

*RSPCA meeting 'Focus on severe suffering'
Brussels, 16 - 17 June 2016*

How to search for information on refining 'severe' models and tests

Adrian Smith

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norecopa.no/RSPCA2016





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- **Strategies for planning research which may involve animals or animal material**
- **How to search for and share 3R resources**
- **Gaps in our knowledge**
- **Action points**

National Consensus Platform for the
Replacement, Reduction and Refinement of
Animal Experiments



A competence centre for the 3Rs

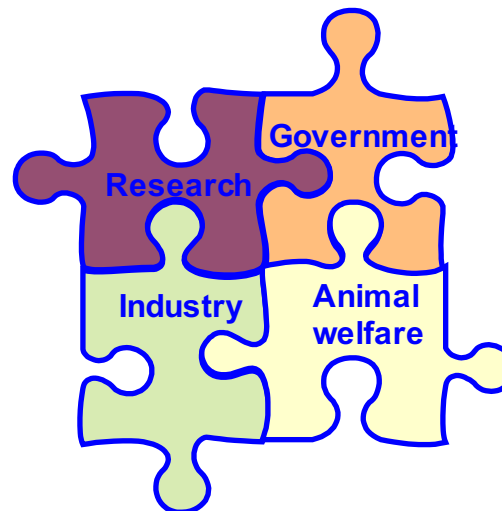
Norecopa is a member of **ecopa**

European Consensus-Platform for Alternatives

www.ecopa.eu



ecopa supports the establishment of National Consensus Platforms (NCPs) where all 4 stakeholders are equally represented:





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The Board represents all 4 stakeholders:

- ***Bente Bergersen***, Norwegian Food Safety Authority, chairperson
deputy: Johan Teige, Norwegian Food Safety Authority
- ***Siri Knudsen***, University of Tromsø
deputy: Aurora Brønstad, University of Bergen
- ***Glenn Arve Sundnes***, MSD Animal Health Innovation
deputy: Børge N. Fredriksen, PHARMAQ
- ***Anton Krag***, Norwegian Animal Protection Alliance
deputy: Harald Small, Norwegian Society for Protection of Animals





International consensus meetings

Harmonisation of the Care and Use of:

Fish (2005)

Wildlife (2008)

Fish (2009)

Agricultural animals (2012)

Wildlife (Autumn 2017)

<http://norecopa.no/consensus-meetings>

All presentations and consensus statements are on the internet: a lasting information resource on the 3Rs



Expert Working Group report on severity classification

July 2009

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



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Working Party Report

Guidance on the severity classification of scientific procedures involving fish: report of a Working Group appointed by the Norwegian Consensus-Platform for the Replacement, Reduction and Refinement of animal experiments (Norecopa)

P Hawkins (Coventry)¹, N Dennison², G Goodman³, S Hetherington⁴, S Llywelyn-Jones⁵, K Ryder⁶ and A J Smith⁷

¹Research Animals Department, BPCSA, Welford Way, Southwell, West Sussex RH13 9RL, UK; ²Thomas (Scientific Procedures) International Home Office, PO Box 2775, Dundee DD1 9WA, UK; ³Biological Services, The University of Edinburgh, Charlotte Building, 48, The Bruce Building, Edinburgh EH8 9JY, UK; ⁴Biological Services, The University of Edinburgh, Charlotte Building, 48, The Bruce Building, Edinburgh EH8 9JY, UK; ⁵Biological Services Ltd, 4th Floor, Holborn Building, St Paul's Campus, London EC1A 4AA, UK; ⁶Norecopa, c/o Norwegian Veterinary Institute, PO Box 750 Sentrum, N-0108 Oslo, Norway; ⁷Corresponding author: P.Hawkins, Email: phawkins@bpcsa.org.uk

Abstract

The severity classification of procedures using animals is an important tool to help focus the implementation of refinement and to assist in reporting the application of the 3Rs (Replacement, Reduction and Refinement). The recently revised Directive that regulates animal research and testing within the European Union is given Member States to ensure that all procedures are classified as 'non-recovery', 'mild', 'moderate' or 'severe', using assignment criteria set out by the European Commission (EC). However, these are focused upon terrestrial species, so an updated reference for fish users, a Working Group set up by the Norwegian Consensus-Platform for the 3Rs (Biological) has produced guidance on the classification of severity in scientific procedures involving fish, including examples of 'subthreshold', 'mild', 'moderate', 'severe' and 'upper threshold' procedures. This document complements the EC guidelines and help to ensure that suffering in fish is effectively prevented and minimized. Norecopa has established a website (www.norecopa.no/categories) where more information on severity classification for procedures using fish, including fish research, will be made available.

Keywords: Fish, harm, severity assessment, humane endpoints, refinement, severity

Laboratory Animals 2011; 45: 219-224. DOI: 10.1056/la.2011.01.010

Background

An effective prediction of the effects of a research protocol on the animals concerned helps to ensure that any pain, suffering or distress they may experience will be effectively anticipated, recognized and alleviated. This is essential not only for animal welfare but also for scientific validity, because physiological and behavioural responses to suffering can significantly affect data quality. Severity classification is thus an important tool to help focus the implementation of refinement, including monitoring its progress, and to assist in reporting the application of the 3Rs (Replacement, Reduction and Refinement) of Russell and Burch,¹ which is now an integral part of the legislation on animal research and testing in many countries. Predictions of severity are also fundamental to the 3Rs (health)

assessment undertaken by bodies such as regulatory authorities and ethical committees when deciding whether or not a project should be licensed or funded.

There may also be a legal requirement to justify and classify severity. For example, the new Directive regulating animal use within the European Union, which must be implemented within all Member States by January 2010, requires the severity of each procedure to be classified on the basis of the degree of pain, suffering, distress or lasting harm expected to be experienced by an individual animal during the course of the procedure, with the aim of enhancing transparency, facilitating proper authorization process and providing basis for monitoring compliance.² Member States will have to ensure that all procedures are classified as 'non-recovery', 'mild', 'moderate' or 'severe' on a case-by-case basis, using the assignment

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Laboratory Animals 2011; 45

More species- and situation- specific guidance is needed

Guidance on the severity classification of procedures involving fish

Report from a Working Group convened by Norecopa

P Hawkins, N Dennison, G Goodman, S Hetherington, S Llywelyn-Jones, K Ryder and AJ Smith

Laboratory Animals, 45: 219-224, 2011

norecopa.no/categories

Guidance on the severity classification of procedures involving fish

P Hawkins¹, K Ryder², N Dennison², G Goodman³, S Hetherington⁴, S Llywelyn-Jones⁵ and AJ Smith⁶

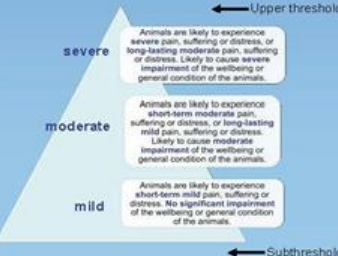
¹Research Animals Department, RSPCA, Wiberforce Way, Southwater, West Sussex, RH13 9RS, UK; ²Animals (Scientific Procedures) Inspectorate, Home Office, P.O. Box 6779, Dundee, DD1 9WW, UK; ³Biological Services, The University of Edinburgh, Chancellor Building, 49, Little France Crescent, Edinburgh, EH16 4SB, UK; ⁴CEFAS, Pakefield Road, Lowestoft, NR33 0HT, UK; ⁵King's College London, Biological Services Unit, 4th floor, Hodgkin Building, Guy's Campus, London, SE1 1UL, UK; ⁶Norecopa, c/o Norwegian Veterinary Institute, P.O. Box 750 Sentrum, N-0106 Oslo, Norway

Severity classification is an important tool in both implementing and monitoring the progress of refinement, including reporting the actual severity of procedures which is now part of the legislation on animal research and testing in some countries. Predictions of severity are also fundamental to the harm-benefit assessments undertaken by bodies such as regulatory authorities, and ethical committees, when deciding whether or not a project should be licensed or funded.

The recently revised EU Directive 2010/63 requires signatories to ensure that the severity of all procedures is classified as 'non-recovery' (under terminal anaesthesia), 'mild', 'moderate' or 'severe', using assignment criteria set out by the European Commission (EC) – see diagram. 'Subthreshold' procedures are those that are expected to inflict less pain, suffering or distress than that caused by the introduction of a needle.

An EC Working Group produced a report in 2009 giving examples of procedures within these categories, but these are most relevant to research using terrestrial species.

A working group set up by the Norwegian Consensus-Platform for the 3Rs (Norecopa) has published a complementary document that gives guidance on severity classification in fish research, including examples of 'subthreshold', 'mild', 'moderate', 'severe' and 'upper threshold' procedures. This document will make it easier for fish researchers to implement the requirements of the new Directive, which must be transposed into national law in January 2013.



← Upper threshold





severe
Animals are likely to experience severe pain, suffering or distress, or long-lasting moderate pain, suffering or distress. Likely to cause severe impairment of the wellbeing or general condition of the animals.

moderate
Animals are likely to experience short-term moderate pain, suffering or distress, or long-lasting mild pain, suffering or distress. Likely to cause moderate impairment of the wellbeing or general condition of the animals.

mild
Animals are likely to experience short-term mild pain, suffering or distress. No significant impairment of the wellbeing or general condition of the animals.

← Subthreshold

How would you categorise these procedures?

Examples from each category in Norecopa's guidelines (simplified):

Subthreshold	Mild	Moderate	Severe	Upper threshold
<ul style="list-style-type: none"> Behavioural studies Feeding studies where food restriction does not cause any harm Marking using non-toxic and non-aversive dyes in the water Manipulations of photoperiod, temperature or water gases that do not cause significant harm 	<ul style="list-style-type: none"> Disease research where humane endpoints are applied at the first clinical sign of disease or earlier Gentle, brief handling of fish out of water Blood sampling under anaesthesia using recommended volumes and techniques Removal of a small part of one fin, where rapid healing and minimal dysfunction or pain are expected Toxicological studies where animals are humanely killed at or before the onset of clinical signs 	<ul style="list-style-type: none"> Cannulation of blood vessels followed by successive blood sampling within recommended limits Intraperitoneal injection of substances known to cause adhesions Intramuscular or intraperitoneal implantation of telemetry devices by surgical procedures (under general anaesthesia) External attachment of telemetry devices with a risk of interference with normal activity and behaviour 'Shaking' in a net out of water to produce a stress response Removal of scales to promote fungal growth 	<ul style="list-style-type: none"> Salwater/freshwater challenge for scientific purposes where it cannot be predicted that the fish will adapt without severe effects or mortality Disease studies likely to cause death where the study cannot be controlled to avoid mortality Vaccine potency testing with persistent impairment of the animal's condition, progressive disease leading to the animal's death, or associated with long-lasting moderate pain, distress or suffering Surgical interventions under general anaesthesia which are expected to result in severe or persistent moderate postoperative pain, suffering or distress 	<ul style="list-style-type: none"> Pathophysiological studies where animals will experience substantial pain, suffering or distress which is long lasting Description of survival curves or similar tests where death is an endpoint and where death is preceded by prolonged and substantial pain, suffering or distress

Norecopa has set up a website with links to these guidelines and more information on severity classification:
www.norecopa.no/categories

Photos: Aurora Brønstad, Janine Nordgreen & VESØ Viken

Correspondence to: Adnan Smith, Norecopa, c/o Norwegian Veterinary Institute, P.O. Box 750 Sentrum, N-0106 Oslo, Norway (adnan.smith@vetinst.no)

Position Statements and Guidelines

- Food deprivation
- Toe clipping
- Pain relief
- Fin clipping of fish
- Biometric methods of identification
- Methods for identification of birds

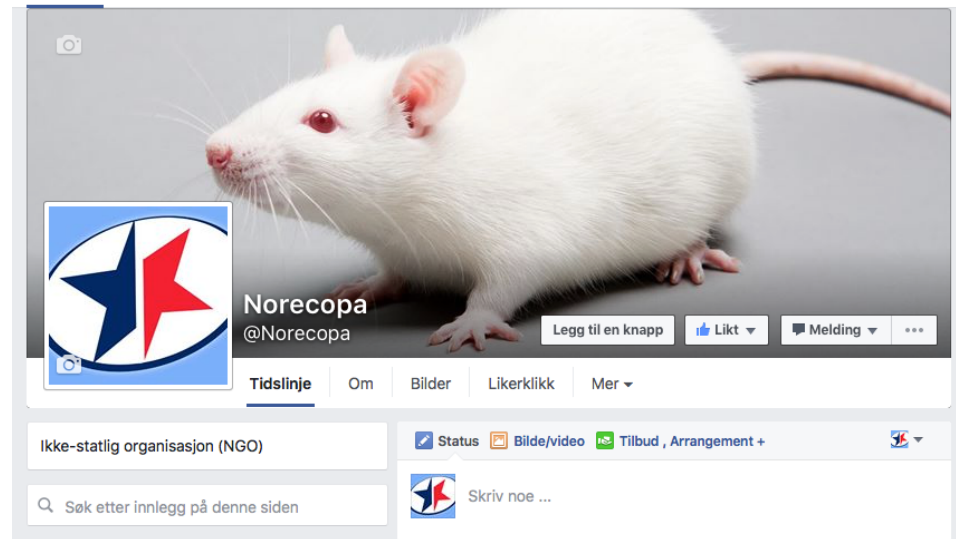
Newsletter 8-9 times a year

- something for you?



Dette brevet inneholder følgende saker:

- Nå er det på tide å nominere til 3R-prisen!
- Nye nettsider for Norecopa
- Arbeidsseminar om design og statistikk
- Frist for sammendrag til FELASA
- Nettbasert kurs om sørafisk
- Ny modul om dyrevelferd fra Newcastle
- Forbedring av fiskeforsøk
- Rådet for dyreetikk har fått nye medlemmer
- Nyheter fra 3R-sentre og komitéer
- UiB-nettside om 3R
- Glimt fra forskningen
- Merking av vilt
- Registrering av smerte hos sau



[Fish 2005](#) | [Wildlife 2008](#) | [Fish 2009](#) | [Agricultural animals 2012](#) | [Past meetings](#) | [Meetings Calendar](#) |

[An informal guide to arranging a scientific meeting](#)



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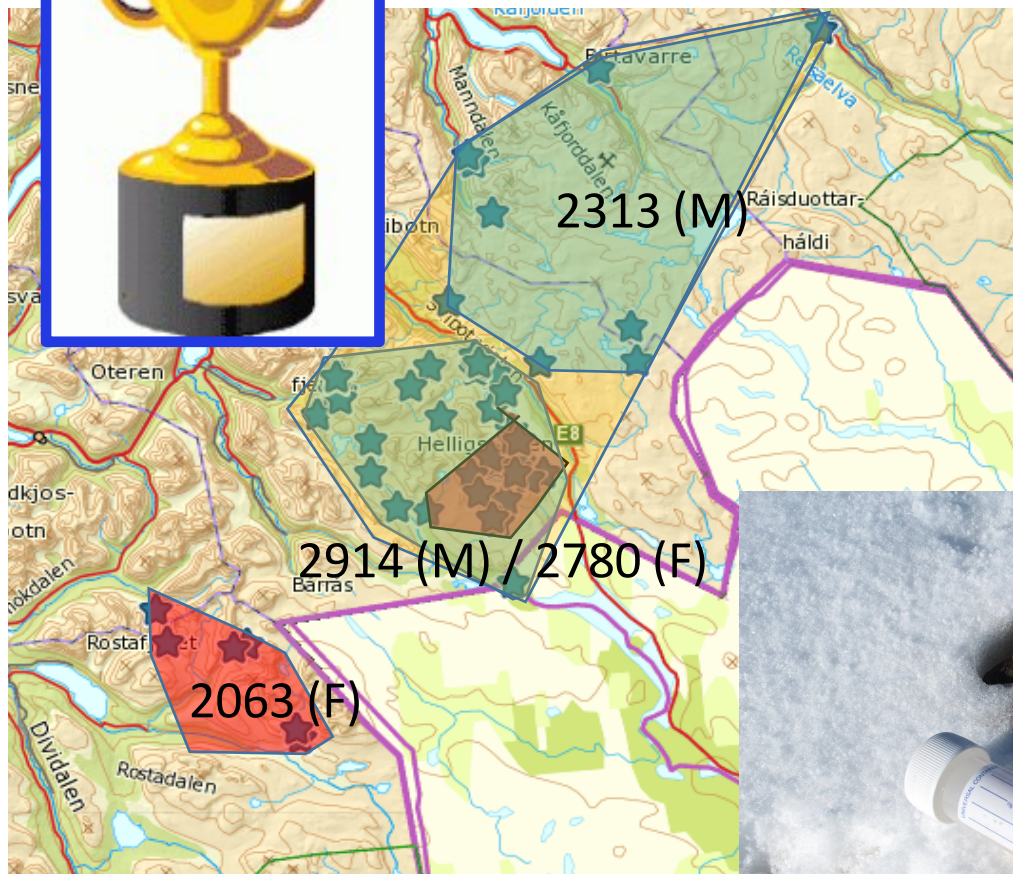
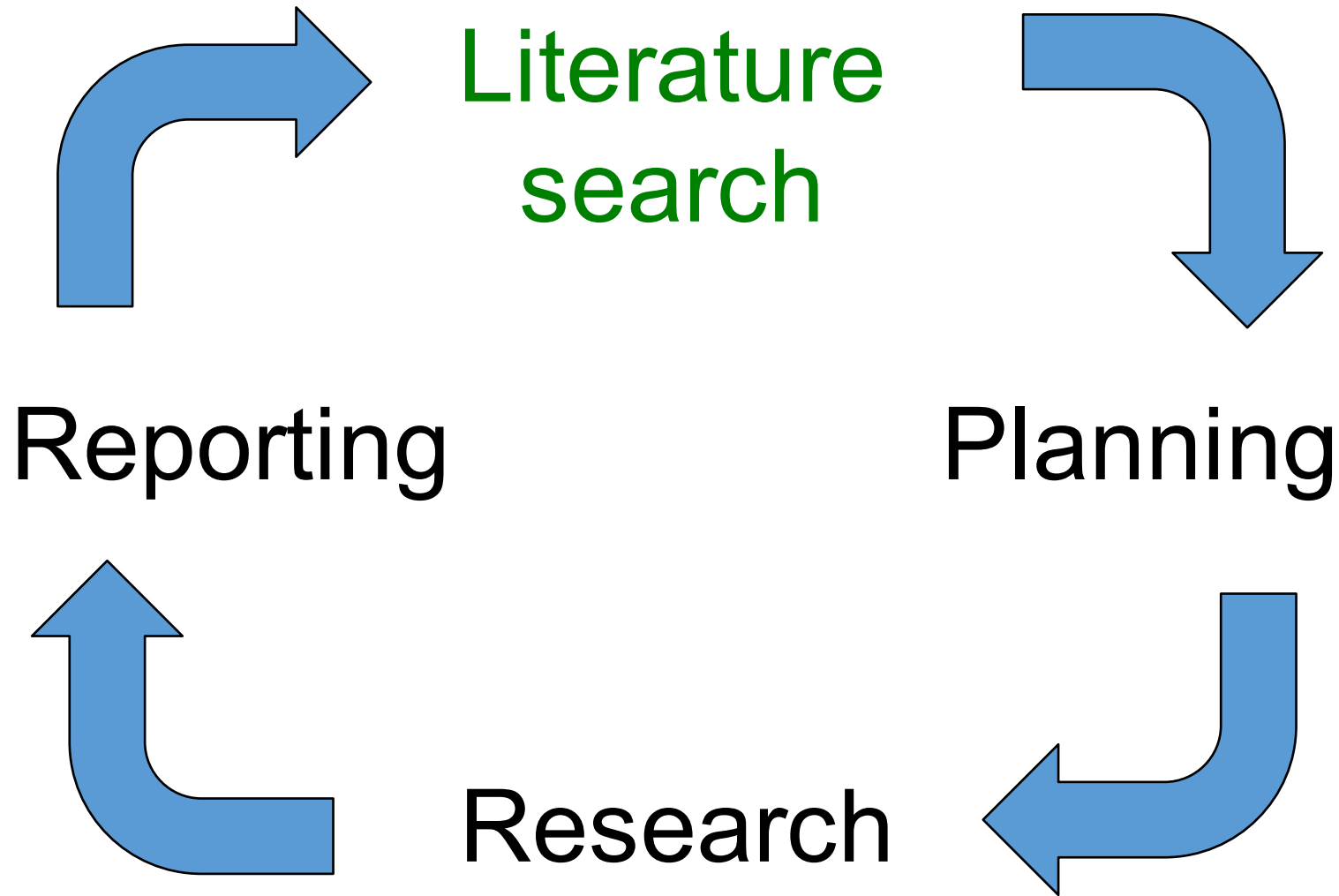


Photo: Vegard Pedersen, Statens naturoppsyn

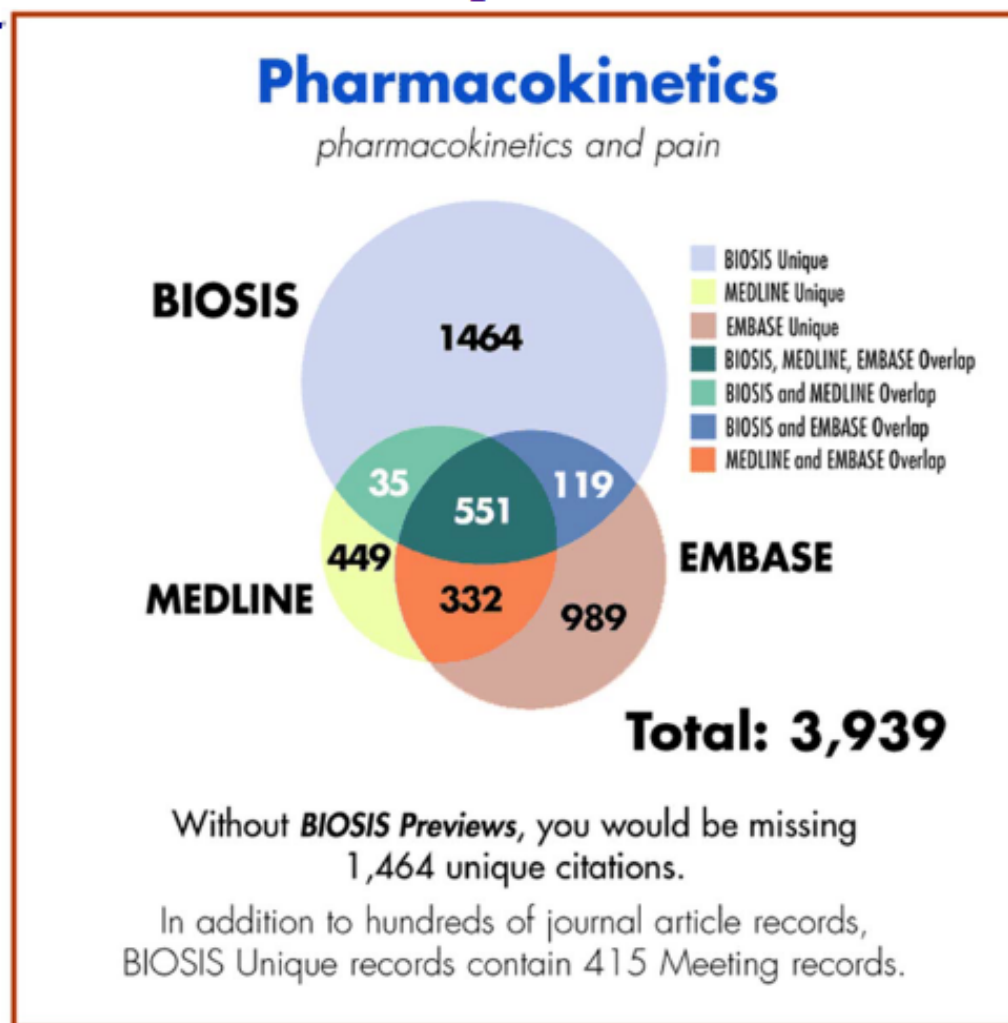


Norecopa's 3R prize
(3,000 euro + diploma)



Correct literature searches are a vital part of the work to implement the 3Rs

Why Search Multiple Databases?



Why are 3R advances to reduce severity so hard to find?

- Bibliographic databases are often not used adequately (poor overlapping between the databases)
- Too few scientists are aware of the specialist 3R-databases
- Scientists rarely use 3R words when they write titles/abstracts/keywords for their papers
- Databases rarely flag 3R-papers with explicit thesaurus terms
- We have no single *Journal of Alternatives*

Things have got worse rather than better after Google arrived:

You always get some results, even if you type in everything at once.

In many ways the situation was better earlier when searches had to be done manually with the help of a librarian

Action needed:

It is high time that all scientists received mandatory education in literature searching

Scientists should ensure that 3R advances are mentioned in the title or abstract

How many of you conduct searches in PubMed / MEDLINE?

How many of you

- *formulate a specific question and then determine which elements will be your search components (SC)*
- *use Word to make a list of search terms for every SC containing*
 - *MeSH terms*
 - *synonyms*
- *perform searches with separate strings for each SC:*

mice[MeSH] OR mice[tiab] OR mouse[tiab] OR murine[tiab]
- *finally, combine the search strings (AND)*

How many are familiar with SYRCLE's

- *Step by step guide to systematically find all relevant animal studies*
- *Search filters for finding animal studies in PubMed and EMBASE*

Alice Tillema, Radboud University:
How to construct a literature search

<http://norecopa.no/how-to-construct-a-literature-search.pdf>

How to construct a literature search

Alice Tillema, Medical Library, Nijmegen

<http://libguides.ru.nl/norecopa>



Radboud University



Radboudumc
university medical center

Norecopa - Literature Search: Search tips

Find other LibGuides

Search

Start page for Norecopa AGM 24 May 2016

Home

Search tips

Search Guide

[ECVAM Search Guide](#) (see
Download Content)




PubMed

-  [PubMed Practical](#)

[PubMed with incorporated animal filter \(SYRCLE\)](#)

How to construct a comprehensive search strategy

- Formulate a specific research question
In animal models for Alzheimer's Disease what is the effect of supplementation of omega-3 fatty acids on cognition and neurodegeneration?
- Determine which elements of the question will be your search components (SC)
animals, alzheimer, omega 3 fatty acids
- Make a list of search terms** for every SC containing
 - MeSH term e.g. *alzheimer disease*[MeSH]
 - synonyms e.g. *alzheimer, alzheimer's, alzheimers, dementia*
- Create a search string for each SC using **OR** between the search terms
[Search string for component *Alzheimer* at SYRCLE website](#)
- Perform searches with separate search strings in PubMed
- Use *History (Advanced)* to combine search strings with AND. [Example](#)
-  ** [Tips for turning a list of search terms into a search string \(in Word\)](#)

SYRCLE

[A step by step guide to systematically find all relevant animal studies](#)

[SYRCLE Tools and support for systematic reviews](#)

[SYRCLE Training materials for Systematic Review workshop](#)

A step-by-step guide to systematically identify all relevant animal studies

Marlies Leenaars¹, Carlijn R Hooijmans¹, Niek van Veggel^{1,2}, Gerben ter Riet³, Mariska Leeflang⁴, Lotty Hooft⁵, Gert Jan van der Wilt⁶, Alice Tillema⁷ and Merel Ritskes-Hoitinga¹

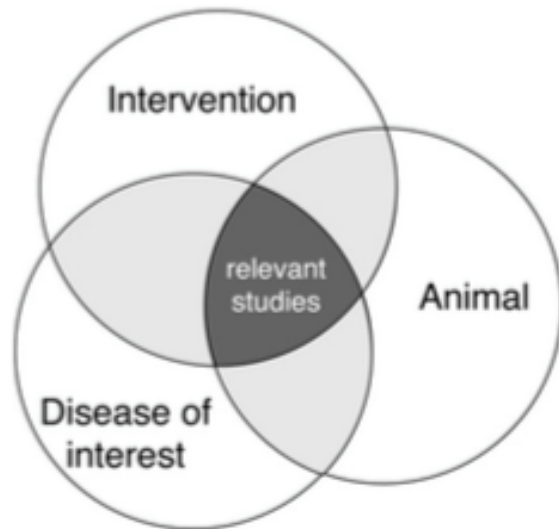


Figure 1 Combining components in the search strategy (adapted from Higgins and Green³)

Text search filter:

```
("animal experimentation"[MeSH Terms] OR "models, animal"[MeSH Terms] OR "invertebrates"[MeSH Terms] OR "Animals"[Mesh:noexp] OR "animal population groups"[MeSH Terms] OR "chordata"[MeSH Terms:noexp] OR "chordata, nonvertebrate"[MeSH Terms] OR "vertebrates"[MeSH Terms:noexp] OR "amphibians"[MeSH Terms] OR "birds"[MeSH Terms] OR "fishes"[MeSH Terms] OR "reptiles"[MeSH Terms] OR "mammals"[MeSH Terms:noexp] OR "primates"[MeSH Terms:noexp] OR "artiodactyla"[MeSH Terms] OR "carnivora"[MeSH Terms] OR "cetacea"[MeSH Terms] OR "chiroptera"[MeSH Terms] OR "elephants"[MeSH Terms] OR "hyraxes"[MeSH Terms] OR "insectivora"[MeSH Terms] OR "lagomorpha"[MeSH Terms] OR "marsupialia"[MeSH Terms] OR "monotremata"[MeSH Terms] OR "perissodactyla"[MeSH Terms] OR "rodentia"[MeSH Terms] OR "scandentia"[MeSH Terms] OR "sirenia"[MeSH Terms] OR "xenarthra"[MeSH Terms] OR "haplorhini"[MeSH Terms:noexp] OR "strepsirhini"[MeSH Terms] OR "platyrrhini"[MeSH Terms] OR "tarsii"[MeSH Terms] OR "catarrhini"[MeSH Terms:noexp] OR "cercopithecidae"[MeSH Terms] OR "hylobatidae"[MeSH Terms] OR "hominidae"[MeSH Terms:noexp] OR "gorilla gorilla"[MeSH Terms] OR "pan paniscus"[MeSH Terms] OR "pan troglodytes"[MeSH Terms] OR "pongo pygmaeus"[MeSH Terms]) OR ((animals[tiab] OR animal[tiab] OR mice[Tiab] OR mus[Tiab] OR mouse[Tiab] OR murine[Tiab] OR woodmouse[tiab] OR rats[Tiab] OR rat[Tiab] OR murinae[Tiab] OR muridae[Tiab] OR cottonrat[tiab] OR cottonrats[tiab] OR hamster[tiab] OR hamsters[tiab] OR cricetinae[tiab] OR rodentia[Tiab] OR rodent[Tiab] OR rodents[Tiab] OR pigs[Tiab] OR pig[Tiab] OR swine[tiab] OR swines[tiab] OR piglets[tiab] OR piglet[tiab] OR boar[tiab] OR boars[tiab] OR "sus scrofa"[tiab] OR
```

...to ensure that you access recent papers also, not just the ones that have been indexed.

Relatively few papers are indexed with 3R MESH terms in MEDLINE

European Commission

ENVIRONMENT

European Commission > Environment > Chemicals > Animals used for scientific purposes

Home About us Policies Funding Legal compliance News & outreach

Animals used for scientific purposes

Retrieval and provision of information on the "Three Rs" and alternatives

Accessing accurate, relevant and up-to-date information on the Three Rs is a challenge for all those use of animals.

Legislation and implementation

- EU legislative framework
- Implementation of Directive 2010/63/EU
- Q&A and guidance documents

The "Three Rs" and alternative approaches

- Replacement, Reduction and Refinement – the "Three Rs"
- Validation, acceptance and use
- EU activities to advance alternatives
- Member State activities to advance alternatives
- Finding and distributing information on alternatives
- Key resources
 - Search Tools
 - Databases
 - Portals and web-sites
 - Journals
 - Other resources and organisations

Animals used for scientific purposes

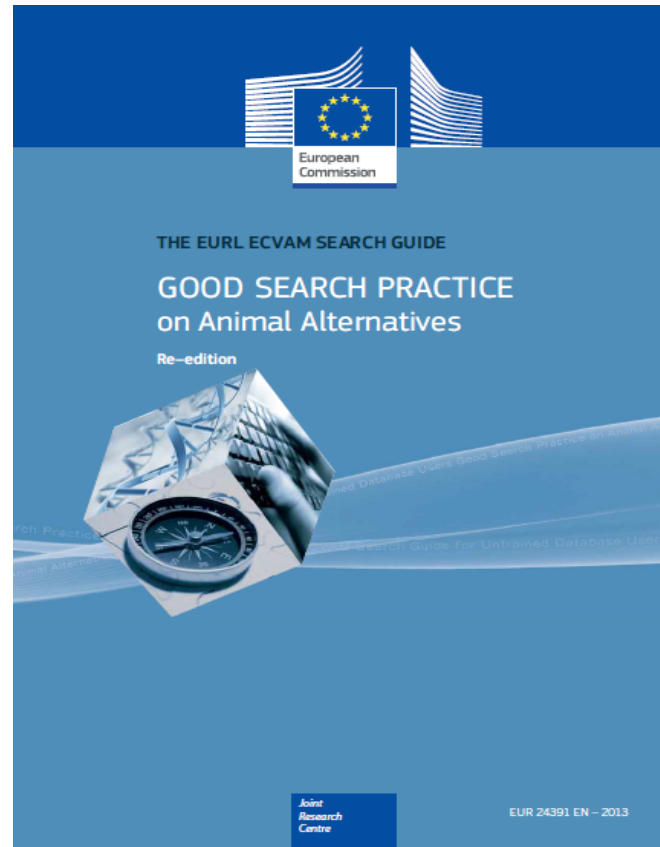
Opinions of European Commission Expert Committees related to the use of animals in experiments

f t

The EURL ECVAM Search Guide

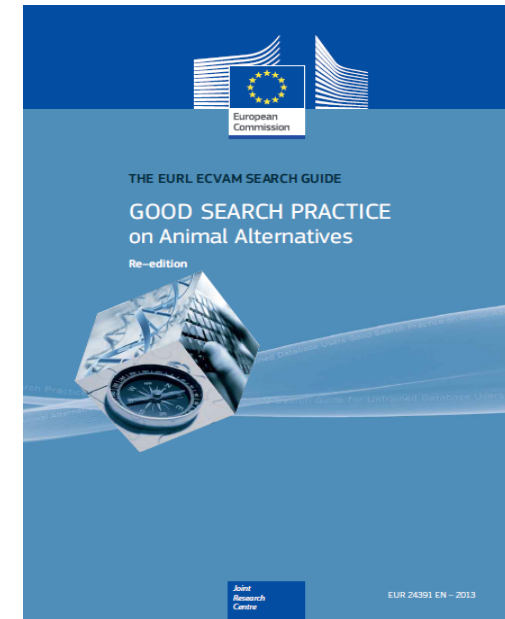
Can be ordered free of charge from

bookshop.europa.eu



Contents

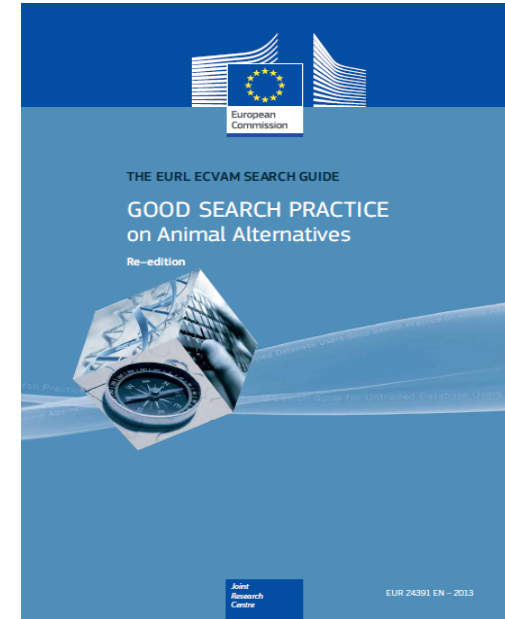
- Data Retrieval Procedures
(basic principles)
- Check-list for searching for information on alternative methods
- Tables comparing the features of
 - Databases
 - Journals
 - Organisations

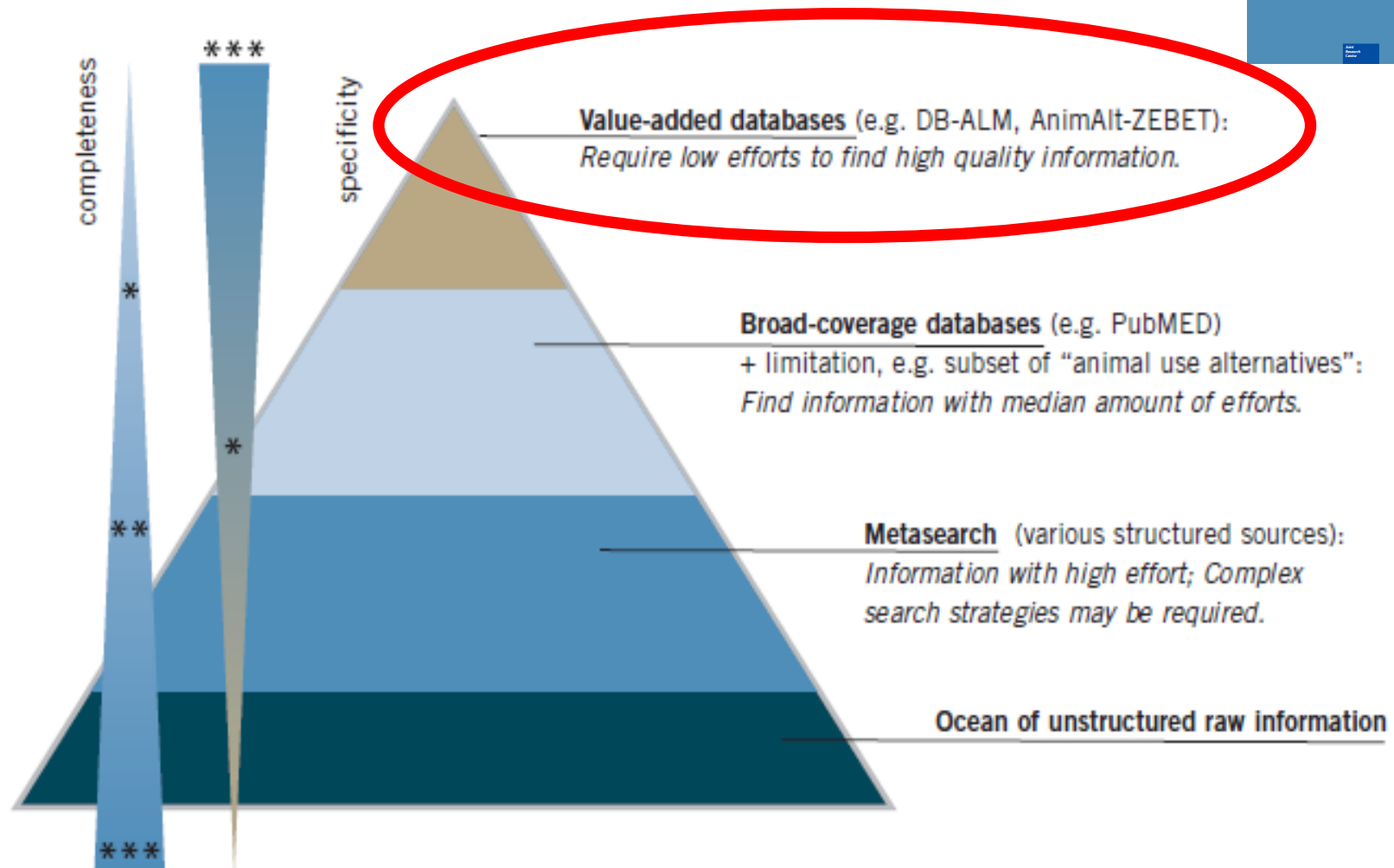


Contents

Seven Golden Steps to Successful Searching

1. Clearly define and be aware of your specific information need
2. Identify the fundamental components of your scientific approach
3. Choose the most appropriate information resources
4. Compile relevant and necessary search terms
5. Start your search with a simple query in a 3Rs specific context
6. Limit search results from more extensive resources
7. Broaden the search horizon







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Search all Norecopa's databases and webpages simultaneously:



[Welcome to Norecopa's new website!](#)

[Search engine help file](#)

More about Norecopa's databases: [3R Guide](#) - [NORINA](#) - [TextBase](#) - [Classic AVs](#)

Animals in research:



Fish



Farm animals



Laboratory animals



Wildlife and wild fish



Cephalopods



Other aquatic animals

Norecopa promotes use of "The Three Rs":

Replace

Replacement of animal experiments with alternatives

Reduce

Reduction of the number of animals used in experiments

Refine

Reduction of pain and suffering in animal experiments

Norecopa aims for consensus between the four stakeholders:

Government and Regulatory Authorities - Research and teaching - Industry - Animal protection and welfare

The search engine

Guidelines bleeding mice

Search

Help

Enable synonyms and stemming

Reset

Did you mean: [guideline breeding mice\(4\)](#)

Category

- Agricultural animals (5)
- Anaesthesia (3)
- Anaesthesia and analgesia (4)
- Anatomy (175)
- Aquatic animals (4)
- Behaviour (4)
- Behavioural research (3)
- Biochemistry (7)
- Biology (4)
- Birds (5)
- Blood sampling (12)
- Cancer research (3)
- Design (7)
- Disease research (3)
- Dissection (7)
- Education and training (3)

Auto-complete function:

- blood
- blood
- blood collection
- blood from
- blood sampling

Synonym list:
Bleeding, bloodsampling, blood sampling, venepuncture,
blood collection, phlebotomy

Categories, types, 3R
relevance and many more

- An index of all the words on all the approx. 6,300 pages
- Fuzzy logic
- Boolean logic
- Wildcards
- Proximity searches
- Truncation



A help file available

Collaboration with US Department of Agriculture

Search for 'bleeding mice' on Google and Norecopa.

The image shows a search results page from Norecopa. At the top, there is a search bar containing the text "bleeding mice" and a magnifying glass icon. Below the search bar, there are navigation tabs for "All", "Images", "Videos", "Shopping", "News", "More", and "Search tools". The search results are displayed below, starting with "About 4,760,000 results (0.35 seconds)".

The main content area is titled "Search all Norecopa's databases and webpages simultaneously:" and contains a search bar with "bleeding mice" and a magnifying glass icon. Below this, there are links for "Welcome to Norecopa's new website!", "Search engine help file", and "More about Norecopa's databases: 3R Guide - NORINA - TextBase - Classic AVs". A blue bar indicates "76 results".

The search results list includes:

- Research Advisory Committee Guidelines for Survival Bleeding Rats**
These guidelines have been developed to assist investigators and National Institutes of Health (NIH) Institutional Animal Care and Use Committees (IACUC) in their choice and application of survival rodent techniques.
- Blood sampling**
Blood sampling is one of the commonest procedures conducted on research animals, but it may cause pain, distress and lasting harm if the technique is poor, or if too much of the circulating blood volume is removed. Videos and slide series showing blood sampling techniques on several common laboratory animal species. Links NC3Rs Microsite on blood sampling Films and slide shows on bleeding techniques...
- Blood Collection in Mice Using the Saphenous Vein - An Alternative to Retro Orbital Collection**
NORINA/8641
These web pages describe a method for blood collection from the saphenous vein of mice, rats, hamsters, gerbils, guinea-pigs, mink and ferrets. Type of record: Web pages. Category: Veterinary Medicine

On the right side, there is a "Search filters" panel. It includes an "Order by:" dropdown menu set to "Relevance", a checkbox for "Enable synonyms and stemming", and two expandable sections: "Browse the databases" and "Search in the databases". The "Browse the databases" section lists various categories with counts: eBooks (6), Free (5), Held at NMBU Oslo (contact kristine.hansen@nmbu.no) (5), Key products (6), On loan (2), and Reviewed. The "Search in the databases" section lists: 3R Guide (6), Classic AVs (6), Website (6), NORINA (35), and TextBase (23). The "Search in the databases" section also has a "All Text" checkbox and a list of fields: Title, Author, and Publisher.

A red box highlights the search bar and the "Search filters" panel. A red circle highlights the "Bleeding" text in the first search result. A red oval highlights the "Search filters" panel.

'Bleeding' not mentioned, but identified by the synonym list



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Search:

[About Norecopa](#) | [Alternatives](#) | [Databases & Guidelines](#) | [Education & training](#) | [Legislation](#) | [Meetings](#) | [News](#) | [Other resources](#) | [Species](#) | [Feedback](#)

[Anaesthesia and analgesia](#) | [Animal facilities](#) | [Animal welfare organisations](#) | [Blood sampling](#) | [Email discussion lists](#) | [Environmental enrichment](#) | [Ethics](#) | [Experimental design and statistical analysis](#) | [Harm-Benefit assessment](#) | [Health monitoring](#) | [Journals](#) | [Organisations](#) | [Severity classification](#) | [Suppliers](#) | [Systematic reviews](#)

norecopa.no / [Other resources](#)

Search all Norecopa's databases and webpages simultaneously:



Organisations of relevance to animal research

Organisations within Laboratory Animal Science

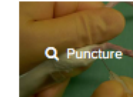
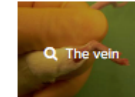
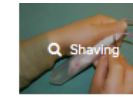
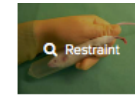
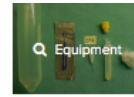
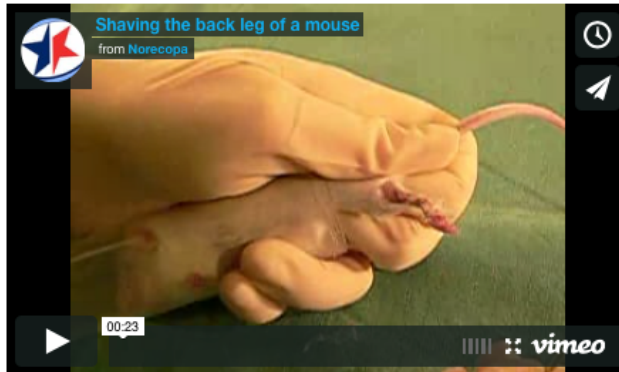
[AAALAC International](#) (Association for Assessment and Accreditation of Laboratory Animal Care International)

[AALAS](#) (American Association for Laboratory Animal Science)

[ACLAM](#) (American College of Laboratory Animal Medicine)

[ASLAP](#) (American Society of Laboratory Animal Practitioners)

Red links: external
Blue link: internal

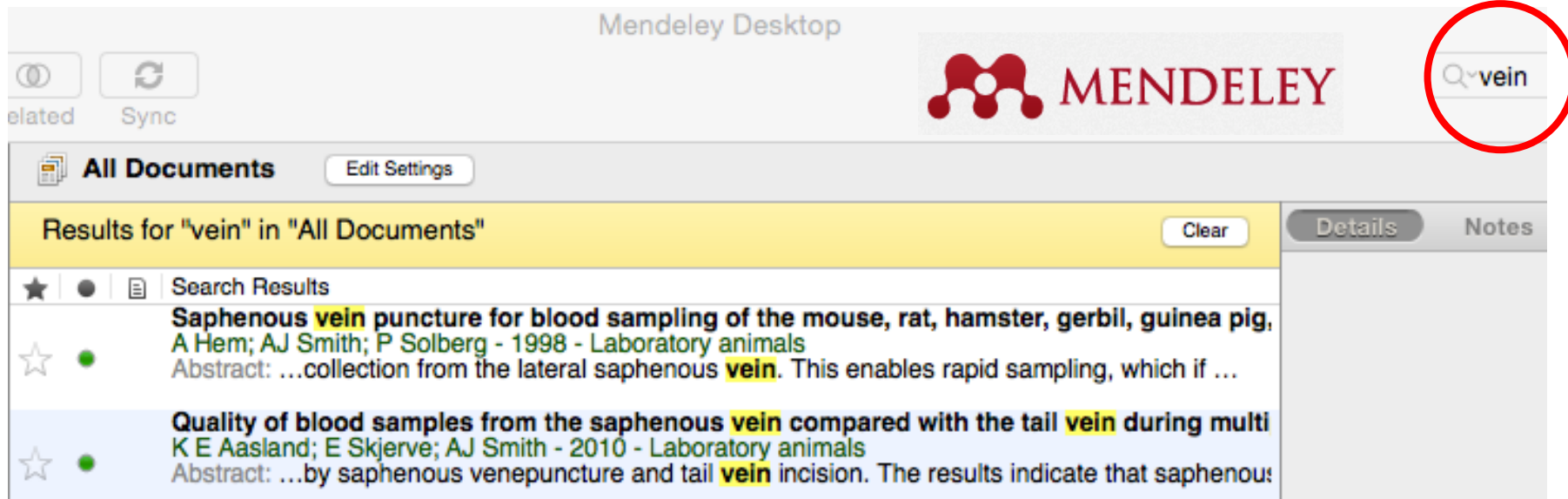


Archive your searches

Norecopa's website generates unique URLs, so a search can be documented and repeated

<http://norecopa.no/search?q=bloodsampling%20mouse>

Archive key documents you retrieve, e.g. in Mendeley



The screenshot shows the Mendeley Desktop application interface. At the top, the title bar reads "Mendeley Desktop". On the right side, there is a search bar containing the text "vein", which is circled in red. Below the search bar, the main area displays search results for "vein" in the "All Documents" collection. The results are listed in a table with columns for "Details" and "Notes". The first result is "Saphenous vein puncture for blood sampling of the mouse, rat, hamster, gerbil, guinea pig, A Hem; AJ Smith; P Solberg - 1998 - Laboratory animals". The second result is "Quality of blood samples from the saphenous vein compared with the tail vein during multi K E Aasland; E Skjerve; AJ Smith - 2010 - Laboratory animals".

Mendeley Desktop

related Sync

MENDELEY

Q vein

All Documents Edit Settings

Results for "vein" in "All Documents" Clear

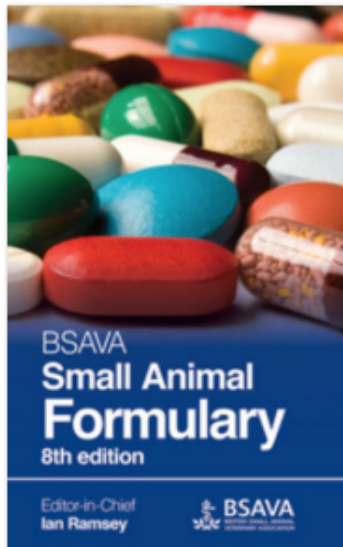
Details Notes

Search Results

☆ ● Saphenous vein puncture for blood sampling of the mouse, rat, hamster, gerbil, guinea pig, A Hem; AJ Smith; P Solberg - 1998 - Laboratory animals
Abstract: ...collection from the lateral saphenous vein. This enables rapid sampling, which if ...

☆ ● Quality of blood samples from the saphenous vein compared with the tail vein during multi K E Aasland; E Skjerve; AJ Smith - 2010 - Laboratory animals
Abstract: ...by saphenous venepuncture and tail vein incision. The results indicate that saphenou:

Hidden 3R resources



norecopa.no / TextBase / Formulary for Laboratory Animals

Formulary for Laboratory Animals

By Terrance C. Hawk, Steven Leary & Timothy Morris

Record number: 13202 (legacy id: 6055)

This Formulary is an important reference for treatment of laboratory animals and small animal pets. Drugs are listed alphabetically and categorized in five sections based on pharmacological activities and animal species. The third edition includes a stronger international component, coverage of several new drugs, hundreds of additional dosages, and a thorough update throughout based on the most current research. It also includes a chapter describing how to estimate drug dosages among species using allometric scaling methodology. Table of Contents: Preface to the First Edition; Preface to the Second Edition; Preface to the Third Edition; Abbreviations; Formulary for Laboratory Animals: Dose Estimation Among Species; References; Analgesics and Sedatives; Anesthetics; Anti-infectives; Parasiticides; Miscellaneous Drugs; Appendixes; References; Index.



Comments & References: Third Edition. 216 pages.

Softcover. Suitable for students and practitioners of veterinary medicine, researchers and laboratory technicians who prescribe or administer drugs used on common laboratory animals. The second edition of this book is also available as a CD-ROM for both PC and Macintosh. Please see record number [5331](#) for the CD-ROM version in the NORINA database, entitled Formulary for Laboratory Animals CD-ROM. A review of the Third Edition is available in Laboratory Animals, October 2005, Volume 39 (4) or at <http://la.rsmjournals.com/archive>.

ISBN-10: 0-8138-1048-5; ISBN-13: 978-0-8138-1048-5

Chapter on Dose estimation among species by Timothy H. Morris

A simple summary would be that since time parameters are related to weight to the power of about 0.25, and volumes are related linearly to the power of about 1.0, volume-rates (volume divided by time, e.g., cardiac output) must be related to weight to the power of about 0.75 (see Lindstedt and Calder, 1981, equation 7):

$$\frac{\text{Volume}}{\text{Time}} \propto \frac{M^{1.0}}{M^{0.25}} = M^{0.75}$$

It will take a lot longer to find refinements for severe models and tests as long as scientists hide their refinements in the Materials and Methods section!



http://www.theodora.com/rodent_laboratory/blog_collection.html



photo: NMBU

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

Saphenous vein puncture for
blood sampling of the mouse, rat,
hamster, gerbil, guinea-pig,
ferret and mink



Most-Cited Articles as of June 1, 2016 - updated monthly

Rankings based on citations to online articles from HighWire-hosted articles.

1. Working Party Report:

W. Nicklas, P. Barthelet, R. Bost, N. Decelle, A. A. Deeny, M. Fumanelli, and B. Illgen-Wilcke

Recommendations for the health monitoring of rodent and rabbit colonies in breeding and experimental units

Lab Anim January 1, 2002 36: 20-42, doi:10.1258/0023677021911740

» [Full Text \(PDF\)](#)

2. Articles:

C. Moolenbeek and E. J. Ruitenberg

The 'Swiss roll': a simple technique for histological studies of the rodent intestine

Lab Anim January 1, 1981 15: 57-59,
doi:10.1258/002367781780958577

» [Abstract](#) » [Full Text \(PDF\)](#)

3. Papers:

Annelise Hem, Adrian J. Smith, and Per Solberg

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

Lab Anim October 1, 1998 32: 364-368,
doi:10.1258/002367798780599866

» [Abstract](#) » [Full Text \(PDF\)](#)

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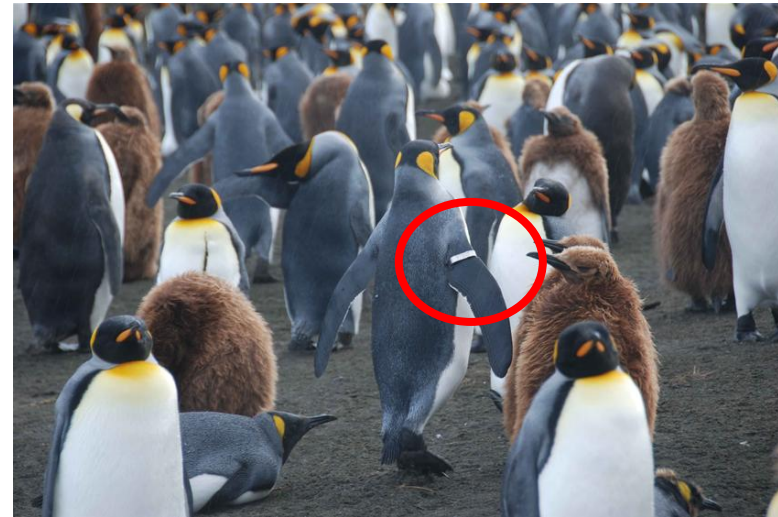
<http://lan.sagepub.com/reports/most-cited>

”Simple” capture and identification methods? Do they affect the animal?

colourbox.com



Photo: T. Poppe, NMBU



http://blogs.discovermagazine.com/notrocketscience/2011/01/12/flipper-bands-impair-penguin-survival-and-breeding-success/#.VLU6_8Y7_wo

“Simple” techniques?



Photo: NMBU

*Are they feasible?
For example, intramuscular injections*



Risk of perforation of the oesophagus

A useful additional (but largely unknown) tool...

Carol M. Newton (1925-2014)



National Library of Medicine

The three S's

- *Good Science*
- *Good Sense**
- *Good Sensibilities**

**We can do this ourselves without scientific literature!*

Carol M Newton, quoted in Rowsell HC (1977): The Ethics of Biomedical Experimentation in The Future of Animals, Cells, Models, and Systems in Research, Development, Education, and Testing pp. 267-281, National Academy of Sciences, Washington, D.C., ISBN 0-309-02603-2.

Critical anthropomorphism:

= *empathy* + objective, knowledge-based consideration of what is likely to be significant to the animal

Smith AJ & Hawkins P (submitted) The Three S's of Carol Newton



photos: NMBU





photo: NMBU

Murphy's Law:

Critical situations leading to severe suffering occur when they are fewest experienced staff on duty and when the scientists are least accessible (public holidays).

Who gets to do what?

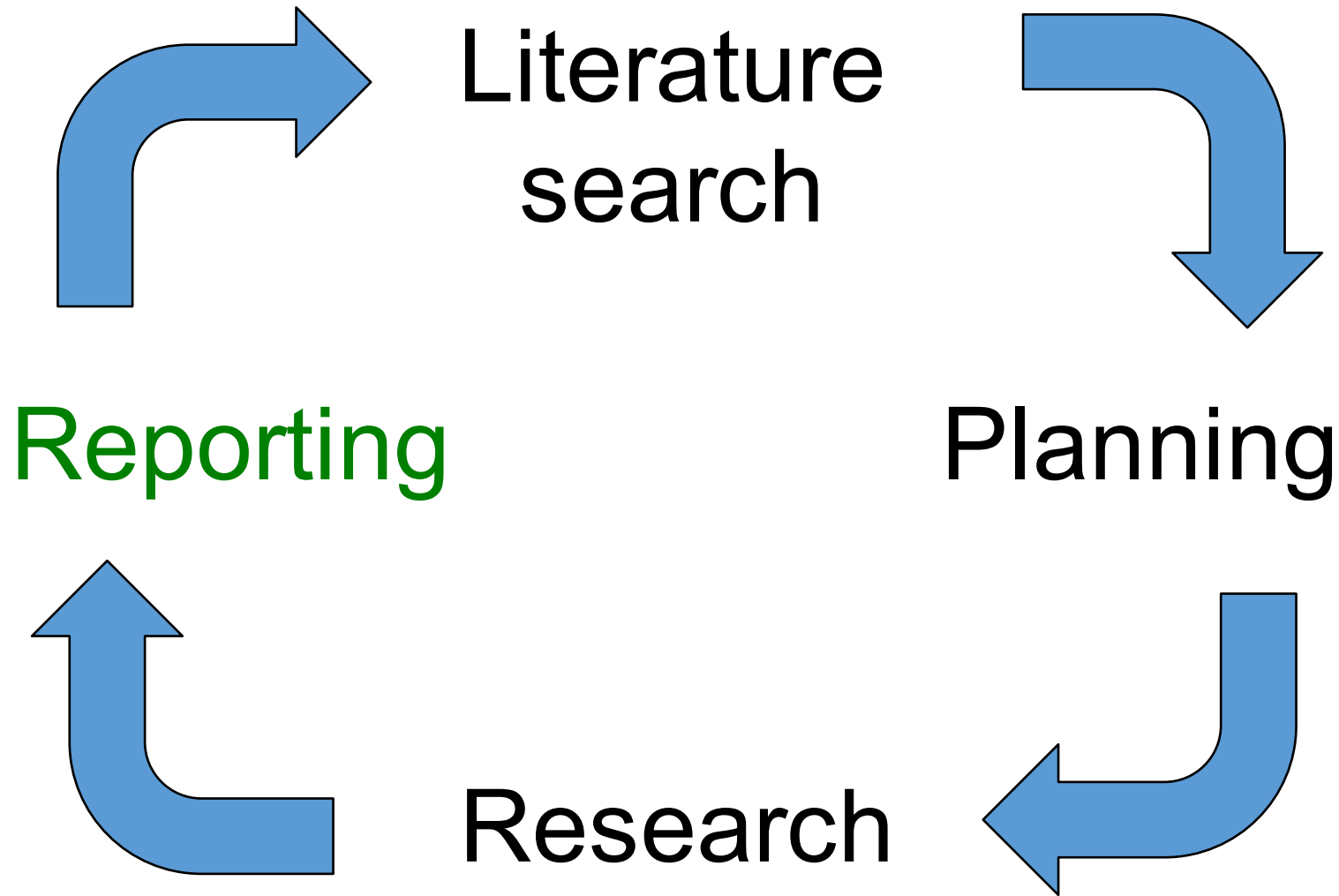
Is it acceptable to give scientists a key to the lab and a room full of mice?

Suffering can occur at all stages

- Breeding
- Weaning
- Transport
- Acclimation
- Re-grouping before the experiment
- Procedures, e.g. choice of
 - dose
 - method of administration
 - methods of data collection (blood sampling, body temperature, heart rate, blood pressure etc.)
- Pilot studies
- The main study
- “Humane” killing
- Re-homing

Consult the technicians from Day 1 when the scientist first visits the facility:

- so they hear all the reasons for the project and its wider relevance to society
- so they don't hear rumours (fear of chemicals, micro-organisms and animal harm)
- they know the possibilities (and limitations) in the animal facility
- they often possess a large range of practical skills and are good at lateral thinking
- they know the animals best
- the animals know them best
- motivated technicians provide the best and most creative service



Honest reporting of failures and cases of suffering is essential if we are to make progress (upwards spiral)

Position Statements from the regulatory authorities



FORSØKSDYRUTVALGET



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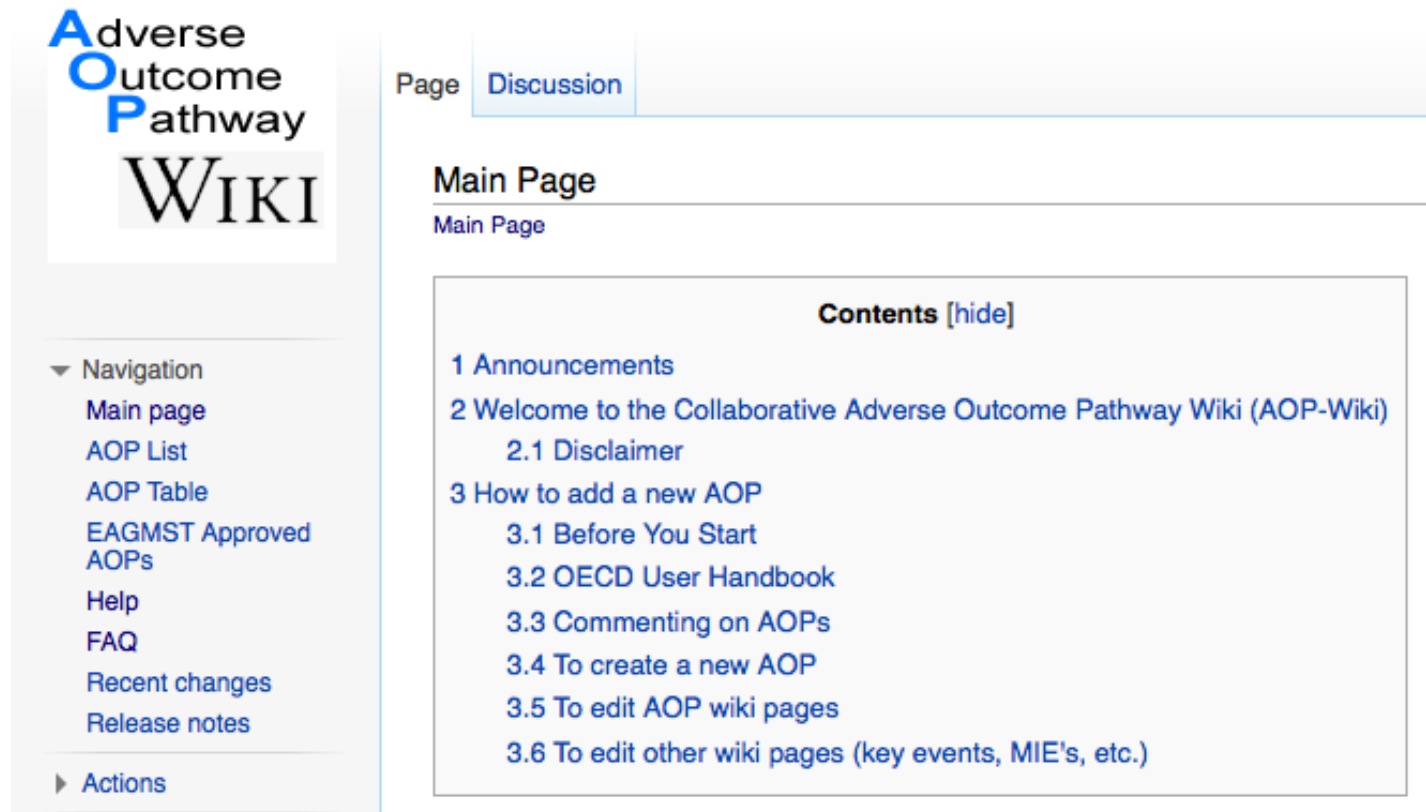
- [\[03.07.14\] Prinsipputtalelse om bruk av telemetri](#)
- [\[03.07.14\] Prinsipputtalelse om bruk av telemetri-halsbånd på hjortevilt og rovvilt](#)
- [\[25.10.13\] Søknadsplikt ved blodprøvetaking av viltlevende fugler](#)
- [\[03.09.13\] Prinsipputtalelse: Merking av viltlevende fugler](#)
- [\[29.11.12\] Prinsipputtalelse om blokk søknader](#)
- [\[23.10.12\] Merkemethoder på fisk i laboratorieforsøk](#)
- [\[28.09.11\] Krav til avdelinger som ønsker å bli godkjente forsøksdyrvirksomheter](#)
- [\[18.03.11\] Retningslinjer for behandling av søknader om forsøk med lakselus](#)
- [\[23.02.11\] Belastende forsøk med smågnagere](#)
- [\[27.10.10\] Alle søknader som involverer lakselus skal inntil videre behandles av FDU](#)
- [\[03.04.09\] Smitteforsøk og smertevoldende forsøk på fisk](#)
- [\[21.01.08\] Bruk av Nevromusklære blokkere til Forsøksdyr](#)
- [\[14.11.06\] Forsøksdyr med ein avvikande fenotype \(genmodifiserte dyr, mutanter og innavla linjer\)](#)
- [\[24.05.06\] Utviklingsstadium for fiskelarver som omfattes av regelverk for forsøksdyr.](#)
- [\[02.06.04\] Avliving av gnagere med CO2](#)
- [\[02.06.04\] Giftighetstesting på fisk i petroleumsvirksomheten](#)
- [\[26.08.03\] Utfasing av LD50 - akutt giftighets testing](#)
- [\[21.07.03\] Forsøk med dyr for å illustrere kjent kunnskap \(inkl. undervisning\)](#)
- [\[21.07.03\] Oppstalling av smågnagere i metabolismebur](#)
- [\[21.07.03\] Veiledning for beredskapsvakt utenom ordinær arbeidstid ved Forsøksdyravdelinger](#)
- [\[11.12.02\] Bruk av eter til bedøvelse](#)
- [\[11.12.02\] Forsøksdyrutvalgets policy ved smertevoldende dyreforsøk](#)
- [\[03.07.02\] Bruk av intraperitoneale radiosendere](#)
- [\[10.05.02\] Produksjon av monoklonale antistoffer \(MAbs\)](#)
- [\[10.05.02\] Avlivningsmetoder for nyfødte smågnagere](#)

Listserve: email discussion lists

- can be useful for firefighting
- often excellent replies (own experience, names of colleagues, literature references)
- rarely possible to access an archive

A possible solution: a Wiki on Refinement (Susanna Louhimies)

like this:



The screenshot displays the AOP Wiki website. On the left is a navigation menu with the following items: Navigation (Main page, AOP List, AOP Table, EAGMST Approved AOPs, Help, FAQ, Recent changes, Release notes) and Actions. The main content area shows the 'Main Page' with a 'Discussion' tab. The page title is 'Main Page' and the content includes a 'Contents [hide]' section with the following items: 1 Announcements, 2 Welcome to the Collaborative Adverse Outcome Pathway Wiki (AOP-Wiki) (with sub-item 2.1 Disclaimer), and 3 How to add a new AOP (with sub-items 3.1 Before You Start, 3.2 OECD User Handbook, 3.3 Commenting on AOPs, 3.4 To create a new AOP, 3.5 To edit AOP wiki pages, and 3.6 To edit other wiki pages (key events, MIE's, etc.)).

<https://aopwiki.org>

A system for pre-peer review:

The image shows a banner for the Peerage of Science website. The background is a blue celestial map with white lines and text. At the top, the title "Peerage of Science" is written in a large, white, serif font. Below the title is a white navigation bar with links: "Home", "Solutions", "How it works", "Peers", "Journals", "ProcPoS", and "FAQ". The main text on the left reads "A free service for scientific peer review and publishing your science, your call". A large white button with blue text says "Submit Your Manuscript". Below this button are two links: "Review examples" and "Sign up". On the right side, there is a "New!" announcement, a call to action "Search and explore Peer profiles... ..and get your own!", and three small profile pictures of people.

Peerage of Science

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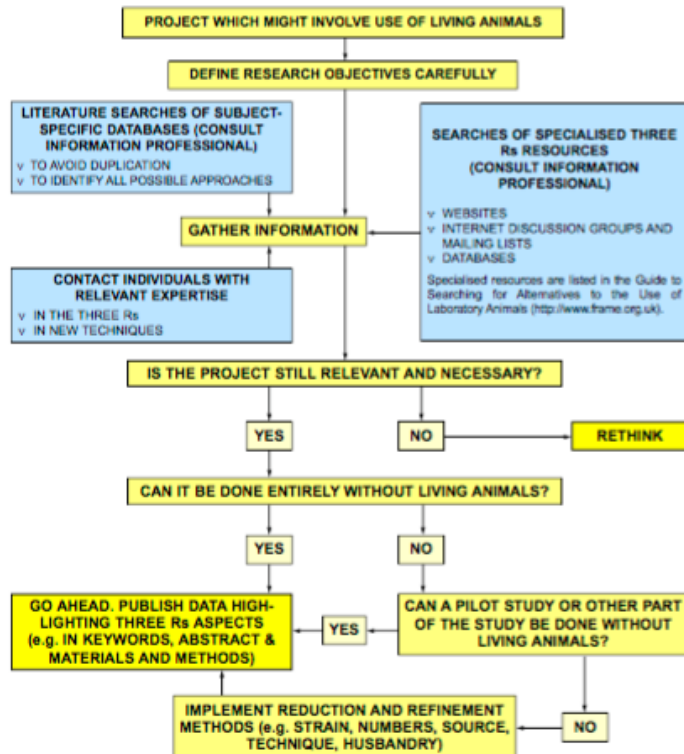
New!
Search and explore Peer profiles...
...and get your own!



<https://www.peerageofscience.org>

EARLY PLANNING FOR A PROJECT WHICH MIGHT INVOLVE THE USE OF ANIMALS

Scientists using animals in scientific procedures have an ethical and legal obligation to ensure that the Three Rs, namely **Reduction**, **Refinement** and **Replacement**, are implemented wherever possible. This strategy was designed by the Focus on Alternatives¹ group to help scientists meet this obligation. The strategy should be applied at the beginning of a project, and at regular intervals throughout. Advice should be sought from the Ethical Review Process and Home Office Inspectorate.



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NORSK ENGLISH

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Design and statistical analysis of animal experiments

Search strategies in a nutshell



colourbox.com

- Define the search as well as possible
- Identify synonyms and 3R terms
- Remember the differences between British & American English
- Use several databases (little overlapping)
- Learn the differences between the search engines (read the instructions!)
- Get used to using Boolean logic and check which terms are supported by the search engine
- Learn how to expand/narrow your search
- Look for core articles and key authors
- Use the possibilities on the Internet to get in touch with the best research labs



Norecopa, Norway's 3R centre: norecopa.no



USDA Animal Welfare Information Center
awic.nal.usda.gov

norecopa.no: a global overview of quality resources within laboratory animal science and welfare

Adrian Smith¹, Karina Smith¹, Øyvind Wærenskjold² & Tim Allen³

¹Norecopa, P.O. Box 750 Sentrum, 0106 Oslo, Norway; ²Bitfarm, Vigeveien 15A, 4639 Kristiansand, Norway; ³Animal Welfare Information Center, National Agricultural Library, 10301 Baltimore Avenue, Beltsville, Maryland 20705, USA

Quality resources in Laboratory Animal Science: where do I find them?

Increased focus on **the 3Rs** (*Replacement, Reduction & Refinement*) in Laboratory Animal Science and regulatory demands mean that scientists, committee members and animal house staff need easy access to relevant resources.

Norecopa has built a brand-new website and intelligent search engine which provide a global overview of selected quality resources. The site consists of three major databases and approx. 500 webpages.

✓ *The search engine returns hits from all these resources simultaneously. A large range of filters can be applied to narrow the list of hits. All searches generate unique web addresses (URLs), making it easy to document the searches which have been performed.*

norecopa.no/website-poster

3R Guide database and webpages

Databases, Guidelines, Regulations, Information Centres, Journals, E-mail lists



Audiovisual products

NORINA

Textbooks

TextBase

Please contact Adrian Smith (adrian.smith@norecopa.no) for more information.

We gratefully acknowledge the financial support of Dag Stiansen's Foundation, Laboratory Animals Ltd., the Nordic Society against Painful Animal Experiments, Novo Nordisk, the Scottish Accreditation Board and the US Department of Agriculture.

Graphics: colourbox.com

Our vision:

To aid dissemination of 3R resources between the different scientific fields



<https://kmonadollaraday.files.wordpress.com/2011/03/information-silos.jpg>

There are lots of platforms...



...but are there enough trains?

Norecopa aims to be a fast train to global 3R resources



<http://www.london-gifts.co.uk>

Photo: <http://www.bbc.com/news/uk-england-london-35882068>



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Thanks to our main sponsors:

- Standing Committee on Business Affairs, Norwegian Parliament
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- Nordic Society Against Painful Experiments
- Novo Nordisk
- Scottish Accreditation Board
- Stiansen Foundation



SCOTTISH ACCREDITATION BOARD



Action points

- Encourage **mandatory training in literature searching** for all scientists planning or conducting research which may involve animals or animal material
- Promote a **Culture of Communication**:
 - Persuade scientists to mention 3R advances in the title or abstract of their papers, so they get indexed by MEDLINE – or publish them as separate M&M papers
 - Lobby industry to publish more preclinical data on drug doses (especially on analgesics) for all species, age groups and both sexes
 - Encourage local regulatory authorities to publish their own policy statements and recommendations, which are as detailed as possible and which cover the areas of greatest risk in their country/state
 - Produce more species- and situation-specific guidelines on the use of newer models (zebrafish, cephalopods, decapods) and new technology. Nothing is too trivial!
 - Build a Refinement Wiki – and in the meantime expand existing websites