***eLife’s* transparent reporting form**

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**Sample-size estimation**

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

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Information on sample size and statistical tests can be found in Material and Methods and respective figure legends.

**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)

Please outline where this information can be found within the submission (e.g., sections or figure legends), or explain why this information doesn’t apply to your submission:

Animals were randomly selected from a large collection of clonally dividing asexual planarians for all experiments. Biological replicates involving 3-5 animals per experiments were performed. No outliers were observed, and no high throughput sequence data is generated in this study. This information can be found in Material and Methods and respective figure legends.

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* Statistical analysis methods should be described and justified
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* 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.

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All data are represented as mean+/- SD and the statistical test and N number of animals used is explained in material and methods section and also in the respective figure legends. The source data file also contains information of the statistical test used for individual datasets. All statistical tests are performed using Graphpad prism v6 and the exact p value for all key questions is reported. (unless p<0.0001 in which case Prism does not provide an exact value).

(For large datasets, or papers with a very large number of statistical tests, you may upload a single table file with tests, Ns, etc., with reference to sections in the manuscript.)

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* 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
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All data generated or analyzed during this study are included in the manuscript. Source data files containing numerical data supporting individual graphs have been provided for all main and supplementary figures.