



The ARRIVE guidelines 2.0: author checklist

The ARRIVE Essential 10

These items are the basic minimum to include in a manuscript. Without this information, readers and reviewers cannot assess the reliability of the findings.

Item	Recommendation	Section/line number, or reason for not reporting
Study design	1 For each experiment, provide brief details of study design including: <ol style="list-style-type: none"> The groups being compared, including control groups. If no control group has been used, the rationale should be stated. The experimental unit (e.g. a single animal, litter, or cage of animals). 	MATERIALS AND METHODS section "Experimental animals" and "Cell culture" line 111 to line 135 MATERIALS AND METHODS section "Experimental animals" and "Cell culture" line 111 to line 135
Sample size	2 <ol style="list-style-type: none"> Specify the exact number of experimental units allocated to each group, and the total number in each experiment. Also indicate the total number of animals used. Explain how the sample size was decided. Provide details of any <i>a priori</i> sample size calculation, if done. 	Section "Experimental animals" line 117-118 Three in control and six in treatment group, which meets the minimum statistically significant sample size
Inclusion and exclusion criteria	3 <ol style="list-style-type: none"> Describe any criteria used for including and excluding animals (or experimental units) during the experiment, and data points during the analysis. Specify if these criteria were established <i>a priori</i>. If no criteria were set, state this explicitly. For each experimental group, report any animals, experimental units or data points not included in the analysis and explain why. If there were no exclusions, state so. For each analysis, report the exact value of <i>n</i> in each experimental group. 	No criteria were set, unless the injected animal dies. No criteria were set, unless the injected animal dies. Section "Experimental animals" line 117-118
Randomisation	4 <ol style="list-style-type: none"> State whether randomisation was used to allocate experimental units to control and treatment groups. If done, provide the method used to generate the randomisation sequence. Describe the strategy used to minimise potential confounders such as the order of treatments and measurements, or animal/cage location. If confounders were not controlled, state this explicitly. 	Nonrandom allocation All the rats were in the same living environment, the injection order and measurements of rats were in no fixed order.
Blinding	5 Describe who was aware of the group allocation at the different stages of the experiment (during the allocation, the conduct of the experiment, the outcome assessment, and the data analysis).	Yanping Huang was in charge of the whole process of animal experiments, including the allocation, the conduct of the experiment, the outcome assessment, and the data analysis.
Outcome measures	6 <ol style="list-style-type: none"> Clearly define all outcome measures assessed (e.g. cell death, molecular markers, or behavioural changes). For hypothesis-testing studies, specify the primary outcome measure, i.e. the outcome measure that was used to determine the sample size. 	Section "Results", line 187 to line 289 Section "Introduction", line 99 to line 105
Statistical methods	7 <ol style="list-style-type: none"> Provide details of the statistical methods used for each analysis, including software used. Describe any methods used to assess whether the data met the assumptions of the statistical approach, and what was done if the assumptions were not met. 	Section "Statistical Analysis", line 181 to line 185. Section "Statistical Analysis", line 181 to line 185.
Experimental animals	8 <ol style="list-style-type: none"> Provide species-appropriate details of the animals used, including species, strain and substrain, sex, age or developmental stage, and, if relevant, weight. Provide further relevant information on the provenance of animals, health/immune status, genetic modification status, genotype, and any previous procedures. 	Section "Methods-Experimental animals" line 117-118 Section "Methods-Experimental animals" line 117-118
Experimental procedures	9 For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including: <ol style="list-style-type: none"> What was done, how it was done and what was used. When and how often. Where (including detail of any acclimatisation periods). Why (provide rationale for procedures). 	Section "Methods-Experimental animals" and "Cell culture" line 111 to line 135 Section "Methods-Experimental animals" and "Cell culture" line 111 to line 135 Section "Methods-Experimental animals" and "Cell culture" line 111 to line 135 Section "Methods-Experimental animals" and "Cell culture" line 111 to line 135
Results	10 For each experiment conducted, including independent replications, report: <ol style="list-style-type: none"> Summary/descriptive statistics for each experimental group, with a measure of variability where applicable (e.g. mean and SD, or median and range). If applicable, the effect size with a confidence interval. 	Section "Results", line 187 to line 289 Section "Results", line 187 to line 289

The Recommended Set

These items complement the Essential 10 and add important context to the study. Reporting the items in both sets represents best practice.

Item	Recommendation	Section/line number, or reason for not reporting
Abstract	11 Provide an accurate summary of the research objectives, animal species, strain and sex, key methods, principal findings, and study conclusions.	Section "Abstract", line 23 to line 45
Background	12 a. Include sufficient scientific background to understand the rationale and context for the study, and explain the experimental approach. b. Explain how the animal species and model used address the scientific objectives and, where appropriate, the relevance to human biology.	Section "Introduction", line 68 to line 105 Section "Introduction", line 68 to line 105
Objectives	13 Clearly describe the research question, research objectives and, where appropriate, specific hypotheses being tested.	Section "Introduction", line 106 to line 109
Ethical statement	14 Provide the name of the ethical review committee or equivalent that has approved the use of animals in this study, and any relevant licence or protocol numbers (if applicable). If ethical approval was not sought or granted, provide a justification.	Section "Ethical statement" line 296 to line 302
Housing and husbandry	15 Provide details of housing and husbandry conditions, including any environmental enrichment.	Section "Methods" line 112 to line 122
Animal care and monitoring	16 a. Describe any interventions or steps taken in the experimental protocols to reduce pain, suffering and distress. b. Report any expected or unexpected adverse events. c. Describe the humane endpoints established for the study, the signs that were monitored and the frequency of monitoring. If the study did not have humane endpoints, state this.	Section "Methods" line 112 to line 122 Section "Methods" line 112 to line 122 Section "Methods" line 112 to line 122
Interpretation/ scientific implications	17 a. Interpret the results, taking into account the study objectives and hypotheses, current theory and other relevant studies in the literature. b. Comment on the study limitations including potential sources of bias, limitations of the animal model, and imprecision associated with the results.	Section "Introduction" line 46 to line 57 Due to the length of the article, we did not mention these limitations
Generalisability/ translation	18 Comment on whether, and how, the findings of this study are likely to generalise to other species or experimental conditions, including any relevance to human biology (where appropriate).	Section "Discussion" line 228-229, line 234-236, line 258-262, line 265-267
Protocol registration	19 Provide a statement indicating whether a protocol (including the research question, key design features, and analysis plan) was prepared before the study, and if and where this protocol was registered.	We had made a protocol, and the protocol was registered in National Natural Science Foundation of China (No. 81401196)
Data access	20 Provide a statement describing if and where study data are available.	Section "Data sharing statement" line 292 to line
Declaration of interests	21 a. Declare any potential conflicts of interest, including financial and non-financial. If none exist, this should be stated. b. List all funding sources (including grant identifier) and the role of the funder(s) in the design, analysis and reporting of the study.	Section "Conflicting interests" line 281 to line 283 Section "Conflicting interests" line 285 to line 287

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