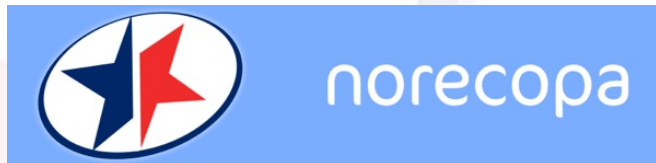


**Norecopa:**  
**PREPARE, Refinement Wiki and training tools**

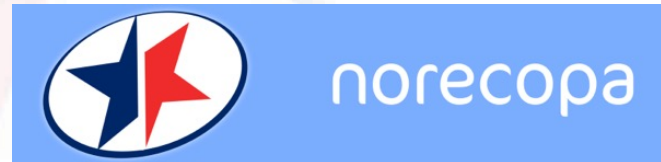
[\*norecopa.no/NCP\*](http://norecopa.no/NCP)

Adrian Smith  
[\*adrian.smith@norecopa.no\*](mailto:adrian.smith@norecopa.no)



# Norecopa

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



<https://norecopa.no>

Norecopa: PREPARE for better Science

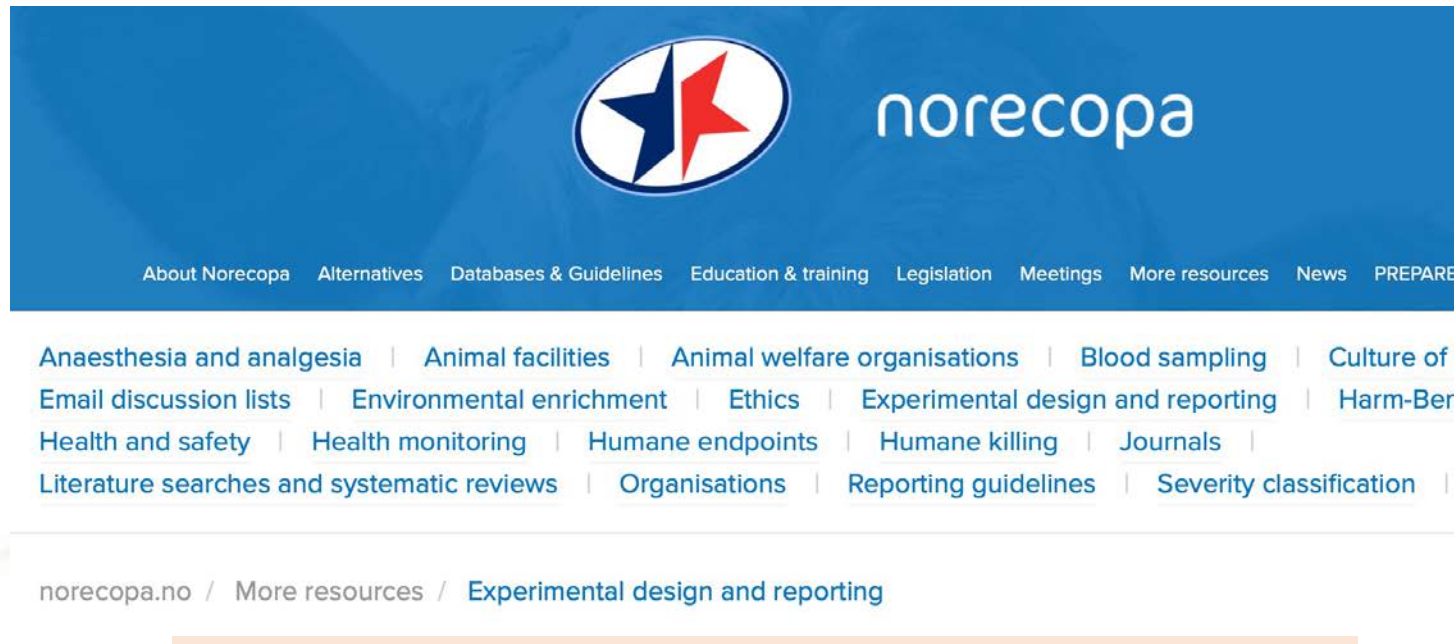
## ***My background***

- Veterinarian working with animal research since 1981
- Experience in working for the regulatory authorities in Norway
- Organised over 50 courses in Laboratory Animal Science for all personnel categories
- Managed an AAALAC-accredited animal facility
- Organised international consensus meetings on field, fish and farm animal research
- Secretary of Norecopa and Board Member of the Danish 3R Centre

## ***What can Norecopa offer NCPs?***

- A large website/database constructed by specialists for all stakeholders, since 1991
- Aims to be a one-stop-shop for global 3R resources

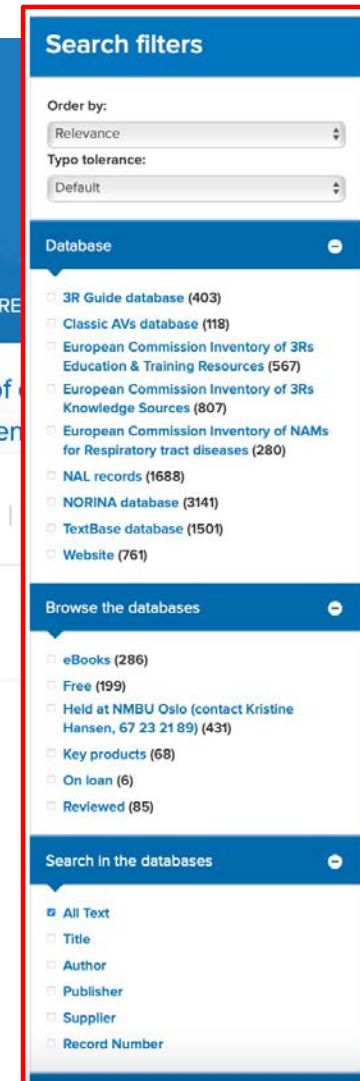
## *norecopa.no : an updated overview of global 3R resources*



The screenshot shows the norecopa.no website. The header features the norecopa logo, which consists of a stylized star with blue and red points. Below the logo is a navigation menu with the following items: About Norecopa, Alternatives, Databases & Guidelines, Education & training, Legislation, Meetings, More resources, News, and PREPARE. The main content area displays a grid of links for various topics, including Anaesthesia and analgesia, Animal facilities, Animal welfare organisations, Blood sampling, Culture of, Email discussion lists, Environmental enrichment, Ethics, Experimental design and reporting, Harm-Ben, Health and safety, Health monitoring, Humane endpoints, Humane killing, Journals, Literature searches and systematic reviews, Organisations, Reporting guidelines, and Severity classification. Below the grid, there is a breadcrumb trail: norecopa.no / More resources / Experimental design and reporting.

- ✓ approx. 9,000 webpages organised as a database with an intelligent search engine tuned to LAS
- ✓ 300,000 hits annually
- ✓ 7-8 detailed newsletters per year

Norecopa: PREPARE for better Science



The screenshot shows the search filters sidebar on the norecopa.no website. It includes the following sections:

- Search filters**
  - Order by: Relevance
  - Typo tolerance: Default
- Database**
  - 3R Guide database (403)
  - Classic AVs database (118)
  - European Commission Inventory of 3Rs Education & Training Resources (567)
  - European Commission Inventory of 3Rs Knowledge Sources (807)
  - European Commission Inventory of NAMs for Respiratory tract diseases (280)
  - NAL records (1688)
  - NORINA database (3141)
  - TextBase database (1501)
  - Website (761)
- Browse the databases**
  - eBooks (286)
  - Free (199)
  - Held at NMBU Oslo (contact Kristine Hansen, 67 23 21 89) (431)
  - Key products (68)
  - On loan (6)
  - Reviewed (85)
- Search in the databases**
  - All Text
  - Title
  - Author
  - Publisher
  - Supplier
  - Record Number



norecopa

NORSK ENGLISH

Search:

[About Norecopa](#) | [Alternatives](#) | [Databases & Guidelines](#) | [Education](#) | [Legislation](#) | [Meetings](#) | [More resources](#) | [News](#) | [PREPARE](#) | [Species](#) | [Wiki](#)

[Fish 2005](#) | [Wildlife 2008](#) | [Fish 2009](#) | [Agricultural animals 2012](#) | [Field research 2017](#) | [Past meetings](#) | [Meetings Calendar](#) | [An informal guide to arranging a scientific meeting](#) | [Presentations](#)

norecopa.no / [Meetings](#) / [Meetings Calendar](#)

[norecopa.no/meetings/meetings-calendar](https://norecopa.no/meetings/meetings-calendar)

## Webinar and Meetings calendar

### May 2021

- > [SETAC Europe 31st Annual Meeting](#), online, 3-6 May 2021
- > [Laboratory Animal Science course](#), Porto, 3-14 May 2021
- > [Kick-off meeting, 3R Centre Network in Baden-Württemberg](#) (online meeting in German), 4 May 2021
- > [Avoid Allergies and Infections when Working with Laboratory Animals](#), online course, 5 May 2021
- > [Nordic 3R webinar series](#), 5-6 May 2021
- > [Meeting the Requirements of the US Animal Welfare Act](#), webinar, 6 May 2021
- > [Skin Sensitization](#), Hamburg, 6-7 May 2021
- > [Swedish 3R Center Workshop: Replace strategy and networking activities](#), 10 May 2021
- > [Animal Research: Critical, Challenging & Creative Thinking Course](#), 10-13 May 2021
- > [Dirty or clean mice - What is better for research?](#) Webinar (André Bleich), 11 May 2021
- > [Poultry in biomedical research](#), 6th Meeting of LASA Large Animal Research Network (LARN), 11 May 2021
- > [3rd Pan-American Conference for Alternative Methods](#), Windsor, 12-14 May 2021

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A global map of 3R centres and associations/networks

[norecopa.no/global3R](http://norecopa.no/global3R)



Centres

- Replacement ⓘ
- Reduction ⓘ
- Refinement ⓘ
- ecopa ⓘ

Associations

- AFLAS (includes South Korea) ⓘ
- Culture of Care Network ⓘ
- EU-NETVAL ⓘ
- EOSRnet ⓘ
- FELASA ⓘ
- FESSACAL ⓘ
- Scand-LAS ⓘ

Norecopa: PREPARE for better Science



- [Compendia](#) | [Courses](#) | [Films and slide shows](#) | [For schools](#) | [Other teaching materials](#) | [Requirements](#) | [Homemade educational materials](#)

norecopa.no / [Education & training](#)

## Education and training in laboratory animal science

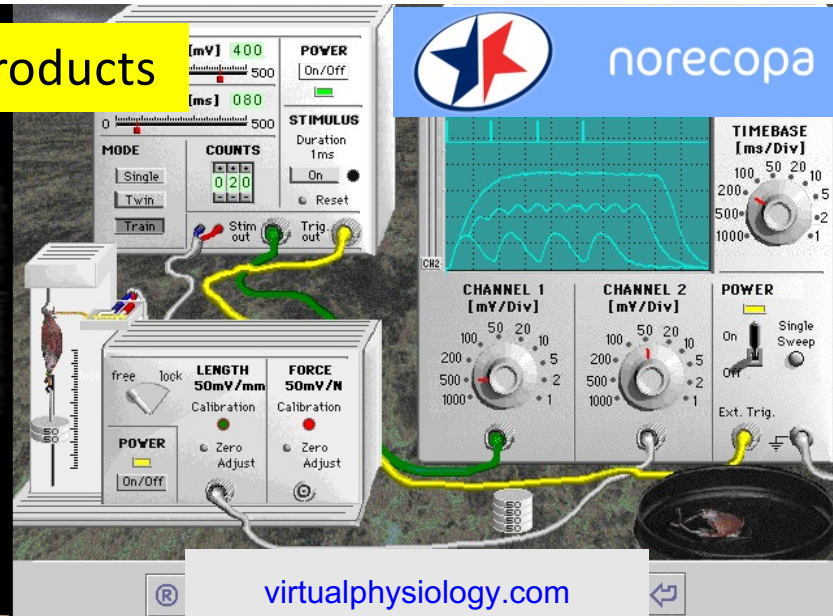
Adequate education in the principles of modern Laboratory Animal Science, and species-specific training in the procedures to be used, are prerequisites for good animal welfare. Animals living in harmony with their surroundings will also deliver the most reliable scientific data in an experiment.

Norecopa: PREPARE for better Science

NORINA database: approx. 3,000 products



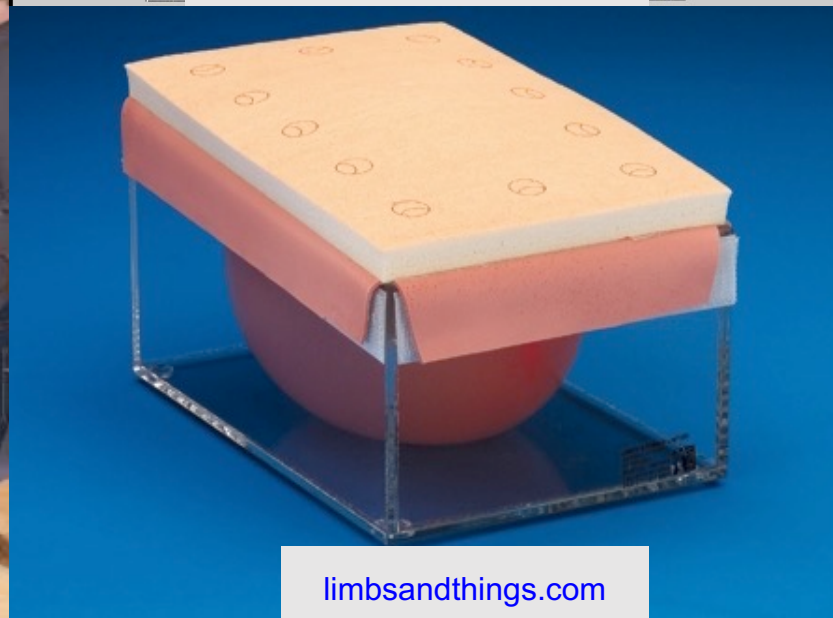
[3dglasshorse.com](http://3dglasshorse.com)



[virtualphysiology.com](http://virtualphysiology.com)



[rescuecritters.com](http://rescuecritters.com)



[limbsandthings.com](http://limbsandthings.com)

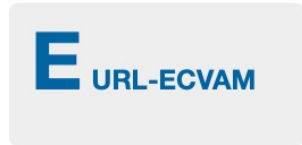




**Organisation:** European Commission, Joint Research Centre

**Point of contact:** ✉ [marcelle.holloway@ec.europa.eu](mailto:marcelle.holloway@ec.europa.eu)

**Title:** Three Rs Education and Training Courses and Resources



## Description

The purpose of the collection of these data undertaken (education and training courses and resources on the refinement of animal use in science) offered at high schools and resources where the Three Rs were both explicitly and resources, now provided here and provides data upon

Embedded and searchable on Norecopa's website

### 522049 - LECTURES IN LABORATORY ANIMAL SCIENCE

European Commission Inventory of 3Rs Education & Training Resources/19c93

The course content complies with requirements in Finnish legislation on the use of animals for teaching and research and the directive of the European parliament and council, including e.g. biology and husbandry of laboratory animals; microbiology and disease; genetics; health hazards and safe practices; design and conduct of animal experiments; experimental procedures; alternative methods.

*A snapshot of the situation in June-September 2018*

### Acclimation of Training Animals for Standard Handling, Restraint and Laboratory Techniques

European Commission Inventory of 3Rs Education & Training Resources/9d4bb

### Advanced Cell Culture Lab based Training

European Commission Inventory of 3Rs Education & Training Resources/4d97c

An introduction to both theory and practice of advanced cell culture techniques through a combination of lectures, demonstrations and practical hands-on experience. The 1 day workshop combines hands-on training with seminar sessions to ensure participants have all the necessary skills and knowledge to commence work using 3D and flow conditions for either academic or commercial research.

Previous **1** 2 3 4 5 6 7 8 9 10 ... Next

Snapshot overview of current, reduction and alternatives include training courses and 569 courses and within an E&T context.

## EU modules for Education and Training in Laboratory Animal Science and Alternatives to Animal Use



ETPLAS is the one-stop-resource library, hosting videos, images, posters, e-modules and links to other resources. If you are a lab animal science educator, you are welcome to use this repository by contacting us through our contact form.

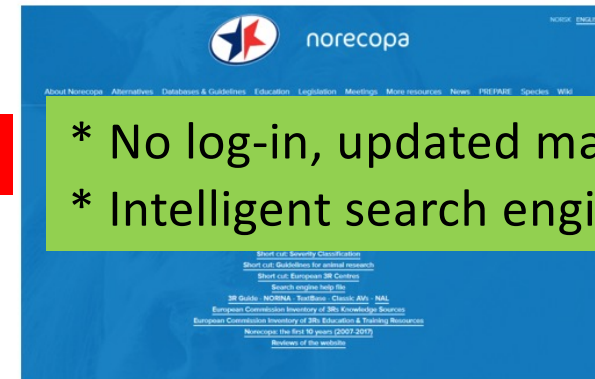
**You must be logged with the correct user type in to view this section**

**Log-in requires manual registration/approval by ETPLAS**

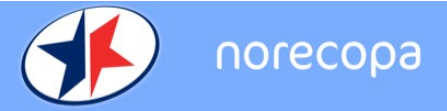
## Important and useful Links

### 3Rs Resources

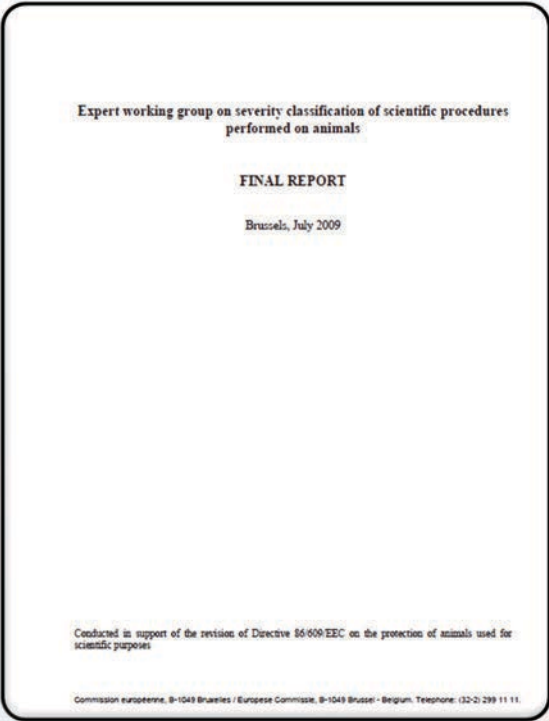
### Norecopa Website



- \* No log-in, updated many times a week
- \* Intelligent search engine



# 3R-Guide: approx. 400 guidelines for animal research and testing



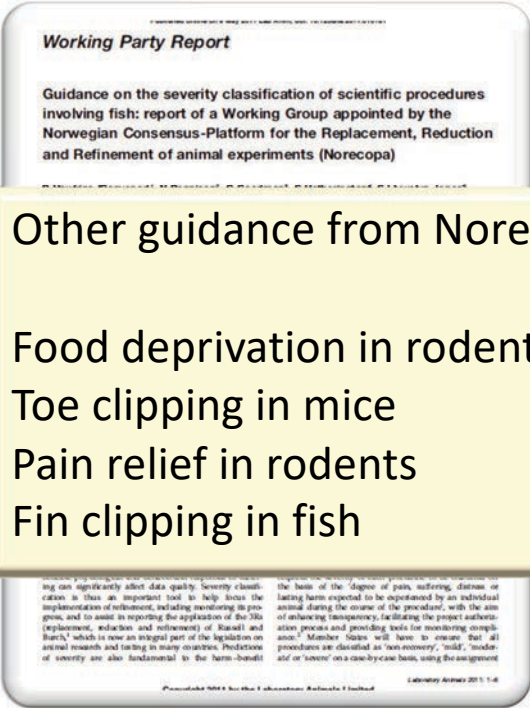
## Guidance on the severity classification of procedures involving fish

Report from a Working Group convened by Norecopa

[norecopa.no/3R-guide](http://norecopa.no/3R-guide)

[ec.europa.eu/environment/chemicals/lab\\_animals/pdf/report\\_ewg.pdf](http://ec.europa.eu/environment/chemicals/lab_animals/pdf/report_ewg.pdf)

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### Other guidance from Norecopa:

- Food deprivation in rodents
- Toe clipping in mice
- Pain relief in rodents
- Fin clipping in fish

**Overall planning:**

PREPARE guidelines

**Specific details:**

EDA + statistician

Other guidelines e.g.

acclimatisation

health monitoring

pain control



**Culture of Care**

**Reporting**

Guidelines e.g. ARRIVE, GSPC

Refinement Wiki





3R improvements should be highlighted in scientific papers

New blood  
sampling  
method



photo:NMBU

Published in:

*SCID-Hu mice immunized with a pneumococcal vaccine produce specific human antibodies and show increased resistance to infection.*

*Encourage scientists to write separate Methods paper if necessary*

**Saphenous vein puncture for blood sampling of the mouse, rat, hamster, gerbil, guineapig, ferret and mink**

**Annelise Hem<sup>1</sup>, Adrian J. Smith<sup>2</sup> & Per Solberg<sup>1</sup>**

<sup>1</sup>Laboratory Animal Unit, National Institute of Public Health, PO Box 4404 Torshov, N-0403 Oslo and

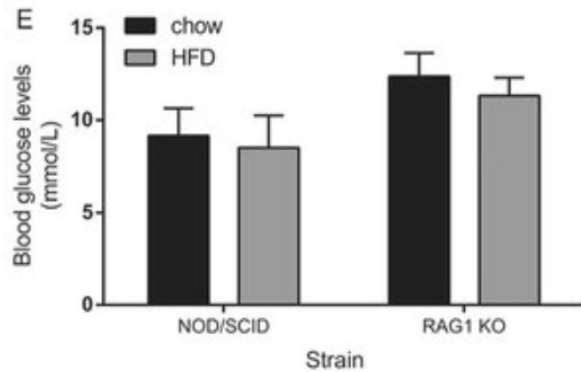
<sup>2</sup>Laboratory Animal Unit, Norwegian School of Veterinary Science, PO Box 8146 Dep., N-0033 Oslo, Norway

© Laboratory Animals Ltd. *Laboratory Animals* (1998) **32**, 364–368

**Summary**

- Not necessarily a high-impact journal
- Use the title and abstract to highlight 3Rs, because these are often the only parts of a paper which get indexed by the bibliographic databases

## The scientist



## The mouse

Breeding

New social groups

Transportation

Acclimatisation to research facility

Allocation to experimental group

Adaptation to new diet

Handling and immobilisation

### Blood samples

*often also:*

injections, gavaging, surgery

pain and distress

developing illness and death

## PREPARE:

Benefited from experience with project evaluation, facility inspection and accreditation

### Formulation of the study

1. Literature searches
2. Legal issues
3. Ethical issues, harm-benefit assessment and humane endpoints
4. Experimental design and statistical analysis

### Dialogue between scientists and the animal facility

5. Objectives and timescale, funding and division of labour
6. Facility evaluation
7. Education and training
8. Health risks, waste disposal and decontamination

### Methods

9. Test substances and procedures
10. Experimental animals
11. Quarantine and health monitoring
12. Housing and husbandry
13. Experimental procedures
14. Humane killing, release, reuse or rehoming
15. Necropsy

Items in pink are not typically highlighted in reporting guidelines





# PREPARE



## The PREPARE Guidelines Checklist

### Planning Research and Experimental Procedures on Animals: Recommendations for Excellence

Adrian J. Smith<sup>1</sup>, R. Eddle Clutton<sup>2</sup>, Elliot Lilley<sup>3</sup>, Kristine E. Aa. Hansen<sup>4</sup> & Trond Brattfeldt<sup>5</sup>

<sup>1</sup>Norecopa, c/o Norwegian Veterinary Institute, P.O. Box 750 Sentrum, 0106 Oslo, Norway; <sup>2</sup>Royal (Dick) School of Veterinary Studies, Easter Bush, Midlothian, EH25 9RG, U.K.; <sup>3</sup>Research Animals Department, Science Group, RSPCA, Wilberforce Way, Southwater, Horsham, West Sussex, GU12 7JF, U.K.; <sup>4</sup>Section of Experimental Biomedicine, Department of Production Animal Clinical Sciences, Faculty of Veterinary Medicine, Norwegian University of Life Sciences, P.O. Box 8146 Dep., 00333 Oslo, Norway; <sup>5</sup>Division for Research Methods, Norwegian University of Life Sciences, 5020 Bergen, Norway.

PREPARE<sup>®</sup> consists of planning guidelines which are complementary to the ARRIVE guidelines. PREPARE covers the three broad areas which determine the quality of research: **1. Formulation of the study**, **2. Dialogue between scientists and the animal facility** and **3. Quality control of the components in the study**.

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 appear in the checklist, since in-house experiments are dependent upon their quality and the management of animal facilities, 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
<b>(A) Formulation of the study</b>	
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 sources. <input type="checkbox"/> Assess the relevance of the species to 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 cover 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.

Three Rs

Your language?

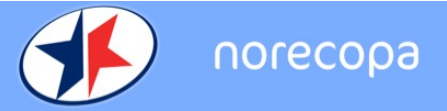
Topic	Recommendation
<b>(B) Dialogue between scientists and the animal facility</b>	
5. Objectives and timescale, funding and division of labour	<input type="checkbox"/> Arrange meetings with all relevant staff when early plans for the project exist. <input type="checkbox"/> Construct an approximate 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.
<b>(C) Quality control of the components in the study</b>	
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. Characteristics of the animals that are essential for the study and for reporting	<input type="checkbox"/> Consider the generation of surplus animals.
11. Health status, any needs for transport, quarantine and isolation, monitoring and consequences for the personnel	<input type="checkbox"/> Assess the animals' likely health status, any needs for transport, quarantine and isolation, monitoring and consequences for the personnel.
12. Husbandry	<input type="checkbox"/> Consider 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 & Brattfeldt 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](mailto:post@norecopa.no) | [@norecopa](https://twitter.com/norecopa)



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

[norecopa.no/PREPARE](http://norecopa.no/PREPARE)



The screenshot shows the top section of the norecopa website. The header is blue and contains the Norecopa logo and the word "norecopa" in white. To the right, 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 the following items: "About Norecopa", "Alternatives", "Databases & Guidelines", "Education & training", "Legislation", "Meetings", "More resources", "News", "PREPARE" (highlighted with a red circle), and "Species". Below the navigation menu 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".

[norecopa.no](http://norecopa.no) / [PREPARE](http://norecopa.no/PREPARE)



Norecopa: PREPARE for better Science



- PREPARE Checklist | 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 | Comparison with ARRIVE

norecopa.no / PREPARE



### Harm-Benefit Assessment

Harm-Benefit assessment, an evaluation of the likely sources and level of suffering of a planned procedure, followed by an assessment of the potential benefits of the research weighed against these harms, lies at the heart of [legislation in the EU](#) and elsewhere. [A framework for severity assessment and severity classification](#) must be established and justified. The likely adverse effects of each procedure should be described, along with their likely incidence and methods of recognising them, with indications of how these effects can be mitigated by implementing refinement. This necessitates the involvement of personnel with the relevant expertise to recognise, assess and reduce animal suffering, especially severe suffering. [Guidance on this is available on the RSPCA website](#). Specific justification of all unavoidable animal suffering must be provided. An estimate must be made of the maximum amount of pain, distress or lasting harm to which an individual can be

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



## A Culture of Care

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!*

# 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

The International Culture of Care Network  
A Quick Start Guide and more resources

[norecopa.no/CoC](http://norecopa.no/CoC)

## 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)<sup>[1]</sup>. The *click* bridges the time between the desired behavior and the presentation of the reward<sup>[1]</sup>. 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<sup>[2]</sup>.

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<sup>[3]</sup>

**Rats:** following a target stick, voluntarily change to a cage, observational learning<sup>[2]</sup>

**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<sup>[4]</sup>.



**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.

- ↑ 1.0 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.
- ↑ 2.0 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.
- ↑ 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.
- ↑ "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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## Refinement Wiki



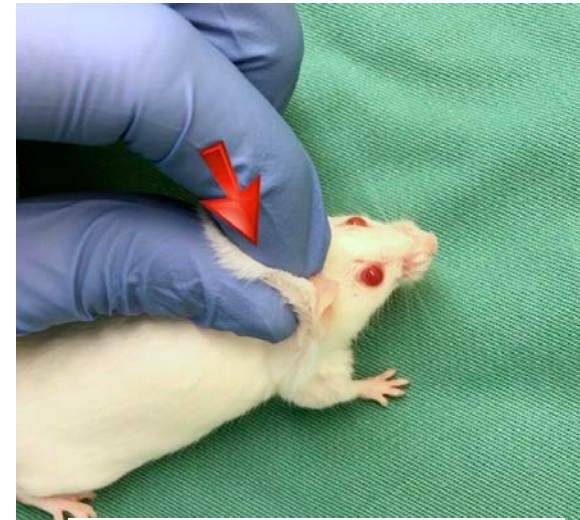
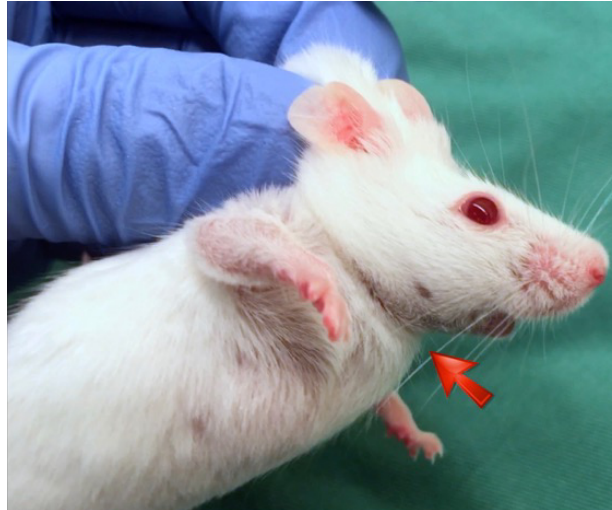
Main page  
Recent changes  
Random page  
Help about MediaWiki

Tools

What links here  
Related changes  
Upload file  
Special pages  
Printable version  
Permanent link  
Page information  
Cite this page

*e.g. Refinement of scruffing mice*

norecopa.no/scruff



Three fingers better than two

Baseline

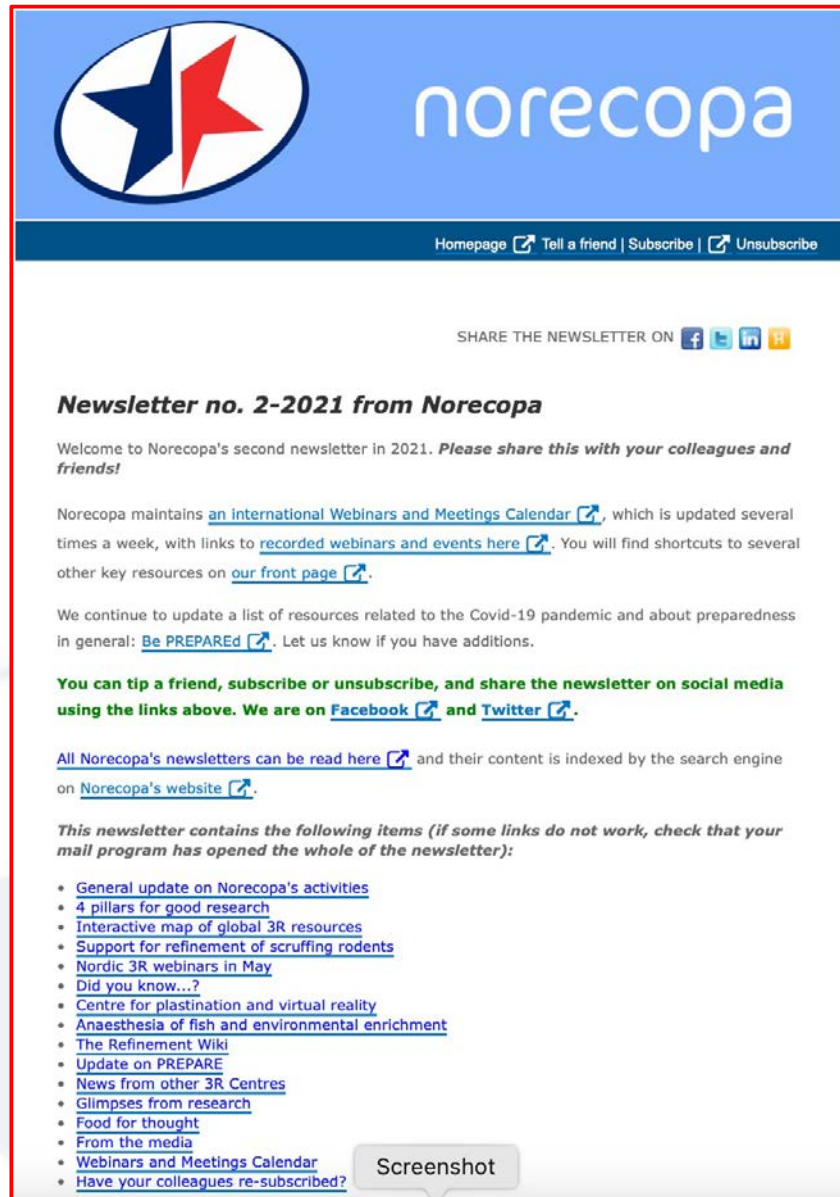


Immobilizing  
Sinus bradycardia, VEC




Reprinted with permission. Labitt RN, Oxford EM, Davis AK, Butler SD, Daugherty EK. 2021. A Validated Smartphone-based Electrocardiogram Reveals Severe Bradycardias during Immobilizing Restraint in Mice of Both Sexes and Four Strains. J Am Assoc Lab Anim Sci 60:201–212. DOI: 10.30802/AALAS-JAALAS-20-000069

Norecopa: PREPARE for better Science



The screenshot shows the top of a newsletter page. At the top left is the Norecopa logo, which consists of a blue and red star inside a white oval. To the right of the logo is the word "norecopa" in a white, lowercase, sans-serif font. Below the logo and name is a dark blue navigation bar with white text: "Homepage", "Tell a friend", "Subscribe", and "Unsubscribe", each with a small icon. Below the navigation bar is a white section with the text "SHARE THE NEWSLETTER ON" followed by icons for Facebook, Twitter, LinkedIn, and YouTube. The main content area has a heading "Newsletter no. 2-2021 from Norecopa" and a welcome message. It includes several paragraphs of text with hyperlinks to various resources. At the bottom, there is a list of items contained in the newsletter, each with a bullet point and a link. A "Screenshot" label is visible in the bottom right corner of the image.

 norecopa

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### Newsletter no. 2-2021 from Norecopa

Welcome to Norecopa's second newsletter in 2021. *Please share this 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 update 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](#) and [Twitter](#).**

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](#)
- [4 pillars for good research](#)
- [Interactive map of global 3R resources](#)
- [Support for refinement of scruffing rodents](#)
- [Nordic 3R webinars in May](#)
- [Did you know...?](#)
- [Centre for plastination and virtual reality](#)
- [Anaesthesia of fish and environmental enrichment](#)
- [The Refinement Wiki](#)
- [Update on PREPARE](#)
- [News from other 3R Centres](#)
- [Glimpses from research](#)
- [Food for thought](#)
- [From the media](#)
- [Webinars and Meetings Calendar](#)
- [Have your colleagues re-subscribed?](#)

Screenshot

## English-language newsletters

[norecopa.no/news/newsletters](http://norecopa.no/news/newsletters)




7-8 times a year

nearly 1,000 international subscribers



***norecopa.no/NCP***

English-language newsletters

<b>Contact oss</b> +47 41 22 09 49 post@norecopa.no   Norecopa on Facebook	<b>Street address</b> Ullevålsveien 68 0454 Oslo  <b>Postal address</b> % Norwegian Veterinary Institute P.O. Box 750 Sentrum N-0106 Oslo, Norway  Org.no. 992 199 199 Bank account: 7694 05 12030 (IBAN: NO51 7694 0512 030) (payment must be marked '12025 Norecopa')	<b>Shortcuts</b> > Give us some feedback! > 2010/63/EU > Information material > Norecopa's Board > Secretariat > Sponsors > Cookies & Privacy > Site map  <b>Resources developed in collaboration with:</b>  Norges miljø- og biovitenskapelige universitet  U.S. Department of Agriculture	<b>Subscribe to our newsletter</b> <input type="text" value="Your email address:"/> <input type="button" value="Register"/> > Browse our latest newsletters
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