Materials Design Analysis Reporting (MDAR) Checklist for Authors

The MDAR framework establishes a minimum set of requirements in transparent reporting applicable to studies in the life sciences (see Statement of Task: doi:10.31222/osf.io/9sm4x.). The MDAR checklist is a tool for authors, editors and others seeking to adopt the MDAR framework for transparent reporting in manuscripts and other outputs. Please refer to the MDAR Elaboration Document for additional context for the MDAR framework.

Materials

Antibodies	Yes (indicate where provided:	n/a
For commercial reagents, provide supplier name, catalogue number and RRID, if available.	Page4/Line 141-142 Page8/Line 160-172	Methods/Paragraph4、6

Cell materials	Yes (indicate where provided:	n/a
Cell lines: Provide species information, strain. Provide accession number in repository **OR** supplier name, catalog number, clone number, **OR** RRID	Page5/Line109-110 Page5/Line111-125	Methods/Paragraph2
Primary cultures: Provide species, strain, sex of origin, genetic modification status.	Primary cell culture was not used in this study	No

Experimental animals	Yes (indicate where provided:	n/a
Laboratory animals: Provide species, strain, sex, age, genetic modification status. Provide accession number in repository **OR** supplier name, catalog number, clone number, **OR** RRID	This research does not involve animal experiments	No
Animal observed in or captured from the field: Provide species, sex and age where possible	This research does not involve animal experiments	No
Model organisms: Provide Accession number in repository (where relevant)	This research does not involve animal experiments	No

Plants and microbes	Yes (indicate where provided:	n/a
Plants: provide species and strain, unique accession number if available, and source (including location for collected wild	This study does not involve animal experiments	No
Microbes: provide species and strain, unique accession number if available,	This study does not involve animal experiments	No

Human research participants	Yes (indicate where provided:	n/a
Identify authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Page16/Line340-343	Footnotes/paragraph3
Provide statement confirming informed consent obtained from study participants.	Page5/Line103-105	Methods/Paragraph1
Report on age and sex for all study participants.	Page5/Line100-102	Methods/Paragraph1

Design

Study protocol	Yes (indicate where provided:	n/a
For clinical trials, provide the trial registration number **OR** cite DOI in manuscript.	This study is not classified clinical trial.	No

Laboratory protocol	Yes (indicate where provided:	n/a
Provide DOI or other citation details if detailed step-by-step protocols are available.	This study is not classified clinical trial.	No

Experimental study design (statistics details)	Yes (indicate where provided:	n/a
State whether and how the following have been done**, or** if they were not carried out.	Page5/Line95-107	Methods/Paragraph1
Sample size determination	Page5/Line95-97	Methods/Paragraph1
Randomisation	This study is not classified randomisation	No
Blinding	This study is not classified blinding	No
Inclusion/exclusion criteria	Page5/Line100-103	Methods/Paragraph1

Sample definition and in-laboratory replication	Yes (indicate where provided:	n/a
State number of times the experiment was replicated in laboratory	Page10/Line210-211	Methods/Paragraph12
Define whether data describe technical or biological replicates	Page10/Line206-211	Methods/Paragraph12

Ethics	Yes (indicate where provided:	n/a
Studies involving human participants: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Page16/Line340-343	Footnotes/paragraph3
Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	This study does not involve animal experiments.	No
Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why.	This study does not involve specimen.	No

Dual Use Research of Concern (DURC)	Yes (indicate where provided:	n/a
If study is subject to dual use research of concern, state the authority granting approval and reference number for the regulatory approval	This study does not involve dual use research.	No

Analysis

Attrition	Yes (indicate where provided: section/paragraph)	n/a
State if sample or data point from the analysis is excluded, and whether the criteria for exclusion were determined and specified in advance.	Page5/Line100-103	Methods/Paragraph1

Statistics	Yes (indicate where provided: section/paragraph)	n/a
Describe statistical tests used and justify choice of tests.	Page12/Line206-211	Methods/Paragraph12

Data Availability	Yes (indicate where provided: section/paragraph)	n/a
State whether newly created datasets are available, including protocols for access or restriction on access.	We all use public databases	No
If data are publicly available, provide accession number in repository or DOI or URL.	Page6/Line130-132 Page6/Line133-137	Methods/Paragraph3
If publicly available data are reused, provide accession number in repository or DOI or URL, where possible.	Page6/Line133-137	Methods/Paragraph3

Code Availability	Yes (indicate where provided: section/paragraph)	n/a
For all newly generated code and software essential for replicating the main findings of the study:	Page10/Line206-211	Methods/Paragraph12
State whether the code or software is available.	Page10/Line206-211	Methods/Paragraph12
If code is publicly available, provide accession number in repository, or DOI or URL.	This study does not involve code.	No

Reporting

Adherence to community standards	Yes (indicate where provided: section/paragraph)	n/a
MDAR framework recommends adoption of discipline-specific guidelines, established and endorsed through community initiatives. Journals have their own policy about requiring specific guidelines and recommendations to complement MDAR.	Page5/Line95-107	Methods/Paragraph1
State if relevant guidelines (eg., ICMJE, MIBBI, ARRIVE) have been followed, and whether a checklist (eg., CONSORT, PRISMA, ARRIVE) is provided with the manuscript.	ICMJE guidelines were followed, as the journal follows ICMJE recommendations for publication.	Methods/Paragraph1

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