



Synthesis of Evidence in Laboratory Animal Research

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Over the last few years, much of the attention in the societal debate on scientific research with laboratory animals has focused on the question whether laboratory animal research is always necessary and correctly designed. NCad wishes to provide clarity on the use of Synthesis of Evidence methods in planning and conducting laboratory animal research and show how these methods contribute towards the 3R policy.

What is Synthesis of Evidence?

Synthesis of Evidence implies the gathering of relevant literature and expertise in order to verify the choice of the most relevant animal model or experimental design, before animal research is initiated. Synthesis of Evidence can be considered an umbrella term. There are different ways to classify the available scientific knowledge:

NARRATIVE REVIEW (Descriptive Literature Research)
Most flexible form of review and used in all fields of study, disadvantage is that review can be limited

SYSTEMATIC REVIEW (SR)
Extension of a narrative review, involves a complete structured literature search, disadvantage is that many papers do not provide all information

DATABASES
Contain information on animal models and other information relevant to research, can be consulted during preparation of research

EXPERT PANELS
Groups of experts that will discuss a specific scientific question on possibilities and limitations of the 3Rs, and issue a report (i.g. WHO/IARC, FAO, EFSA, OECD, ECVAM, and SCHER)



Conclusions

Careful preparation of laboratory animal research is considered important to maintain quality and societal acceptance of performance of animal experiments. NCad believes that Synthesis of Evidence is essential to increase the quality of laboratory animal research, yet points out that Synthesis of Evidence can also lead to an increase in the required number of laboratory animals in an experiment if that improves the study design.

Recommendations

1. Encourage the application of a documented Synthesis of Evidence in the design of a research project which considers the use of laboratory animals but bear in mind that the scope and depth of the Synthesis of Evidence is dependent on the available knowledge regarding the research objective and the field
2. The providers of grants should promote the full spectrum of Synthesis of Evidence, in particular the creation and updating of relevant databases regarding the applicability of animal models
3. Assessors of applications for project licences for animal procedures, such as the Animal Ethics Committees, the Central Authority for Scientific Procedures on Animals, and Animal Welfare Bodies should critically assess the application of Synthesis of Evidence in the assessment of research projects
4. Encourage publishing negative results and replications of earlier studies by embedding this subject more firmly in training courses and in the criteria by which scientists are assessed

Dutch government contributions to Synthesis of Evidence and other organizations

1. Grants made available by Ministry of Agriculture
2. Round-table discussions with researchers and laboratory animal experts
3. Laboratory Animal Science Course with focus on Synthesis of Evidence
4. CAMARADES (Collaborative Approach to Meta-Analysis and Review of Animal Data from Experimental Studies)
5. SYRCL (Systematic Review Centre for Laboratory Animal Experimentation)

Critical Points

- Design of animal experiments and the quality of reports is often far from optimal
- Animal procedures often not blinded and randomized
- Sample sizes without proper statistical justification
- Negative results are often not published
- Not all conducted animal procedures are published because of confidentiality agreements

Applicability of different forms of Synthesis of Evidence

Research Area	Narrative reviews	SR	Database	Expert panels
Fundamental research	X		X	X
(Pre-) clinical/applied research	X	X		
Regulatory research	X	X		

Follow-up

The minister of Agriculture has embraced the opinion of the NCad.

The full report is available on the NCad website:

As a follow-up, the NCad has been commissioned to draft an extended paper on Synthesis of Evidence in cooperation with national and international partners. This paper will be submitted to a peer-reviewed international journal shortly.

<https://english.ncadierproevenbeleid.nl/advies/documents/publications/16/7/19/soe>



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About the NCad

In 2014, The Netherlands National Committee for the protection of animals used for scientific purposes (NCad) was appointed by the Minister of Agriculture for the protection of animals used for scientific and educational purposes. NCad aims to make a significant contribution to minimizing laboratory animal use, both at national and international level. This will involve giving (policy) advice, exchanging knowledge, and developing both national and international networks. The ethical review of animal procedures is of pivotal importance in this regard, as are the 3Rs (Replacement, Reduction and Refinement).