# The ARRIVE Guidelines Checklist

| Item | Item No | RECOMMENDATION | Reported on Page Number/Line Number | Reported on Section/Paragraph |
|------|---------|----------------|-------------------------------------|-----------------------------|
| Title | 1       | Provide as accurate and concise a description of the content of the article as possible. | Page 1/Line 2 | Title page |
| Abstract | 2 | Provide an accurate summary of the background, research objectives, including details of the species or strain of animal used, key methods, principal findings and conclusions of the study. | Page 2/Line 34-61 | Abstract |
| **INTRODUCTION** | | | | |
| Background | 3 | a. Include sufficient scientific background (including relevant references to previous work) to understand the motivation and context for the study, and explain the experimental approach and rationale. <br>b. Explain how and why the animal species and model being used can address the scientific objectives and, where appropriate, the study’s relevance to human biology. | Page 3/Line 67-78 | Introduction/Paragraphs 1 and 2 <br>Pages 3-4/Line 88-92 | Introduction/Paragraph 3 |
| Objectives | 4 | Clearly describe the primary and any secondary objectives of the study, or specific hypotheses being tested. | Page 4/Line 98-101 | Introduction/Paragraph 3 |
| **METHODS** | | | | |
| Ethical statement | 5 | Indicate the nature of the ethical review permissions, relevant licences (e.g. Animal [Scientific Procedures] Act 1986), and national or institutional guidelines for the care and use of animals, that cover the research. | Page 4/Line 112-115 | Methods/Paragraphs 1 |
| Study design | 6 | For each experiment, give brief details of the study design including: <br>a. The number of experimental and control groups. <br>b. Any steps taken to minimise the effects of subjective bias when allocating animals to treatment (e.g. randomisation procedure) and when assessing results (e.g. if done, describe who was blinded and when). <br>c. The experimental unit (e.g. a single animal, group or cage of animals). A time-line diagram or flow chart can be useful to illustrate how complex study designs were carried out. | Page 4/Line 109-112 | Methods/Paragraphs 1 <br>Page 4/Line 105-115 | Methods/Paragraphs 1 <br>Page 4/Line 109-112 | Methods/Paragraphs 1 |
| Experimental procedures | 7 | For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example: <br>a. How (e.g. drug formulation and dose, site and route of administration, anaesthesia and analgesia used [including monitoring], surgical procedure, method of euthanasia). Provide details of any specialist equipment used, including supplier(s). <br>b. When (e.g. time of day). <br>c. Where (e.g. home cage, laboratory, water maze). <br>d. Why (e.g. rationale for choice of specific anaesthetic, route of administration, drug dose used). | Page 5.6/Line 118-137,146-152 | Methods/Paragraphs 2-3, Paragraphs 1 <br>Page 5/Line 118-119 | Methods/Paragraphs 2 <br>Page 4/Line 106-107 | Methods/Paragraphs 1 <br>Page 5/Line 118-137 | Methods/Paragraphs 2-3 |
| Section                                      | Paragraphs | Lines          | Notes       |
|----------------------------------------------|------------|----------------|-------------|
| Experimental animals                        |            |                | PAGE 4/LINE 105-106 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 4-5/LINE 116-117 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 4/LINE 106-109 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 4/LINE 106-109 | N/A |
|                                              |            |                | PAGE 4/LINE 109-112 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 4/LINE 109-111 | METHODS/PARAGRAPHS 1 |
| Housing and husbandry                       |            |                | PAGE 4/LINE 105-115 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 4/LINE 111-113 | METHODS/PARAGRAPHS 1 |
| Sample size                                 |            |                | PAGE 5/LINE 138-142 | METHODS/PARAGRAPHS 2 |
|                                              |            |                | PAGE 8/LINE 213-214 | RESULTS/PARAGRAPHS 2 |
| Allocating animals to experimental groups   |            |                | PAGE 8/LINE 202-210 | METHODS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 8/LINE 202-210 | N/A |
| Statistical methods                         |            |                | PAGE 8/LINE 213-216 | RESULTS/PARAGRAPHS 2 |
|                                              |            |                | PAGE 8-9/LINE 213-218 | RESULTS/PARAGRAPHS 2 |
|                                              |            |                | N/A | N/A |
| RESULTS                                     |            |                | PAGE 9/LINE 224-229 | RESULTS/PARAGRAPHS 1 |
|                                              |            |                | PAGE 10/LINE 251-257 | RESULTS/PARAGRAPHS 1 |
| Baseline data                               |            |                | PAGE8/LINE 213-214 | RESULTS/PARAGRAPHS 2 |
| Numbers analysed                            |            |                | N/A | N/A |
|                                              |            |                | PAGE 11/LINE 237-238 | RESULTS/PARAGRAPHS 2 |
| Outcomes and estimation                     |            |                | N/A | N/A |
| Adverse events                              |            |                | PAGE8/LINE 213-214 | RESULTS/PARAGRAPHS 2 |
|                                              |            |                | PAGE 12/LINE 245-246 | RESULTS/PARAGRAPHS 2 |
### DISCUSSION

| Interpretation/ scientific implications | 18 | 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 any potential sources of bias, any limitations of the animal model, and the imprecision associated with the results.  
| c. Describe any implications of your experimental methods or findings for the replacement, refinement or reduction (the 3Rs) of the use of animals in research. | Page 11/Line 274-288 | Discussion/ Paragraph 1  
| Generalisability/ translation | 19 | Comment on whether, and how, the findings of this study are likely to translate to other species or systems, including any relevance to human biology. | Page 13/Line 322-333 | Discussion/ Paragraph 1  
| Funding | 20 | List all funding sources (including grant number) and the role of the funder(s) in the study. | Page 13/Line 341-342 | Acknowledgments  

**References:**

1. Kilkenny C, Browne WJ, Cuthill IC, Emerson M, Altman DG (2010) Improving Bioscience Research Reporting: The ARRIVE Guidelines for Reporting Animal Research. PLoS Biol 8(6): e1000412. doi:10.1371/journal.pbio.1000412  
2. Schulz KF, Altman DG, Moher D, the CONSORT Group (2010) CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. BMJ 340:c332.

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**From:**
Animal Research: Reporting In Vivo Experiments  
Carol Kilkenny¹, William J Browne², Innes C Cuthill³, Michael Emerson⁴ and Douglas G Altman⁵  
¹The National Centre for the Replacement, Refinement and Reduction of Animals in Research, London, UK, ²School of Veterinary Science, University of Bristol, Bristol, UK, ³School of Biological Sciences, University of Bristol, Bristol, UK, ⁴National Heart and Lung Institute, Imperial College London, UK, ⁵Centre for Statistics in Medicine, University of Oxford, Oxford, UK.

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**References:**

1. Kilkenny C, Browne WJ, Cuthill IC, Emerson M, Altman DG (2010) Improving Bioscience Research Reporting: The ARRIVE Guidelines for Reporting Animal Research. PLoS Biol 8(6): e1000412. doi:10.1371/journal.pbio.1000412  
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Article information: http://dx.doi.org/10.21037/tau-20-1128  
*As the checklist was provided upon initial submission, the page number/line number reported may be changed due to copyediting and may not be referable in the published version. In this case, the section/paragraph may be used as an alternative reference.*