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.	Section Methods / Paragraph 8	

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	Section Methods / Paragraph 3	
Primary cultures: Provide species, strain, sex of origin, genetic modification status.		**N/A** Cells purchased as passaged cultures

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		N/A No animal experiments
Animal observed in or captured from the field: Provide species, sex and age where possible		N/A No animal experiments
Model organisms: Provide Accession number in repository (where relevant) **OR** RRID		N/A No animal experiments

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 specimens)		N/A No Plants
: provide species and strain, unique accession number if available, and source		N/A No Microbes

Human research participants	Yes (indicate where provided:	n/a
Identify authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.	Section Methods/Paragraph 2	
Provide statement confirming informed consent obtained from study participants.	Section Methods/Paragraph 2	
Report on age and sex for all study participants.		N/A It is not relevant to the study

Design

Study protocol	Yes (indicate where provided:	n/a
For clinical trials, provide the trial registration number **OR** cite DOI in manuscript.		N/A No clinical trials

Laboratory protocol	Yes (indicate where provided:	n/a
Provide DOI or other citation details if detailed step-by-step protocols are available.	Section Methods /Paragraph 10	

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.		N/A
Sample size determination	Section Methods / Paragraph 2	
Randomisation		N/A Not mentioned
Blinding		N/A Not mentioned
Inclusion/exclusion criteria	Section Methods /Paragraph 2	

Sample definition and in-laboratory replication	Yes (indicate where provided:	n/a
State number of times the experiment was replicated in laboratory	Section Methods/Paragraph 6，7	
Define whether data describe technical or biological replicates	Section Methods/Paragraph 6，7	

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.	Section Methods / Paragraph 2	
Studies involving experimental animals: State details of authority granting ethics approval (IRB or equivalent committee(s), provide reference number for approval.		N/A Not mentioned
Studies involving specimen and field samples: State if relevant permits obtained, provide details of authority approving study; if none were required, explain why.	Section Methods / Paragraph 2	

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		N/A Not mentioned

Analysis

Attrition	Yes (indicate where provided:	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.	Section Methods / Paragraph 2	

Statistics	Yes (indicate where provided:	n/a
Describe statistical tests used and justify choice of tests.	Section Methods/Paragraph 10	

Data Availability	Yes (indicate where provided:	n/a
State whether newly created datasets are available, including protocols for access or restriction on access.		N/A Data is not publicly available
If data are publicly available, provide accession number in repository or DOI or URL.		N/A Data is not publicly available
If publicly available data are reused, provide accession number in repository or DOI or URL, where possible.		N/A Data is not publicly available

Code Availability	Yes (indicate where provided:	n/a
For all newly generated code and software essential for replicating the main findings of the study:		N/A
State whether the code or software is available.	Section Methods/Paragraph 5,6,10/Line 135-139,146-	
If code is publicly available, provide accession number in repository, or DOI or URL.		N/A No Code

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.		
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.	

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