

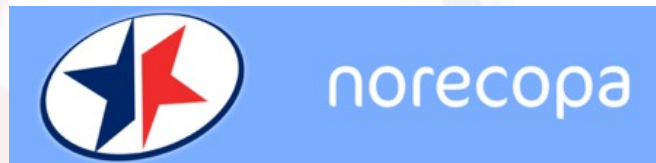
Norecopa: PREPARE for better Science

Adrian Smith

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[@adrian_3r](#)

norecopa.no/121222



<https://norecopa.no>

Norway's National Consensus Platform for the
Three Rs: Replacement, Reduction and Refinement
and a source of *global* 3R resources



<https://norecopa.no>

Established in 2007

Norecopa: PREPARE for better Science

Slide deck about the 3Rs



ccac.ca

The 3Rs of Russell and Burch:

Replacement, Reduction & Refinement

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With some material from:

Smith AJ & Richmond J (Forthcoming). The Three-Rs.
In: *The UFAW Handbook on the Care and Management
of Laboratory and Other Research Animals*. 9th edition.
Richardson CA and Golledge HDR (eds).
Oxford: Wiley-Blackwell.

Available at norecopa.no/3Rs

version 18.11.22 09.00 CET

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Culture of Care

The International Culture of Care Network

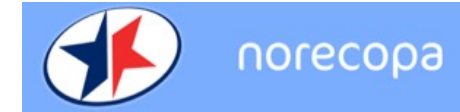
norecopa.no/coc

A demonstrable commitment, throughout the establishment, to improving:

- animal welfare
- scientific quality
- care of staff
- transparency for all stakeholders, including the public

It goes beyond simply complying with the law!

Norecopa: PREPARE for better Science



Communication and the Culture of Care

Penny Hawkins, RSPCA Research Animals Department
on behalf of the International Culture of Care Network*

Effective two-way communication between scientists and animal technologists is essential for a good Culture of Care
The European Commission suggests the 'development of formal and informal communication channels, for mutual benefit with respect to science and animal welfare'
Here are some examples from International Culture of Care network members

Regular meetings

Scheduled meetings for scientists, animal technologists, vets, unit managers and AWERB members



Regular refresher/update meetings for all organised by NTCO



Special events

Duo-talks: researcher talks about their science, and animal technologists talk about techniques and animal care within the project



ELH organises an informal meeting for all, in which anyone can raise welfare issues



Building communication into existing processes

Each study has a pre-start and wash-up meeting involving everybody



Three Rs improvements reported to AWERB & shared at external user meetings



Other ideas

A 'boxless' event: anyone can submit 'out of the box' ideas to improve practice



A staff survey for all e.g. how much do you agree with statements such as 'in our group we listen to each others' ideas about animal welfare'



*norecopa.no/culture-of-care



Culture of Care Network

norecopa.no/coc



Centres

- [Replacement](#) i
- [Reduction](#) i
- [Refinement](#) i
- [ecopa](#) i

Associations

- [ACURET](#) i
- [AFLAS \(includes South Korea\)](#) i
- [Culture of Care Network](#) i
- [ecopa](#) i
- [EU-NETVAL](#) i
- [EU3Rnet](#) i
- [FELASA](#) i
- [FESSACAL](#) i
- [Scand-LAS](#) i
- [Concordat on Openness](#) f

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norecopa.no : an updated overview of global 3R resources

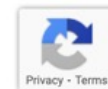


The screenshot shows the top section of the norecopa.no website. It features a blue header with the norecopa logo (a stylized star) and the text 'norecopa'. To the right, there are language options for 'NORSK' and 'ENGLISH', and a search bar with a magnifying glass icon. Below the header is a navigation menu with links for 'About Norecopa', 'Alternatives', 'Databases & Guidelines', 'Education & training', 'Legislation', 'Meetings', 'More resources', 'News', 'PREPARE', 'Species', and 'Wiki'. A secondary menu lists various topics: 'Anaesthesia and analgesia', 'Animal facilities', 'Animal welfare organisations', 'Blood sampling', 'Culture of care', 'Email discussion lists', 'Environmental enrichment', 'Ethics', 'Experimental design and reporting', 'Harm-Benefit Assessment', 'Health and safety', 'Health monitoring', 'Humane', 'Literature searches and systematic reviews', 'Organisations', and 'Suppliers'. A breadcrumb trail at the bottom of the screenshot reads 'norecopa.no / More resources / Experimental design and reporting'. An orange callout box is overlaid on the page, containing the following text:

approx. 9,000 webpages
1,000 hits per day on average
7-8 detailed newsletters per year

Design and reporting of animal experiments

This page supplements advice given in [Section 4 of the PREPARE guidelines](#). PREPARE covers all aspects of design (including animal and facility related issues).

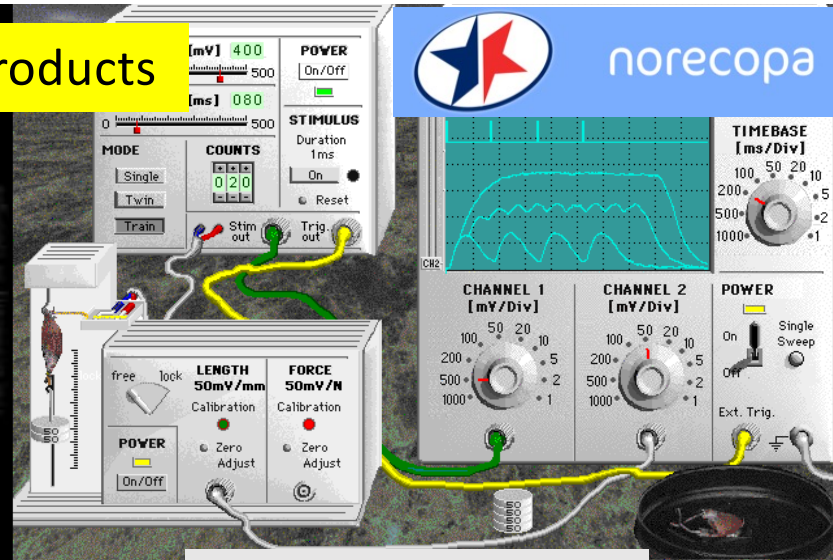


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NORINA database: approx. 3,000 products



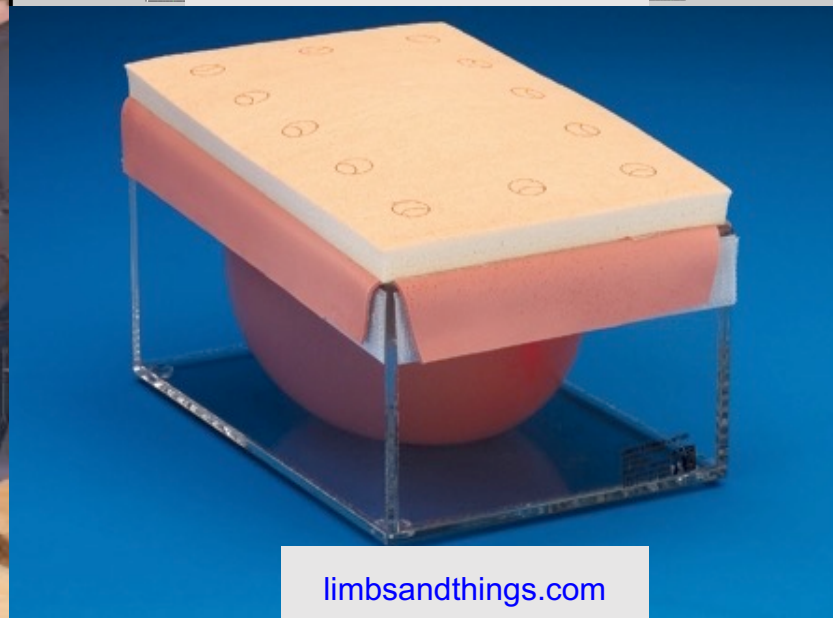
3dglasshorse.com



virtual-physiology.com



rescuecritters.com



limbsandthings.com



Rat s.c. injection
Norecopa | 1,380 views



Testing anaesthetic depth in the chicken
Norecopa | 598 views



Blood sam
Norecop



Blood sampling from the pig
Norecopa | 3,914 views



Subcutaneous injection in the rabbit
Norecopa | 1,479 views



Rat i.p. injection (method 2)
Norecopa | 1,280 views



Blood collection from the saphenous vein in the mouse
Norecopa | 6,777 views



Blood sam
Norecop



Intravenous injection in a rabbit
Norecopa | 2,025 views



Subcutaneous injection in the chicken
Norecopa | 1,806 views

ANATOMÍA DE LA RATA
Dra. Dolores Vallejo Ruiz
Departamento de Biología de Sistemas, Universidad de Alcalá (Madrid)
Asesoría Científica: Dr. José María Orellana Moriana
Centro de Experimentación Animal, CAI Medicina-Biología, Universidad de Alcalá

Anatomía de la rata
Norecopa | 977 views



Subcutaneous injection in the rat - Technique 1
Norecopa | 2,249 views



Blood sam
Norecop








Lifting a rabbit
Norecopa | 2,420 views
















Immobilisation of the rabbit
Norecopa | 2,072 views

Training resources for animal research

| | |
|--|---|
|  <p>National Legislation (EU1) Understand the national and international legal and regulatory framework within which projects involving animals are constructed and managed and of the legal responsibilities of the people involved.</p> |  <p>Ethics, Animal Welfare and the 3Rs (EU2) Identify the ethical and welfare issues raised by the use of animals in scientific procedures and understand the basic principles of the 3Rs.</p> |
|  <p>Basic and Appropriate Biology (EU3) Discover the basic principles of animal behaviour, care, biology and husbandry.</p> |  <p>Animal Care, Health and Management (EU4) Examine information on various aspects of animal health, care and management including: environmental controls, husbandry practices, diet, health status and disease.</p> |
|  <p>Recognition of Pain, Suffering and Distress (EU5) Identify the normal condition and behaviour of experimental animals and differentiate between a normal animal and one which is showing signs of pain, suffering or distress.</p> |  <p>Humane Methods of Killing (EU6.1) Learn the principles of humane killing including descriptions of the different methods available and information to help you compare the methods permitted to determine the most appropriate method.</p> |
|  <p>Minor Procedures without Anaesthesia (EU7) An introduction to the theory relating to minor procedures and information about appropriate methods of handling, restraint, appropriate techniques for injection, dosing and sampling relevant to the species.</p> |  <p>Anaesthesia for Minor Procedures (EU20) Guidance and information for individuals who, during their work with animals, will need to apply sedation or short-term anaesthesia for a brief period and mild pain level procedure.</p> |

eModules

| | | | |
|---|---|---|---|
|  <p>eModule – Recognition and Prevention of Pain, Suffering and Distress (EU5) ACCESS</p> |  <p>eModule – Humane Methods of Killing (EU6) ACCESS</p> |  <p>eModule – Design of procedures and projects (level 1) (EU10) ACCESS</p> |  <p>eModule – Design of procedures and projects (level 2) (EU11) ACCESS</p> |
|  <p>eModule – The Severity Assessment Framework (EU12) ACCESS</p> |  <p>eModule – Anaesthesia for Minor Procedures (EU20) ACCESS</p> |  <p>eModule – Pre-Anaesthetic Preparations (EU21-1) ACCESS</p> |  <p>eModule – Choosing an Anaesthetic (EU21-2) ACCESS</p> |
|  <p>eModule – Anaesthetic Monitoring and Intraoperative Care (EU21-3) ACCESS</p> |  <p>eModule – Anaesthetic Breathing Systems, Airway Management and Neuromuscular Blocking Agents (EU21-4) ACCESS</p> |  <p>eModule – Anaesthetic Management and Preventing Problems (EU21-5) ACCESS</p> |  <p>eModule – Post Anaesthetic Care (EU21-6) ACCESS</p> |
|  <p>eModule – Project Evaluation (EU25)</p> | | | |

TextBase:

1,500 books related to LAS:

norecopa.no/textbase

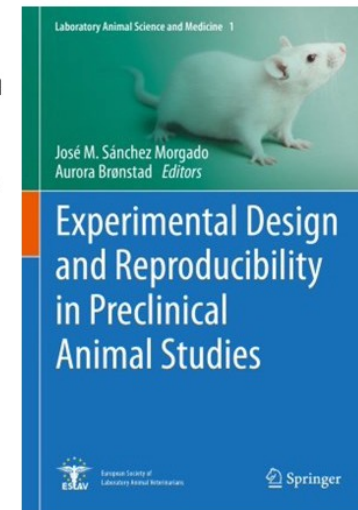
Experimental Design and Reproducibility in Preclinical Animal Studies

By José M. Sánchez Morgado & Aurora Brønstad (Eds.)

Record number: 8619d

This book provides grounds on how to plan and conduct animal experiments that can be reproduced by others. It touches on factors that may impact the reproducibility of animal studies including: the animal genetic background, the animal microbial flora, environmental and physiological variables affecting the animal, animal welfare, statistics and experimental design, systematic reviews of animal studies, and the publishing process.

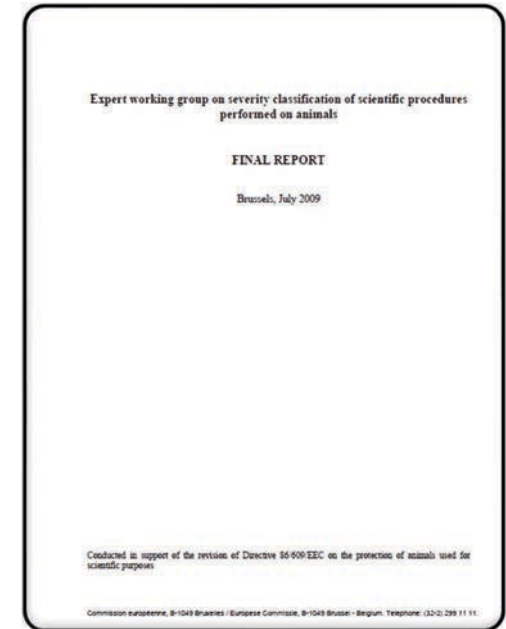
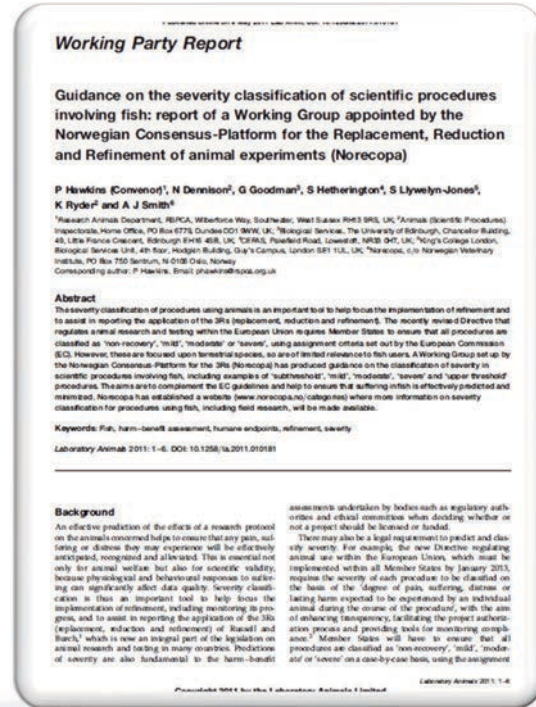
The book addresses advanced undergraduates, graduate students and all scientists working with animals.



norecopa.no/textbase/experimental-design-and-reproducibility-in-preclinical-animal-studies

3R-Guide (400 guidelines for animal research and testing)

norecopa.no/3r-guide



Guidance on the severity classification of procedures involving fish

Report from a Working Group convened by Norecopa

Laboratory Animals, 2011
norecopa.no/categories

http://ec.europa.eu/environment/chemicals/lab_animals/pdf/report_ewg.pdf

Norecopa: PREPARE for better Science



PREPARE



The PREPARE Guidelines Checklist Planning Research and Experimental Procedures on Animals: Recommendations for Excellence

Adrian J. Smith¹, R. Eddie Clutton², Elliot Lilley³, Kristine E. Aa. Hansen⁴ & Trend Brattli⁵
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PREPARE consists of planning guidelines which are complementary to reporting guidelines such as ARRIVE¹. 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.

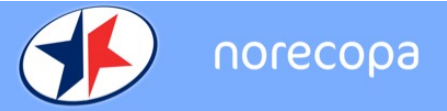
| Topic | Recommendation |
|---|--|
| (A) Formulation of the study | |
| 1. Literature searches | <input type="checkbox"/> Form a clear hypothesis, with primary and secondary objectives. <input type="checkbox"/> Consider the use of systematic reviews. <input type="checkbox"/> Decide upon databases and information. <input type="checkbox"/> Assess the relevance of the species to be used, with the least suffering, and its suitability for the study. <input type="checkbox"/> Assess the reproducibility and translatability of the study. |
| 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. |

+ 2 online versions

| 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 | |
| | <input type="checkbox"/> Provide as much information as possible about test substances, test procedures and the skills needed to perform them. <input type="checkbox"/> Consider the feasibility and validity of test procedures and the skills needed to perform them. <input type="checkbox"/> Consider the characteristics of the animals that are essential for the study and for reporting, and the use 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 & Brattli T. PREPARE: Guidelines for Planning Animal Research and Testing. *Laboratory Animals*, 2017, DOI: 10.1177/0023677217724923.
 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)



In addition to the checklist, much more information is available on:

norecoppa.no/PREPARE

A screenshot of the norecoppa.no website. The header is blue with the Norecoppa logo and the word "norecoppa" in white. In the top right corner, there are language options for "NORSK" and "ENGLISH", and a search bar with the text "Search: Q". Below the header is a navigation menu with several items: "About Norecoppa", "Alternatives", "Databases & Guidelines", "Education & training", "Legislation", "Meetings", "More resources", "News", "PREPARE", and "Species". The "PREPARE" item is circled in red. Below the navigation menu, there is a list of links for the PREPARE Checklist, including: "1-Literature searches", "2-Legal issues", "3-Ethical issues, Harm-Benefit Assessment and humane endpoints", "4-Experimental design and statistical analysis", "5-Objectives and timescale, funding and division of labour", "6-Facility evaluation", "7-Education and training", "8-Health risks, waste disposal and decontamination", "9-Test substances and procedures", "10-Experimental animals", "11-Quarantine and health monitoring", "12-Housing and husbandry", "13-Experimental procedures", "14-Humane killing, release, re-use or re-homing", "15-Necropsy", and "Comparison with ARRIVE". At the bottom left of the page, there is a breadcrumb trail: "norecoppa.no / PREPARE". At the bottom right, there are social media icons for Facebook, Twitter, Email, and a plus sign for more options.

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norecopa.no/PREPARE

- 3-Ethical issues, harm-benefit assessment and humane endpoints
 - 3a Construct a lay summary.
 - 3b In dialogue with ethics committees, consider whether statements about this type of research have already been produced.
 - 3c Address the 3Rs (Replacement, Reduction, Refinement) and the 3Ss (Good Science, Good Sense, Good Sensibilities).
 - 3f Assessment and justify any likely animal harm.
 - 3f Discuss the learning objectives, if the animal use is for educational or training purposes.
 - 3g Allocate a severity classification to the project.
 - 3h Define objective, easily measurable and unequivocal humane endpoints.
 - 3i Discuss the justification, if any, for death as an end-point.
- 4-Experimental design and statistical analysis

5. Have the experiments been carried out before, and is any repetition justifiable?
6. What [approaches to reduce distress](#) have been considered?

3a Construct a lay summary.

- General principles
- For fish researchers**

1. Have national or local research ethics committees already produced statements relevant to the research being planned? Consideration should also be paid to the broader context of the research. For example, research directed at increasing the productivity of farming at the expense of (or without improving) individual animal welfare, or wildlife research whose primary aim is population management.

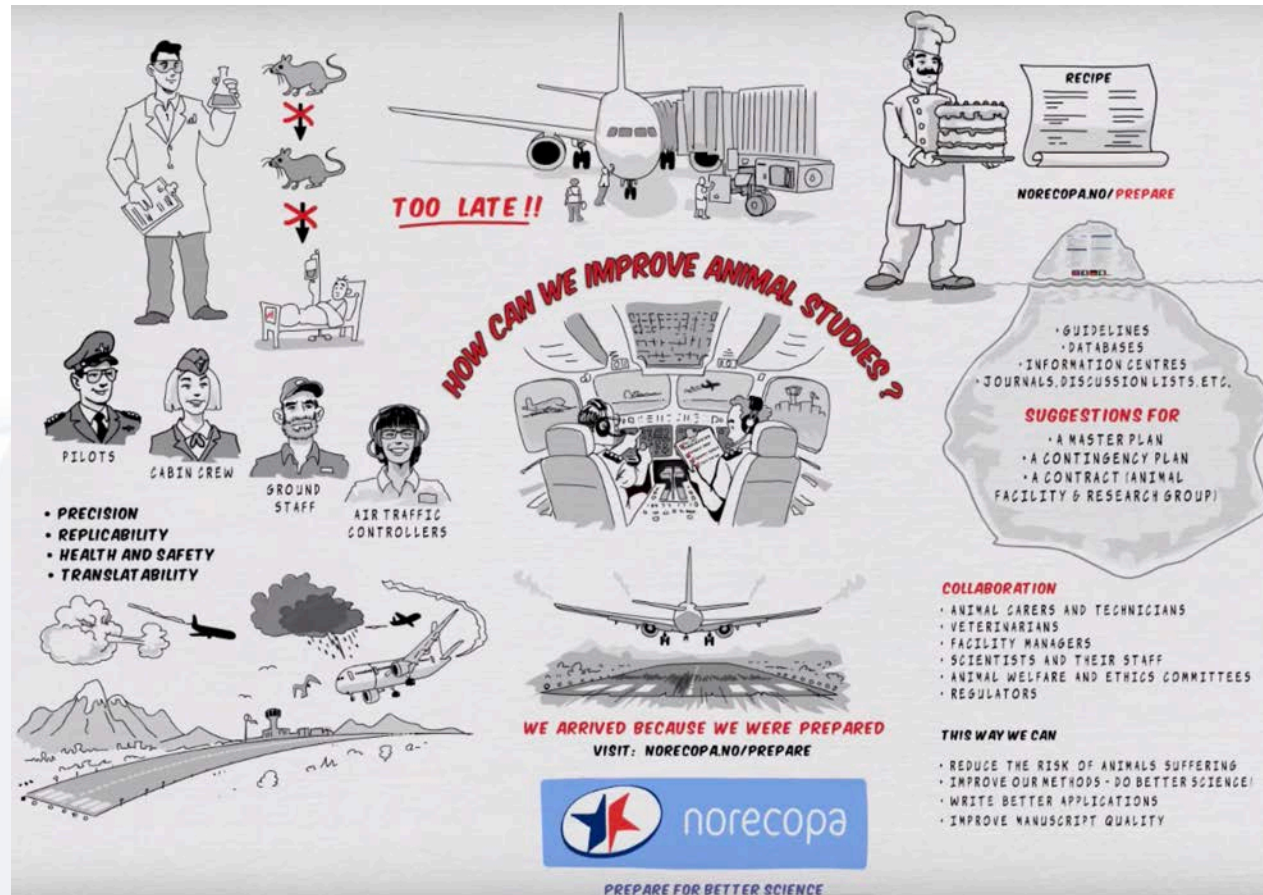
Links to quality guidelines and scientific papers worldwide on e.g. blood sampling, injection volumes, housing and husbandry, analgesia, humane endpoints, experimental design

2. Will any advances in this research be published, and if so, will the publication only index the title and abstract, or will the full paper be made available? Will the project be rejected?
3. Have the Three S's ([Good Science, Good Sense and Good Sensibilities](#)) been addressed? Sufficient time should be allocated to this point, since two of the three S's are highly subjective, but equally important. The use of commonsense and critical anthropomorphism are justifiably part of the work to assess the impact of research on animals, not least when a scientific evidence base does not exist.
4. Does the proposed study have a clear rationale and scientific relevance, and what will be the next step if the hypothesis is supported or rejected?
5. Have the experiments been carried out before and is any repetition justifiable?
6. What [approaches to reduce distress](#) have been considered?
7. Will the project undergo [pre-registration](#) and will negative results be published, to avoid publication bias?

Many more [links to resources on ethics are available here](#). Details about [pre-registration of animal studies and reporting of critical incidents](#) are to be found in the section on [Experimental Design and Statistical Analysis](#).

Harm-Benefit Assessment

norecopa.no/PREPARE/film
3-minute cartoon film



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NORSK ENGLISH

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norecopa.no / Meetings / Meetings Calendar

norecopa.no/meetings/meetings-calendar

Webinar and Meetings calendar

- ▶ [The influence of age on experimental outcomes and animal care](#), webinar (Paul Potter), 29 November 2022
- ▶ [SGV 2022 Meeting \(Swiss Laboratory Animal Science Association\)](#), Lausanne, 29-30 November 2022

+ webpages for recorded meetings, sorted by PREPARE topics

December 2022

December 2022

- ▶ [How can alternatives to animal testing bring benefit to chemical industry](#), webinar (Barbara Birk), 1 December 2022
- ▶ [Replacement methods for the diagnostics of botulinum neurotoxins: Challenges and recent progress](#), webinar (Brigitte Dorner), 1 December 2022
- ▶ [The culture of care within the Directive 2010/63/EU](#), webinar (Susanna Louhimies), 2 December 2022

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wiki.norecopa.no

The Refinement Wiki

Born from the knowledge that a lot of good ideas on refinement circulate on discussion forums, but never get published.



Designed to be

- a portal for rapid publication and dissemination of these ideas
- a place to identify experts on specific refinement techniques

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Clicker training

Clicker training is an operant conditioning based on positive reinforcement. When the animal offers the desired behavior, a *click* or another distinctive sound (secondary reinforcer) is delivered and within the following few seconds the reward is presented (primary reinforcer)^[1]. The *click* bridges the time between the desired behavior and the presentation of the reward^[1]. A target stick providing a visual guide for the animal can be used for the training.

Animals are usually trained individually, though it is also possible to perform clicker training in a groups, e.g. in mice, rats, and rabbits. For rats, it was demonstrated that they learned tasks by observing the clicker training of their cage mates^[2].

Clicker training can be used to train animals in a stress-free way. The following behaviours are examples for what this technique can be used for:

Mice: entering a tunnel, following a target stick, climbing on the palm of the hand^[3]

Rats: following a target stick, voluntarily change to a cage, observational learning^[2]

Rabbits: following a target stick, rearing/standing up to inspect the abdomen, approaching a human, being touched and lifted by a human, trimming nails, coming on command

Pigs: Pigs can be easily trained to cooperate if they are treated empathetically and desired behavior is reinforced by providing food stuff in form of treats and apple juice^[4].



Clicker training with mice using a target stick. *Left:* The mouse is following the target stick and is climbing on the experimenter's hand. If the hand is lifted, the mouse will remain on the palm of the hand. *Right:* The mice are trained in a group. Two mice are following the target stick on the palm of the experimenter's hand.

1. [↑] ^{1.0} ^{1.1} Feng, Lynna C.; Howell, Tiffani J.; Bennett, Pauleen C. (1 August 2016). "How clicker training works: Comparing Reinforcing, Marking, and Bridging Hypotheses" *Applied Animal Behaviour Science*. **181**: 34–40. doi:10.1016/j.applanim.2016.05.012. ISSN 0168-1591.
2. [↑] ^{2.0} ^{2.1} Leidinger, Charlotte Sophie; Kaiser, Nadine; Baumgart, Nadine; Baumgart, Jan (25 October 2018). "Using Clicker Training and Social Observation to Teach Rats to Voluntarily Change Cages" *JoVE (Journal of Visualized Experiments)* (140): e58511. doi:10.3791/58511. ISSN 1940-087X. PMC 6235608. PMID 30417890.
3. [↑] Leidinger, Charlotte; Herrmann, Felix; Thöne-Reineke, Christa; Baumgart, Nadine; Baumgart, Jan (6 March 2017). "Introducing Clicker Training as a Cognitive Enrichment for Laboratory Mice" *JoVE (Journal of Visualized Experiments)* (121): e55415. doi:10.3791/55415. ISSN 1940-087X. PMC 5408971. PMID 28287586.
4. [↑] "Positive Reinforcement Training in Large Experimental Animals" (PDF).

Experts for clicker training in mice and rats: [TARC](#), Mainz, Germany

This page was created and edited by [KH191219](#) (talk).

This page was last edited on 27 May 2020, at 11:23.

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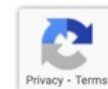
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The screenshot shows the top section of the Norecopa website. It features a blue header with the Norecopa logo (a stylized star) and the text 'norecopa'. To the right, there are language options for 'NORSK' and 'ENGLISH', and a search bar with the text 'Search:'. Below the header is a navigation menu with various categories: 'About Norecopa', 'Alternatives', 'Databases & Guidelines', 'Education & training', 'Legislation', 'Meetings', 'More resources', 'News', 'PREPARE', 'Species', and 'Wiki'. The 'Wiki' link is circled in red. Below the navigation menu is a list of links for various topics, including 'Anaesthesia and analgesia', 'Animal facilities', 'Animal welfare organisations', 'Blood sampling', 'Culture of care', 'Email discussion lists', 'Environmental enrichment', 'Ethics', 'Experimental design and reporting', 'Harm-Benefit Assessment', 'Health and safety', 'Health monitoring', 'Humane endpoints', 'Humane killing', 'Journals', 'Literature searches and systematic reviews', 'Organisations', 'Reporting guidelines', 'Severity classification', and 'Suppliers'.

All Wiki content is also retrievable from Norecopa's search engine

A simple instruction manual to keep the threshold for adding new content as low as possible

This page supplements advice given in [Section 4 of the PREPARE guidelines](#). PREPARE covers all aspects of design (including animal and facility related issues).

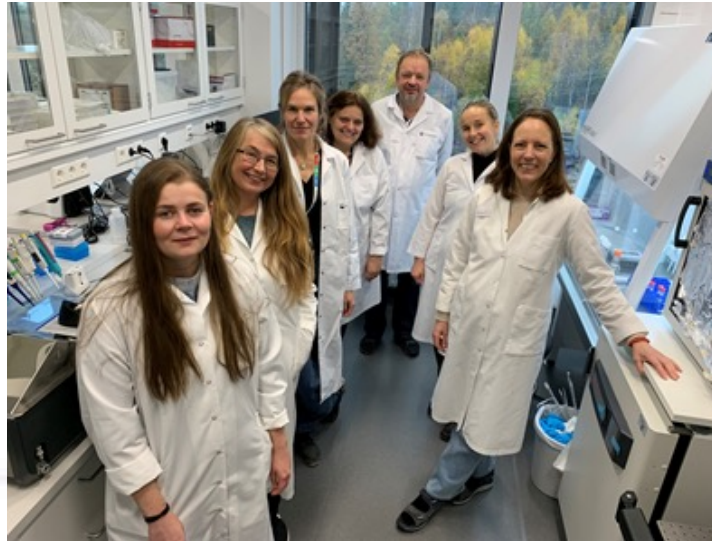


Norecopa: PREPARE for better Science

- Acclimatisation
- Adrian Smith
- Alphaxalone
- Anaesthesia in neonates
- Analgesia
- Asepsis
- Blood sampling of hamsters
- Blood sampling of pigs
- Blood sampling of rainbow trout
- Breeding strategies for mice
- Clicker training
- Contingency plans
- Decapitation
- Detecting early onset of clinical signs in the mouse model of Covid-19
- Detection of pain and distress in mice
- EMLA cream
- Embryo transfer
- Experimental Autoimmune Encephalomyelitis (EAE)
- Facial expression analysis
- Food crunchers
- General discussion on use of analgesics
- Genotyping mice
- Habituation training
- High-fat diets
- Hot Bead Sterilisers
- Housing nude mice
- Housing research fish
- Humane endpoints
- Hydrodynamic gene delivery
- Intra-ocular injections
- Intranasal administration
- Intraperitoneal injection
- Intraperitoneal pentobarbitone
- Ketamine and alpha-2 agonist combinations
- Long-term anaesthesia in rodents
- Lumpfish
- Main Page
- Marble Burying Test
- Metabolic cages
- Minipumps
- Montanide adjuvant
- Mouse Grimace Scale
- Mouse handling
- Nest building material
- Oestrus suppression in ferrets
- Pneumocystis murina
- Recapping needles
- Rotarod Test
- Screening cell lines
- Sedation of cattle
- Splenectomy
- Sterilisation of instruments
- TTEAM and TTouch
- Tail vein injection
- Tramadol
- Transport stress
- Tumour cell implant into mammary fat pad
- Ulcerative Dermatitis in Mice
- Water quality
- Xenopus laevis
- Zebrafish swabbing

Norecopa's 3R Prize

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- fish gill cell cultures

- Norwegian Veterinary Institute



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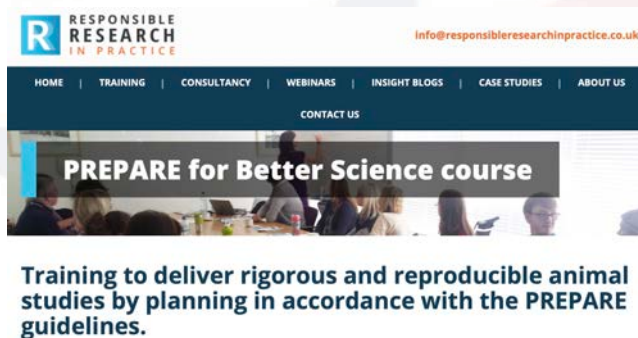


Culture of Care meeting



FRAME Training School, Bergen, March 2023

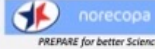
Online PREPARE course, January 2023



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norecopa.no/Europhysiology




Let's PREPARE together to ARRIVE in better shape: how to plan animal experiments

Adrian Smith, Norecopa, c/o Norwegian Veterinary Institute, P.O. Box 64, 1431 Ås, Norway
adrian.smith@norecopa.no

What's the problem?

Preclinical *in vivo* research needs to be reproducible and translatable, while maximising the animals' welfare and replacing them with alternatives wherever possible. This can be summed up in the 3Rs of Russell & Burch: **Replace, Reduce & Refine**.

Scientists are usually well aware of **reporting** guidelines when publishing research. These are important, but a sub-standard study, like a burnt cake, cannot be improved by a better description. Guidelines for **planning**, although not mandatory, are of great help in designing better experiments.



norecopa.no/PREPARE

What can Norecopa offer?

Norecopa maintains a comprehensive database of resources for scientists, which include:


- 8,900 searchable webpages of quality 3R resources, with filters to facilitate searching
- the PREPARE guidelines for planning animal experiments, with a checklist in over 30 languages
- links to recordings of webinars covering all aspects of animal research
- an International Webinars & Meetings Calendar
- a collection of 400 guidelines for planning and conducting animal research
- an English-language newsletter with the latest developments within experimental design
- the NORINA database of alternatives to animal use in education and training
- a Refinement Wiki



Examples of Norecopa's resources:


PREPARE covers:

- ✓ Formulation of a study
- ✓ Dialogue between scientists and the animal facility
- ✓ Quality control of the components in the study



norecopa.no/PREPARE

The Refinement Wiki
wiki.norecopa.no



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The Norwegian Parliament, the Ministry of Agriculture & Food and the Ministry of Trade, Industry & Fisheries; the Nordic Society against Painful Experiments (NMSO), Nova Nordisk, the Norwegian Animal Protection Alliance (Dyrevernalliansen), the Norwegian Society for Protection of Animals (Dyreskytelsen Norge), the Research Council of Norway, Laboratory Animals Ltd., the Royal Society for the Prevention of Cruelty to Animals (RSPCA), Sanofi, the Scottish Accreditation Board, the Stjerner Foundation, the Universities Federation of Animal Welfare (UFAW) and the US Department of Agriculture (USDA).

Illustration graphic: colorbox.com

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Newsletter no. 3-2022 from Norecopa

Welcome to Norecopa's third newsletter in 2022!

Please share this newsletter with your colleagues and friends!

Norecopa maintains [an international Webinars and Meetings Calendar](#), which is updated several times a week, with links to [recorded webinars and events here](#).

You will find shortcuts to several other key resources on [our front page](#).

We continue to maintain a list of resources related to the Covid-19 pandemic and about preparedness in general: [Be PREPARED](#). Let us know if you have additions.

You can tip a friend, subscribe or unsubscribe, and share the newsletter on social media using the links above. We are on [Facebook](#), [Twitter](#) and [LinkedIn](#).

[All Norecopa's newsletters can be read here](#) and their content is indexed by the search engine on [Norecopa's website](#).

This newsletter contains the following items (if some links do not work, check that your mail program has opened the whole of the newsletter):

- [General update on Norecopa's activities](#)
- [Overview: The rise of European 3R centres](#)
- [Quality assurance of Norecopa's website](#)
- [Infographics about non-animal methods](#)
- [Resources from the RSPCA](#)
- [European overview: Non-animal methods in science](#)
- [Framework proposal for intensive 3R courses](#)
- [News from other 3R Centres](#)
- [Resources from Understanding Animal Research](#)
- [Prizes and Grants](#)
- [New books on animal welfare](#)
- [Glimpses from research](#)
- [A roadmap for behavioural studies](#)
- [Food for thought](#)
- [From the media](#)
- [Webinars and Meetings Calendar](#)
- [Have your colleagues subscribed?](#)

English-language newsletters

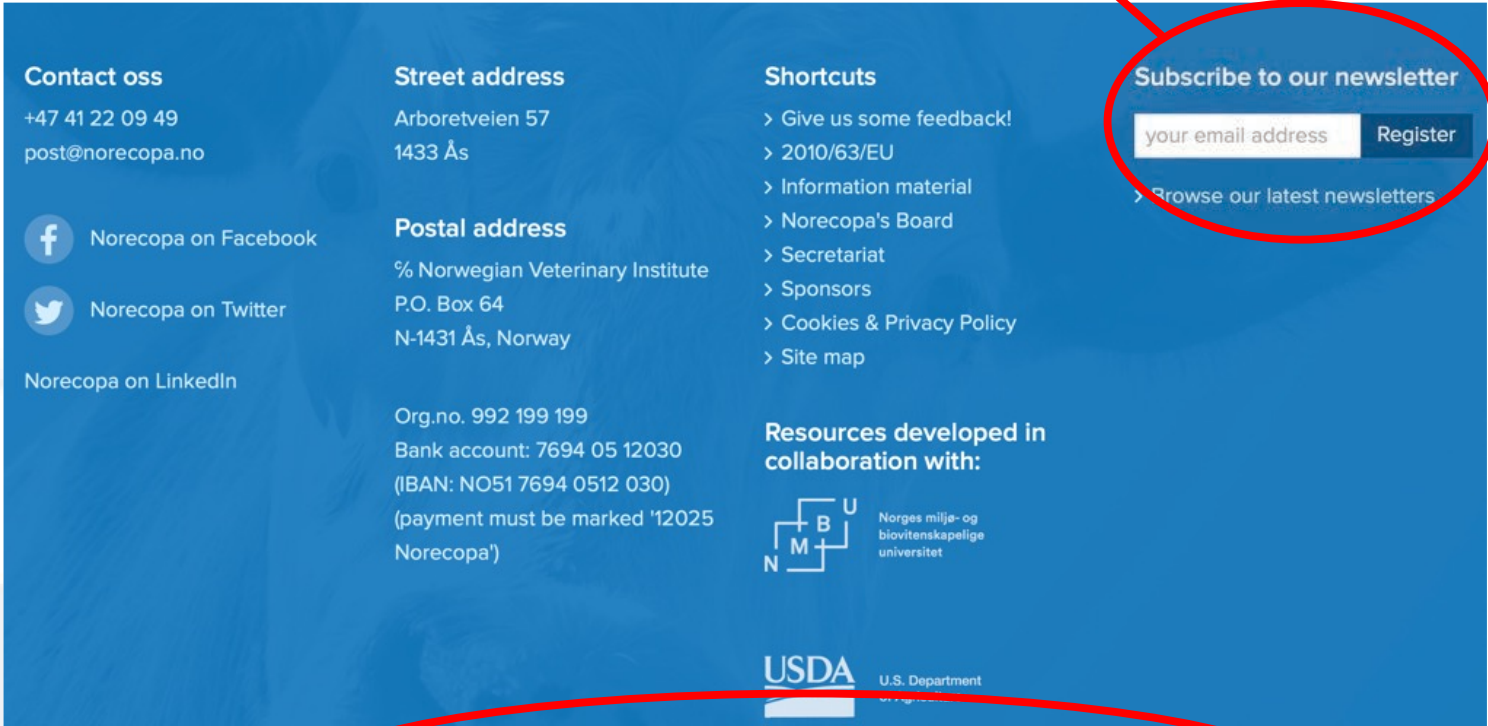
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7-8 times a year

1,200 international subscribers

At the bottom of Norecopa's webpages

English-language newsletters



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