

Editorial Policy Checklist

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Competing interests

Policy information about [competing interests](#)

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

Competing interests declaration

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

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

Gerald Watts (corresponding author) reports personal fees for lectures from Amgen, Novartis and Sanofi; Research grants from Amgen and Arrowhead Pharmaceuticals; honoraria for serving on advisory boards from Amgen, AstraZeneca, Esperion, Novartis, Pfizer, and Arrowhead.

James Hamilton, Bruce Given, Stacey Melquist, Javier San Martin, Ting Chang, and Rong Zhou are, or were recently, Arrowhead Pharmaceuticals employees and shareholders.

Ira Goldberg reports being on advisory boards for Arrowhead Pharmaceuticals and IONIS.

Christie Ballantyne reports Grant/Research Support (all significant [>\$10,000] and all paid to institution, not individual): Akcea, Amgen, Arrowhead, Esperion, Ionis, Merck, Novartis, Novo Nordisk, Regeneron, NIH; consultant for 89Bio, Alnylam Pharmaceuticals, Althera, Amarin, Amgen, Arrowhead, Astra Zeneca, Denka Seiken*, Esperion, Genentech, Gilead, Illumina, Matinas BioPharma Inc, Merck, New Amsterdam*, Novartis, Novo Nordisk, Pfizer, Regeneron, and Sanofi-Synthelabo (*significant where noted).

Patrick Gladding reports being principal investigator for Verve101 and receiving consulting fees from Verve Therapeutics.

Robert Hegеле reports consulting fees from Acasti, Akcea/Ionis, Amgen, Amryt, Arrowhead, Boston Heart, HLS Therapeutics, Pfizer, Novartis, Regeneron, Sanofi and Ultradagenyx.

Daniel Gaudet reports grants and/or personal fees from Arrowhead, Acasti, Amgen, Kowa, Regeneron, Unique, Akcea, Allergan, Amryt, CRISPR Therapeutics, Eli Lilly, Ionis, Novartis, aliogen, Sanofi, Novonordisk, Pfizer, Verve therapeutics, Aegerion, Applied therapeutics, Astra Zeneca, Boehringer-Ingelheim, Ceapro, Dalcor, Esperion, and The Medicine Company.

David Sullivan reports personal fees from Regeneron, personal fees from Amgen, personal fees from AstraZeneca, personal fees from Amarin, personal fees from Esperion, personal fees from Novartis, personal fees from Sanofi, outside the submitted work.

No competing interests were reported by Christian Schwabe, Peter Clifton, Russell Scott, John Baker, and Joshua Knowles.

Authorship

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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 Portfolio Authorship Policy and confirm that this manuscript complies.

Policy information about Authorship: inclusion & ethics in global research

All authors are encouraged to provide an "Inclusion & Ethics" statement where relevant.

We have provided an "Inclusion & Ethics" statement.

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 description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

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

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We have read Nature Portfolio'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.).

Where blots and gels are presented, please take particular care to ensure that lanes have not been spliced together, that loading controls are run on the same blot, and that unprocessed scans match the corresponding figures.

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Does not apply	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> <input type="checkbox"/> 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 checked="" type="checkbox"/> <input 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 type="checkbox"/> <input checked="" type="checkbox"/> Human research participants <input type="checkbox"/> <input checked="" type="checkbox"/> Clinical data <input checked="" type="checkbox"/> <input type="checkbox"/> Archaeological, geological, and palaeontological materials
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Human research participants

Policy information about [studies involving human research participants](#)

Ethical compliance

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

Ethics committee

Confirm that the manuscript states the name(s) of the board and/or institution that:

Approved the study protocol -OR- Provided guidelines for study procedures (if protocol approval is not required)

Informed consent

We have obtained informed consent from all participants and this is noted in the manuscript.

Identifiable images

For publication of identifiable images of research participants, confirm that consent to publish was obtained and is noted in the Methods.

Authors must ensure that consent meets the conditions set out in the [Nature Portfolio participant release form](#).

Yes No identifiable images of human research participants

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Policy information about [clinical studies](#)

Clinical trial registration

We have provided the trial registration number from [ClinicalTrials.gov](#) or an equivalent agency in the manuscript.

Phase 2 and 3 randomized controlled trials

We have provided the [CONSORT checklist](#) with your submission.

Yes No Not a phase 2/3 randomized controlled trial

Tumor marker prognostic studies

We have followed the [REMARK reporting guidelines](#).

Yes No Not a tumor marker prognostic study

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

Typed signature James Hamilton MD

Date Sep 29, 2022

