

Editorial Policy Checklist

This form is used to ensure compliance with Nature Research editorial policies related to research ethics and reproducibility. For further information, please see our [Authors & Referees](#) site. All relevant questions on the form must be answered.

Competing interests

Policy information about [competing interests](#)

Competing interests declaration

In the interest of transparency and to help readers form their own judgements of potential bias, Nature Research journals require authors to declare any competing financial and/or non-financial interest in relation to the work described in the submitted manuscript.

We declare that none of the authors have competing financial or non-financial interests as defined by Nature Research.

We declare that one or more of the authors have a competing interest as defined by Nature Research.

Daniel D. De Carvalho received research funds unrelated to this project from Pfizer and Nektar Therapeutics. Daniel D. De Carvalho is a co-founder, employee and shareholder of DNAMx, Inc. The other authors declare no competing interests.

Authorship

Policy information about [authorship](#)

Prior to submission all listed authors must agree to all manuscript contents, the author list and its order and the author contribution statements. Any changes to the author list after submission must be approved by all authors.

We have read the Nature Research Authorship Policy and confirm that this manuscript complies.

Data availability

Policy information about [availability of data](#)

Data availability statement

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

We have provided a full data availability statement in the manuscript.

Mandated accession codes ([where applicable](#))

Confirm that all relevant data are deposited into a public repository and that accession codes are provided.

All relevant accession codes are provided Accession codes will be available before publication No data with mandated deposition

Code availability

Policy information about [availability of computer code](#)

Code availability statement

For all studies using custom code or mathematical algorithm that is deemed central to the conclusions, the manuscript must include a statement under the heading "Code availability" describing how readers can access the code, including any access restrictions. Code availability statements should be provided as a separate section after the data availability statement but before the References.

We have provided a full code availability statement in the manuscript

Data presentation

For all data presented in a plot, chart or other visual representation confirm that:

n/a Confirmed

- Individual data points are shown when possible, and always for $n \leq 10$
- The format shows data distribution clearly (e.g. dot plots, box-and-whisker plots)
- Box-plot elements are defined (e.g. center line, median; box limits, upper and lower quartiles; whiskers, 1.5x interquartile range; points, outliers)
- Clearly defined error bars are present and what they represent (SD, SE, CI) is noted

Image integrity

Policy information about [image integrity](#)

- We have read Nature Research's image integrity policy and all images comply.

Unprocessed data must be provided upon request. Please double-check figure assembly to ensure that all panels are accurate (e.g. all labels are correct, no inadvertent duplications have occurred during preparation, etc.).

Additional policy considerations

Some types of research require additional policy disclosures. Please indicate whether each of these apply to your study. If you are not certain, please read the appropriate section before selecting a response.

Does not apply	Involved in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> Macromolecular structural data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Unique biological materials
<input type="checkbox"/>	<input checked="" type="checkbox"/> Research animals and/or animal-derived materials that require ethical approval
<input checked="" type="checkbox"/>	<input type="checkbox"/> Human embryos, gametes and/or stem cells
<input checked="" type="checkbox"/>	<input type="checkbox"/> Human research participants
<input checked="" type="checkbox"/>	<input type="checkbox"/> Clinical data

Research animals

Policy information about [studies involving animals](#); [ARRIVE guidelines](#) recommended for reporting animal research

Ethical compliance

- We have complied with all relevant ethical regulations and include a statement affirming this in the manuscript.

Ethics committee

- We have disclosed the name(s) of the board and institution that approved the study protocol in the manuscript.

I certify that all the above information is complete and correct.

Typed signature Qin Wu

Date Jun 21, 2021

