution were prepared for each experimental animal. The vials were randomized by a person who was neither involved in the implementation nor evaluated the experiments. These numbers were randomly distributed to mice of the same age and sex in different cages. This was carried out independently by another person who was neither involved in the data evaluation nor the randomization of the samples.This information is also provided in the Materials and methods section. |  |
| Blinding | The experiments were executed and evaluated by scientists who were not involved in any randomization processes and did not know the identity of the samples or treatment groups. This information is also provided in the Materials and methods section. |  |
| Inclusion/exclusion criteria | After completion of the data collection, values from mice with signs of spared axons were first removed from the data set for quality assurance. The criteria for this were a BMS Score of a maximum of 0-1 on the first day after the lesion and the absence of uninjured serotonergic axons in spinal cord cross-sections >9-10 mm distal to the lesion site. Finally, the data points were assigned to the respective experimental groups by the person who initially blinded the vials.This information is also provided in the Materials and methods section.  |  |
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| **Sample definition and in-laboratory replication** | **Indicate where provided: section/figure legend** | **N/A** |
| State number of times the experiment was replicated in the laboratory. | Information concerning the experimental replicates varied between experiments and are described in the respective figure legends. |  |
| Define whether data describe technical or biological replicates. | Although most data describe biological replicates (biologically distinct samples, e.g. single animals or single cell culture samples), technical replicates were also used for some experiments (e.g. multiple wells from one cell culture sample). This information is provided in the respective figure legends. |  |
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| **Ethics** | **Indicate where provided: section/submission form** | **N/A** |
| Studies involving human participants: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval. | The use of human eyes and publishing of the obtained results was approved by the ethics committee of Heinrich Heine University Düsseldorf (study number 4067) and performed by the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. |  |
| Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval. | All animal experiments were approved by the local animal care committee (LANUV Recklinghausen). Reference number of approval: 84-02.04.2017.A218 |  |
| Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why. | Field samples were not used, as experiments required a uniform genetic background to ensure sufficient comparability between animals and treatment groups. | x |
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| **Dual Use Research of Concern (DURC)** | **Indicate where provided: section/submission form** | **N/A** |
| If study is subject to dual use research of concern regulations, state the authority granting approval and reference number for the regulatory approval. |  | x |

**Analysis:**

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| **Attrition** | **Indicate where provided: section/figure legend** | **N/A** |
| Describe whether exclusion criteria were pre-established. Report if sample or data points were omitted from analysis. If yes, report if this was due to attrition or intentional exclusion and provide justification. | No samples or data points were omitted from analysis, with the exception of the animals which did not meet the inclusion criteria (e.g. spared axons after spinal cord injury, as described above). |  |
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| **Statistics** | **Indicate where provided: section/figure legend** | **N/A** |
| Describe statistical tests used and justify choice of tests. | Significances of intergroup differences were evaluated using Student’s t-test or either one-way or two-way analysis of variance (ANOVA) followed by Tukey or Holm-Sidak post hoc tests using the Sigma STAT3.1 software (Systat Software), depending on the sample size and experimental groups. For all experiments, statistical tests and precision measures are described in the figure legends. Single data points and p-values are shown within the respective figures. |  |
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| **Data availability** | **Indicate where provided: section/submission form** | **N/A** |
| For newly created and reused datasets, the manuscript includes a data availability statement that provides details for access (or notes restrictions on access). |  | x |
| When newly created datasets are publicly available, provide accession number in repository OR DOI and licensing details where available. |  | x |
| If reused data is publicly available provide accession number in repository OR DOI, OR URL, OR citation. |  | x |
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| **Code availability** | **Indicate where provided: section/figure legend** | **N/A** |
| For any computer code/software/mathematical algorithms essential for replicating the main findings of the study, whether newly generated or re-used, the manuscript includes a data availability statement that provides details for access or notes restrictions. |  | x |
| Where newly generated code is publicly available, provide accession number in repository, OR DOI OR URL and licensing details where available. State any restrictions on code availability or accessibility. |  | x |
| If reused code is publicly available provide accession number in repository OR DOI OR URL, OR citation. |  | x |

**Reporting:**

The MDAR framework recommends adoption of discipline-specific guidelines, established and endorsed through community initiatives.

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| **Adherence to community standards** | **Indicate where provided: section/figure legend** | **N/A** |
| State if relevant guidelines (e.g., ICMJE, MIBBI, ARRIVE, STRANGE) have been followed, and whether a checklist (e.g., CONSORT, PRISMA, ARRIVE) is provided with the manuscript. |  | x |

\* We provide the following guidance regarding transparent reporting and statistics; we also refer authors to [Ten common statistical mistakes to watch out for when writing or reviewing a manuscript](https://doi.org/10.7554/eLife.48175).

**Sample-size estimation**

* You should state whether an appropriate sample size was computed when the study was being designed
* You should state the statistical method of sample size computation and any required assumptions
* If no explicit power analysis was used, you should describe how you decided what sample (replicate) size (number) to use

**Replicates**

* You should report how often each experiment was performed
* You should include a definition of biological versus technical replication
* The data obtained should be provided and sufficient information should be provided to indicate the number of independent biological and/or technical replicates
* If you encountered any outliers, you should describe how these were handled
* Criteria for exclusion/inclusion of data should be clearly stated
* High-throughput sequence data should be uploaded before submission, with a private link for reviewers provided (these are available from both GEO and ArrayExpress)

**Statistical reporting**

* Statistical analysis methods should be described and justified
* Raw data should be presented in figures whenever informative to do so (typically when N per group is less than 10)
* For each experiment, you should identify the statistical tests used, exact values of N, definitions of center, methods of multiple test correction, and dispersion and precision measures (e.g., mean, median, SD, SEM, confidence intervals; and, for the major substantive results, a measure of effect size (e.g., Pearson's r, Cohen's d)
* Report exact p-values wherever possible alongside the summary statistics and 95% confidence intervals. These should be reported for all key questions and not only when the p-value is less than 0.05.

**Group allocation**

* Indicate how samples were allocated into experimental groups (in the case of clinical studies, please specify allocation to treatment method); if randomization was used, please also state if restricted randomization was applied
* Indicate if masking was used during group allocation, data collection and/or data analysis