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Norecopa: Prepare for better science

By Adrian Smith^{1,2,3}

¹Norecopa, Norway | ²The Danish 3R Centre, Denmark | ³The Danish Committee for the protection of animals used for scientific purposes, Denmark

Norecopa is Norway's consensus platform for replacement, reduction and refinement of animal experiments, founded in 2007. The name comes from the fact that Norecopa is a member of ecopa, an umbrella organisation which supports national platforms that have representatives in their governing bodies from all the 4 stakeholder groups: Regulators, research, industry and animal welfare.

Who is Norecopa?

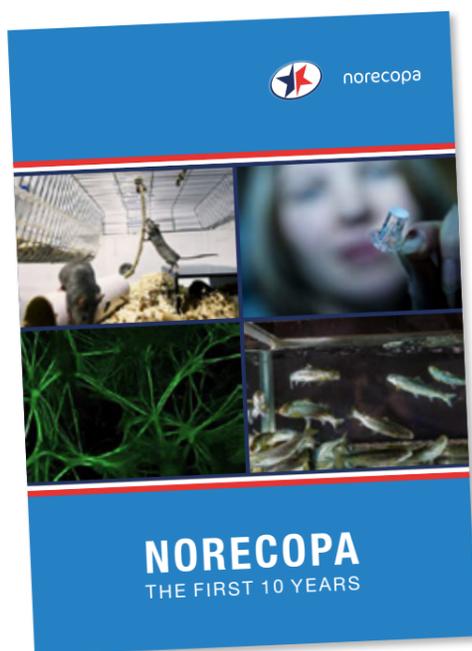
Norecopa is an independent member organisation representing four major stakeholders in animal research:

- Government and regulatory authorities
- Research and teaching
- Industry
- Animal protection and welfare

Norecopa functions as a centre of competence on questions concerning the 3Rs and attempts to achieve its goals through consensus between the stakeholders by functioning as a National Consensus Platform.

The primary aim of Norecopa is to promote the use of the 3R's, and hence contribute to increased knowledge of:

- *Replacement* of animal experiments by alternatives
- *Reduction* of the number of animals used in experiments
- *Refinement* of animal experiments to reduce suffering, increase animal welfare and increase the value of the experiments



Picture 1
Norecopa has accomplished a lot since the establishment in 2007. Download the publication from norecopa.no.

What Norecopa does

Norecopa aims to be a "one-stop-shop" for information about animal research and welfare. The Norecopa website consists of over 9,000 pages and currently gets over 300,000 hits each year - this figure has increased by 20-40% annually in recent years.

Databases

The website contains a number of databases for those planning animal research: these include one on guidelines for animal use, one on literature within lab animal science, and one with an overview of alternatives and supplements to the use of animals in teaching and training. All these databases have been seamlessly embedded in the website, together with an intelligent search engine, so only one search is necessary. Recently, a Refinement Wiki was added to the website. This is for the dissemination of advice and knowledge which often circulates on discussion forums but which does not get published in scientific papers. The wiki aims to fill this gap.

Species specific information

The website contains sections on specific groups of animal species, so that those who, for example, are mostly interested in farm animals can go directly to that section. All the relevant educational resources produced by Ellegaard Göttingen Minipigs of which Norecopa is aware, have been cited on the website.

International meetings

Norecopa arranges international consensus meetings about the care and use of animals in research, and has produced its own guidelines and positions statements on specific areas.

Webinars and online meetings

One of the positive side-effects of the covid-19 pandemic has been an upsurge in the number of webinars and virtual meetings about animal research and testing. Norecopa has for many years maintained a comprehensive Webinars & Meetings Calendar, updated several times a week. This calendar is now larger than ever before and also contains a page with links to recordings of presentations.

Newsletter

Norecopa issues an English-language newsletter 7-8 times a year, with information about the latest developments worldwide within research animal science and welfare. The newsletters are archived so that they are searchable by Norecopa's search engine. This section of the website also includes a newsfeed from European media about animal research and testing.

PREPARE for better science

Norecopa's motto is "PREPARE for better Science", whether that be with or without the use of animals. The word PREPARE refers to the PREPARE guidelines published by Norecopa in 2018. These guidelines provide a checklist for scientists planning experiments which may involve animal use, supported by comprehensive webpages with more information and references for each of the 15 main topics on the checklist.

PREPARE covers all stages from literature searches to collaboration with the animal facility and detailed advice on all stages of a project, including experimental design. The PREPARE paper was published under Open Access for free downloading, and has already been viewed or downloaded over 16,000 times. The PREPARE checklist has been translated into 22 languages so far and can be downloaded free of charge.

Norecopa has produced a 3-minute cartoon film to illustrate the importance of early planning and collaboration, using the aviation industry as an example. The film has optional subtitles in several languages:



Picture 2
Cartoon film by Norecopa illustrating the importance of planning and cooperation when doing research involving research animals. Links to the film are available from norecopa.no/PREPARE/film

USEFUL LINKS TO NORECOPA'S WEBSITE

The Norecopa website:

norecopa.no

Norecopa - The first 10 years:

norecopa.no/media/8091/the-first-10-years.pdf

The PREPARE guidelines:

norecopa.no/PREPARE

All translated versions of the PREPARE checklist:

norecopa.no/PREPARE/prepare-checklist

If the PREPARE checklist is not available in your language, contact adrian.smith@norecopa.no

Refinement Wiki:

wiki.norecopa.no

International consensus meetings:

norecopa.no/meetings

The 3R principles explained

Replacement alternatives

Methods which permit a given purpose to be achieved without conducting procedures on animals.

Reduction alternatives

Methods for obtaining comparable levels of information from the use of fewer animals in scientific procedures, or for obtaining more information from the same number of animals

Refinement alternatives

Methods which alleviate or minimise potential pain, suffering or distress, and which enhance animal well-being.

Table 1
Find more information on norecopa.no/alternatives/the-three-rs.

Webinars & Meetings Calendar:

norecopa.no/meetings/webinars-and-meetings-calendar

Species selection, farm animals:

norecopa.no/species/farm-animals

Information about minipigs:

norecopa.no/species/farm-animals/minipigs

Newsletter:

norecopa.no/news/newsletters

Research and testing in European media:

norecopa.no/news/newsfeed

Do you know of resources which should be mentioned on Norecopa's website? Contact adrian.smith@norecopa.no

PREPARE



The PREPARE Guidelines Checklist

Planning Research and Experimental Procedures on Animals: Recommendations for Excellence

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PREPARE¹ consists of planning guidelines which are complementary to reporting guidelines such as ARRIVE².

PREPARE covers the three broad areas which determine the quality of the preparation for animal studies:

1. Formulation of the study
2. Dialogue between scientists and the animal facility
3. Quality control of the components in the study

The topics will not always be addressed in the order in which they are presented here, and some topics overlap. The PREPARE checklist can be adapted to meet special needs, such as field studies. PREPARE includes guidance on the management of animal facilities, since in-house experiments are dependent upon their quality. The full version of the guidelines is available on the Norecopa website, with links to global resources, at <https://norecopa.no/PREPARE>.

The PREPARE guidelines are a dynamic set which will evolve as more species- and situation-specific guidelines are produced, and as best practice within Laboratory Animal Science progresses.

Topic	Recommendation
(A) Formulation of the study	
1. Literature searches	<input type="checkbox"/> Form a clear hypothesis, with primary and secondary outcomes. <input type="checkbox"/> Consider the use of systematic reviews. <input type="checkbox"/> Decide upon databases and information specialists to be consulted, and construct search terms. <input type="checkbox"/> Assess the relevance of the species to be used, its biology and suitability to answer the experimental questions with the least suffering, and its welfare needs. <input type="checkbox"/> Assess the reproducibility and translatability of the project.
2. Legal issues	<input type="checkbox"/> Consider how the research is affected by relevant legislation for animal research and other areas, e.g. animal transport, occupational health and safety. <input type="checkbox"/> Locate relevant guidance documents (e.g. EU guidance on project evaluation).
3. Ethical issues, harm-benefit assessment and humane endpoints	<input type="checkbox"/> Construct a lay summary. <input type="checkbox"/> In dialogue with ethics committees, consider whether statements about this type of research have already been produced. <input type="checkbox"/> Address the 3Rs (replacement, reduction, refinement) and the 3Ss (good science, good sense, good sensibilities). <input type="checkbox"/> Consider pre-registration and the publication of negative results. <input type="checkbox"/> Perform a harm-benefit assessment and justify any likely animal harm. <input type="checkbox"/> Discuss the learning objectives, if the animal use is for educational or training purposes. <input type="checkbox"/> Allocate a severity classification to the project. <input type="checkbox"/> Define objective, easily measurable and unequivocal humane endpoints. <input type="checkbox"/> Discuss the justification, if any, for death as an end-point.
4. Experimental design and statistical analysis	<input type="checkbox"/> Consider pilot studies, statistical power and significance levels. <input type="checkbox"/> Define the experimental unit and decide upon animal numbers. <input type="checkbox"/> Choose methods of randomisation, prevent observer bias, and decide upon inclusion and exclusion criteria.

Topic	Recommendation
(B) Dialogue between scientists and the animal facility	
5. Objectives and timescale, funding and division of labour	<input type="checkbox"/> Arrange meetings with all relevant staff when early plans for the project exist. <input type="checkbox"/> Construct an approximate timescale for the project, indicating the need for assistance with preparation, animal care, procedures and waste disposal/decontamination. <input type="checkbox"/> Discuss and disclose all expected and potential costs. <input type="checkbox"/> Construct a detailed plan for division of labour and expenses at all stages of the study.
6. Facility evaluation	<input type="checkbox"/> Conduct a physical inspection of the facilities, to evaluate building and equipment standards and needs. <input type="checkbox"/> Discuss staffing levels at times of extra risk.
7. Education and training	<input type="checkbox"/> Assess the current competence of staff members and the need for further education or training prior to the study.
8. Health risks, waste disposal and decontamination	<input type="checkbox"/> Perform a risk assessment, in collaboration with the animal facility, for all persons and animals affected directly or indirectly by the study. <input type="checkbox"/> Assess, and if necessary produce, specific guidance for all stages of the project. <input type="checkbox"/> Discuss means for containment, decontamination, and disposal of all items in the study.
(C) Quality control of the components in the study	
9. Test substances and procedures	<input type="checkbox"/> Provide as much information as possible about test substances. <input type="checkbox"/> Consider the feasibility and validity of test procedures and the skills needed to perform them.
10. Experimental animals	<input type="checkbox"/> Decide upon the characteristics of the animals that are essential for the study and for reporting. <input type="checkbox"/> Avoid generation of surplus animals.
11. Quarantine and health monitoring	<input type="checkbox"/> Discuss the animals' likely health status, any needs for transport, quarantine and isolation, health monitoring and consequences for the personnel.
12. Housing and husbandry	<input type="checkbox"/> Attend to the animals' specific instincts and needs, in collaboration with expert staff. <input type="checkbox"/> Discuss acclimatization, optimal housing conditions and procedures, environmental factors and any experimental limitations on these (e.g. food deprivation, solitary housing).
13. Experimental procedures	<input type="checkbox"/> Develop refined procedures for capture, immobilisation, marking, and release or rehoming. <input type="checkbox"/> Develop refined procedures for substance administration, sampling, sedation and anaesthesia, surgery and other techniques.
14. Humane killing, release, reuse or rehoming	<input type="checkbox"/> Consult relevant legislation and guidelines well in advance of the study. <input type="checkbox"/> Define primary and emergency methods for humane killing. <input type="checkbox"/> Assess the competence of those who may have to perform these tasks.
15. Necropsy	<input type="checkbox"/> Construct a systematic plan for all stages of necropsy, including location, and identification of all animals and samples.

References

1. Smith AJ, Clutton RE, Lilley E, Hansen KEA & Brattelid T. PREPARE: Guidelines for Planning Animal Research and Testing. *Laboratory Animals*, 2017; DOI: 10.1177/0023677217724823.
2. Kilkenny C, Browne WJ, Cuthill IC *et al.* Improving Bioscience Research Reporting: The ARRIVE Guidelines for Reporting Animal Research. *PLoS Biology*, 2010; DOI: 10.1371/journal.pbio.1000412.

Further information

<https://norecopa.no/PREPARE> | post@norecopa.no | [@norecopa](https://twitter.com/norecopa)