Supplementary

Table S1 Search strategy (PubMed) of interventional animal experiments

Aim	Step	Search strategy
Interventional animal experiments	#1	(animals, laboratory [MeSH Terms]) OR (animals, genetically modified [MeSH Terms]) OR (animals, newborn [MeSH Terms]) OR (animals, outbred strains [MeSH Terms]) OR (animal experiment*[All Fields]) OR (animal*[All Fields]) OR (animal stud*[All Fields]) OR (animal model*[All Fields]) OR (mouse[Title/Abstract]) OR (mice[Title/Abstract]) OR (rat*[Title/Abstract]) OR (rabbit*[Title/Abstract]) OR (dog*[Title/Abstract]) OR (guinea pig*[Title/Abstract]) OR (pig*[Title/Abstract]) OR (hamster*[Title/Abstract]) OR (cat*[Title/Abstract]) OR (monkey*[Title/Abstract]) OR (orangutan*[Title/Abstract]) OR (gorilla*[Title/Abstract]) OR (ape*[Title/Abstract]) OR (chicken[Title/Abstract]) OR (chicks[Title/Abstract]) OR (hen[Title/Abstract]) OR (rooster*[Title/Abstract]) OR (cattle[Title/Abstract]) OR (cow*[Title/Abstract]) OR (bull*[Title/Abstract]) OR (sheep[Title/Abstract]) OR (goat*[Title/Abstract]) OR (goose*[Title/Abstract]) OR (duck*[Title/Abstract]) OR (fish*[Title/Abstract]) OR (bird*[Title/Abstract]) OR (bear*[Title/Abstract]) OR (snake*[Title/Abstract]) OR (frog*[Title/Abstract]) OR (toad*[Title/Abstract]) OR (transgene*[Title/Abstract]) OR (in vivo[All Fields]) OR (Preclinical[All Fields]) OR (ARRIVE guideline[All Fields]) OR (ARRIVE checklist[All Fields]) OR (ARRIVE report*[All Fields])
Interventional animal experiments from four journals^ publishing ARRIVE 1.0 guidelines between May 30, 2005-May 30, 2010	#2	("PLoS Biol"[Journal]) OR ("Osteoarthritis and Cartilage"[Journal]) OR ("Veterinary Clinical Pathology"[Journal]) OR ("J Pharmacol Pharmacother"[Journal])
	#3	"2005/5/30"[Date - Publication]: "2010/5/30"[Date - Publication]
	#4	#1 AND #2 AND #3
Interventional animal experiments from four journals^ publishing ARRIVE 1.0 guidelines between May 30, 2014 to May 30, 2019	#5	"2014/5/30"[Date - Publication]: "2019/5/30"[Date - Publication]
	#6	#1 AND #2 AND #5
Interventional animal experiments from seven journals# publishing ARRIVE 2.0 guidelines between January 1, 2021 to December 31, 2021	#7	("British Journal of Pharmacology"[Journal]) OR ("PLoS Biol"[Journal]) OR ("J Cereb Blood Flow Metab"[Journal]) OR ("The Journal of Physiology"[Journal]) OR ("BMC Veterinary Research"[Journal]) OR ("Experimental Physiology"[Journal]) OR ("BMJ Open Sci"[Journal])
	#8	"2021/1/1"[Date - Publication]: "2021/12/31"[Date - Publication]
	#9	#1 AND #7 AND #8

^, four journals: *PLOS Biology, Osteoarthritis and Cartilage*, *Veterinary Clinical Pathology*, and *Journal of Pharmacology & Pharmacotherapeutics*. #, seven journals: *PLOS Biology, British Journal of Pharmacology*, *Journal of Cerebral Blood Flow & Metabolism*, *The Journal of Physiology*, *BMC Veterinary Research, Experimental Physiology,* and *BMJ Open Science.*

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Table S2 The similar subitems in Post-ARRIVE 1.0 and 2.0

Description	Post-ARRIVE 1.0 (N=330)		Post-ARRIVE 2.0 (N=398)	
	Subitems	Recommendation	Subitems	Recommendation
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."	11	"Provide an accurate summary of the research objectives, animal species, strain and sex, key methods, principal findings, and study conclusions."
Sufficient scientific background	3a	"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."	12a	"Include sufficient scientific background to understand the rationale and context for the study, and explain the experimental approach."
Animal species and models justified	3b	"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."	12b	"Explain how the animal species and model used address the scientific objectives and, where appropriate, the relevance to human biology."
Objectives	4	"Clearly describe the primary and any secondary objectives of the study, or specific hypotheses being tested."	13	"Clearly describe the research question, research objectives and, where appropriate, specific hypotheses being tested."
Ethical statement	5	"Indicate the nature of the ethical review permissions, relevant licenses (e.g. Animal [Scientific Procedures] Act 1986), and national or institutional guidelines for the care and use of animals, that cover the research."	14	"Provide the name of the ethical review committee or equivalent that has approved the use of animals in this study, and any relevant license or protocol numbers (if applicable). If ethical approval was not sought or granted, provide a justification."
Number of groups	6a	"For each experiment, give" … "The number of experimental and control groups."	1a	"For each experiment, provide" ... "The groups being compared, including control groups. If no control group has been used, the rationale should be stated. "
Randomization	6b	"For each experiment, give" … "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)."	4a&5	"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 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)."
Experimental unit	6c	"For each experiment, give" … "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."	1b	"For each experiment, provide" … "The experimental unit (e.g., a single animal, litter, or cage of animals)."
How (experimental procedures)	7a	"For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example:" ..."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)."	9a	"For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including:" ... "What was done, how it was done, and what was used."
When (time, frequency)	7b	"For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example:" ..."When (e.g., time of day)."	9b	"For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including:" ... "When and how often."
Where (the site for the experimental procedures)	7c	"For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example:" ..."Where (e.g., home cage, laboratory, water maze)."	9c	"For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including:" ... "Where (including detail of any acclimatisation periods)."
Why (procedures rationale)	7d	"For each experiment and each experimental group, including controls, provide precise details of all procedures carried out. For example:" ..."Why (e.g., rationale for choice of specific anaesthetic, route of administration, drug dose used)."	9d	"For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including:" ... "Why (provide rationale for procedures)."
Animals details	8a	"Provide details of the animals used, including species, strain, sex, developmental stage (e.g., mean or median age plus age range), and weight (e.g., mean or median weight plus weight range)."	8a	"Provide species-appropriate details of the animals used, including species, strain and substrain, sex, age or developmental stage, and, if relevant, weight."
Other animals information	8b	"Provide further relevant information such as the source of animals, international strain nomenclature, genetic modification status (e.g. knock-out or transgenic), genotype, health/immune status, drug- or test-naïve, previous procedures, etc."	8b	"Provide further relevant information on the provenance of animals, health/immune status, genetic modification status, genotype, and any previous procedures."
Housing and husbandry	9a&9b	"Provide details of:" ... "Housing (e.g., type of facility, e.g., specific pathogen free (SPF); type of cage or housing; bedding material; number of cage companions; tank shape and material etc. for fish)." & "Husbandry conditions (e.g., breeding programme, light/dark cycle, temperature, quality of water etc. for fish, type of food, access to food and water, environmental enrichment)."	15	"Provide details of housing and husbandry conditions, including any environmental enrichment."
Animal number	10a	"Specify the total number of animals used in each experiment and the number of animals in each experimental group."	2a	"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."
Sample size calculation	10b	"Explain how the number of animals was decided. Provide details of any sample size calculation used."	2b	"Explain how the sample size was decided. Provide details of any a priori sample size calculation, if done."
Animals allocation	11a&11b	"Give full details of how animals were allocated to experimental groups, including randomisation or matching if done." & "Describe the order in which the animals in the different experimental groups were treated and assessed."	4b	"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."
Outcomes definitions	12	"Clearly define the primary and secondary experimental outcomes assessed (e.g., cell death, molecular markers, behavioural changes)."	6a	"Clearly define all outcome measures assessed (e.g., cell death, molecular markers, or behavioural changes)."
Statistical methods	13a	"Provide details of the statistical methods used for each analysis."	7a	"Provide details of the statistical methods used for each analysis, including software used."
Assumptions of statistical methods	13c	"Describe any methods used to assess whether the data met the assumptions of the statistical approach."	7b	"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."
The number of animals for analysis	15a	"Report the number of animals in each group included in each analysis. Report absolute numbers (e.g. 10/20, not 50%)."	3c	"For each analysis, report the exact value of n in each experimental group."
Exclusion reasons	15b	"If any animals or data were not included in the analysis, explain why."	3b	"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."
Outcomes and estimation	16	"Report the results for each analysis carried out, with a measure of precision (e.g., standard error or confidence interval)."	10b	"If applicable, the effect size with a confidence interval."
Details of all important adverse events	17a	"Give details of all important adverse events in each experimental group."	16b	"Report any expected or unexpected adverse events."
Reduced adverse events	17b	"Describe any modifications to the experimental protocols made to reduce adverse events."	16a	"Describe any interventions or steps taken in the experimental protocols to reduce pain, suffering, and distress."
Results interpretation	18a	"Interpret the results, taking into account the study objectives and hypotheses, current theory, and other relevant studies in the literature."	17a	"Interpret the results, taking into account the study objectives and hypotheses, current theory, and other relevant studies in the literature."
Study limitations	18b	"Comment on the study limitations including any potential sources of bias, any limitations of the animal model, and the imprecision associated with the results."	17b	"Comment on the study limitations, including potential sources of bias, limitations of the animal model, and imprecision associated with the results."
Generalisability	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."	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)."
Funding	20	"List all funding sources (including grant number) and the role of the funder(s) in the study."	21b	"List all funding sources (including grant identifier) and the role of the funder(s) in the design, analysis, and reporting of the study."

The improved 14 similar subitems are indicated in bold (the specific data could be found in *Figure 2C*).

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Table S3 The detailed statements about ARRIVE guidelines in the author's instructions of the included 9 journals (updated on February 19, 2024)

Journal	ARRIVE statement in the author's instructions
PB	"We encourage authors using vertebrates or cephalopods in their research to comply with the ARRIVE guidelines (see also the publications on the guidelines and elaboration document)."
OC	"*Osteoarthritis and Cartilage* supports the ARRIVE (Animal Research: Reporting In Vivo Experiments) guidelines to improve standards of reporting of animal experiments and ensure that the data can be fully evaluated and utilized."
VCP	"*VCP* endorses b. The ARRIVE guidelines 2.0: Updated guidelines for reporting animal research. PLoS Biol 18(7): e3000410 at https://doi.org/10.1371/journal.pbio.3000410"
JPP	"The Journal has adopted the ARRIVE guidelines."
BJP	"Where animals have been used as a test system, please adhere to the *BJP*'s requirements for the reporting of experiments involving animals or animal tissue (adherence to ARRIVE 2.0 and BJP guidelines should be stated in this section; see details below)."
JCBFM	"For experiments involving animals (or material from animals, such as cell cultures, brain slices) submitted for publication, the following must be stated explicitly in the Material and Methods section: a statement confirming that the experiments have been REPORTED following/in compliance with the ARRIVE guidelines (Animal Research: Reporting in Vivo Experiments) for how to REPORT animal experiments https://www.nc3rs.org.uk/arrive-guidelines. This means that you will be required to confirm compliance with the ARRIVE guidelines both in the submission site, where you will be asked to fill out a detailed check sheet, and in the Materials and Methods section of your manuscript."
JP	"The ARRIVE guidelines 2.0 were republished in both journals in 2020, and include 'essential' and 'recommended' standards". "Please note that our policy mandates, rather than recommends, some of the elements listed in the 'recommended set' and authors will be required to adhere to journal policy where these go beyond the recommendations in the ARRIVE guidelines. Authors should consult the Information for Authors for The Journal of Physiology or Experimental Physiology and the Editorial 'Principles and standards for reporting animal experiments in The Journal of Physiology and Experimental Physiology' to ensure they meet the journal-specific requirements."
BMC-VR	"Manuscripts reporting results of an animal clinical trial must conform to ARRIVE 2.0 standards, and authors should submit a completed ARRIVE checklist alongside their manuscript."
EP	"The Editorial Boards of *The Journal of Physiology and Experimental Physiology* endorse the ARRIVE Guidelines for reporting *in vivo* experiments. The ARRIVE guidelines 2.0 were republished in both journals in 2020, and include 'essential' and 'recommended' standards."

PB, PLOS Biology; OC, Osteoarthritis and Cartilage; VCP, Veterinary Clinical Pathology; JPP, Journal of Pharmacology & Pharmacotherapeutics; BJP, British Journal of Pharmacology; JCBFM, Journal of Cerebral Blood Flow & Metabolism; JP, The Journal of Physiology; BMC-VR, BMC Veterinary Research; EP, Experimental Physiology.

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