

Ethical considerations in the use of experimental animals

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According to various international guidelines, the use of animals in scientific research is considered ethically acceptable if the benefit derived from the knowledge that could be obtained outweighs the suffering that would be caused to them;¹ however, there is no consensus as to what this statement implies.¹

Ethical deliberation about preclinical studies is a great challenge for ethics committees, that frequently limit themselves to the technical evaluation of procedures, in which it is easier to reach consensus. Thus, they avoid fully assessing whether the expected benefits are greater than the suffering of the animals involved.¹

There are different perspectives regarding this discussion. Some authors have debated the moral quality attributable to research animals in order to justify an ethical debate on their use in experimental studies.¹ According to this rationale, a benefit should be obtained for the animals and not exclusively for third parties.¹ However, it can be argued that Veterinary Medicine can also benefit from the use of experimental animals,¹ for which reason research subjects themselves could benefit in some cases.

On the other hand, it should be considered that when animals are used in a scientific study it is not possible to know with certainty the benefit that could be obtained with its results; studies may not achieve the expected result.

This discussion becomes further complicated if one considers the deficiencies that are observed in conducting and reporting results in preclinical studies.¹ Thus, the ethical implications of the use of experimental animals include not only their handling, but also the design, management and reporting of results.

In general terms, the use of experimental animals can be considered ethically appropriate if it meets the following criteria:¹

1. Experiments are carried out with appropriate methodology.
2. The chosen methodology can correctly answer the research question posed.
3. It is not possible to answer the research question without resorting to experimental animals.
4. The number of animals used is reduced to a minimum.
5. Any unnecessary suffering for the animals is avoided.



Additionally, initiatives such as the 3Rs — reduction, replacement and refinement in the use of experimental animals (<https://nc3rs.org.uk/the-3rs>) — have emerged, whose purpose is “make animal research more humane.”

However, some researchers point out that the ethical deliberation of preclinical studies should not be limited to the application of the 3Rs, but should also involve their external validity, replicability, and the transparency of their methodologies.¹

Some authors consider that most of the results obtained in scientific studies (both preclinical and otherwise) could be false² or, at least, not replicable. This is related to the fact that as the number of studies addressing the same research question increases, the probability of finding a statistically significant result increases by chance.² Moreover, the use of small sample sizes, as recommended by the 3Rs, favors obtaining false positives.²

In this context, the conduction of systematic reviews and other types of evidence synthesis becomes highly relevant to assess its real contribution.¹

Following this rationale, it is crucial to improve the quality of reporting in preclinical studies, which is why guidelines such as “Animal Research: Reporting In Vivo Experiments” (ARRIVE)³ have appeared, whose application may result in a replicability increase in individual studies, and greater reliability in the synthesis of such evidence. The quality of research reporting can be assessed with tools such as SciScore.⁴

Finally, methodology transparency is improved with the public registry of protocols, similar to what initiatives such as <https://clinicaltrials.gov/> propose regarding clinical studies. Preclinical study protocols can be made public on platforms such as Octopus (<https://science-octopus.org/>), Open Science Framework (<https://osf.io/>), or even PROSPERO (<https://www.crd.york.ac.uk/prospero/>), when they are related to systematic reviews of preclinical studies.

In summary, the ethical deliberation on scientific studies that use experimental animals is extremely complex, especially considering the discussion about the moral status of research subjects. It is considered that this debate should include the application of all necessary efforts to reduce animal suffering, but some authors point out that it should not be limited to this aspect; protocols transparency, experiment design, analysis and reporting of results should also be considered. The latter seeks to favor the replicability of the studies; without which the sacrifice of experimental animals is questionable.

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