



THE ECVAM SEARCH GUIDE

CHECK LIST for Searching Information on Alternative Methods

Annett J. Roi, Barbara Grune

The 3Rs search procedure checklist is designed to:

- put into practice the principles set out elsewhere in the Search Guide as “The Seven Golden Steps to Successful Searching”,
- obtain information of the quality required to both consider relevant alternatives, and justify any necessary animal use.

Using the 3Rs search procedure checklist enables scientists to construct **systematic and efficient searches**.

It includes items that are specific for searching information on alternative methods.

STEP 1. INFORMATION NEED

- Clearly define your specific information need:

STEP 2. COMPONENTS OF YOUR APPROACH

- Identify the fundamental components of your scientific approach.
- a. Field of investigation:
 - b. Specific objective(s):
 - c. Methods/Models:

STEP 3. APPROPRIATE INFORMATION RESOURCES

- Define the most appropriate information resources.
- a. Value-added:
 - b. Limitable (to a 3Rs-subset of documents) broad coverage: indicate what limitations you plan to use (e.g. MeSH-term-based: *animal use alternatives*).
 - c. Unlimited broad coverage.

STEP 4. RELEVANT SEARCH TERMS

- Compile the search terms that best describe your scientific objectives and approach, and need for 3Rs information.

Select terms with appropriate levels of specificity/breadth.
Consider thesaurus terms, and advanced queries.

a. Field of investigation:

b. Objective(s):

c. Methods/Models:

STEP 5 START YOUR SEARCH WITH A SIMPLE QUERY IN A 3Rs SPECIFIC CONTEXT

- Start your search in value-added 3Rs sources, trying out different search terms within a simple query, and browsing through the inventory (classification scheme) if available.

- Evaluate the documents retrieved.

Is there information on alternative method(s) that are suitable to reach the scientific purpose of your approach, are there potentially better search terms?

STEP 6 LIMIT SEARCH RESULTS FROM MORE EXTENSIVE RESOURCES

- If no information on suitable alternatives is found using the value-added sources, continue your search using limitable broad coverage sources.

- Try different kinds of 3Rs-relevant limitations (e.g. MeSH-term-based, journal-based etc) to limit the results to relevant and manageable lists of documents. Evaluate the results and consider if it is possible to improve your query by adding varying search terms and Boolean operators.

- Evaluate the most relevant documents retrieved.

STEP 7 BROADEN THE SEARCH HORIZON

- If no suitable alternative was retrieved by restricting the search by predetermined 3Rs-relevant limitations, repeat step 5 in broader coverage resources with more general limitations consistent with your scientific methodology and objectives.

- Evaluate the documents retrieved.

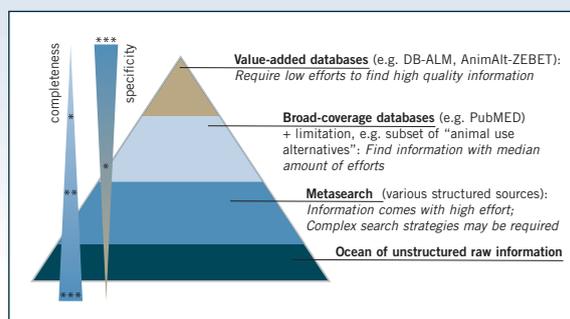


step 5

START YOUR SEARCH WITH A SIMPLE QUERY IN A 3Rs SPECIFIC CONTEXT

Efficient and effective searches **follow a systematic and structured routine**; they capitalise on efforts that have already made to structure information and add expert input.

These efforts create “islands” of well-defined and structured information within an “ocean” of inhomogeneous raw information illustrated in the Figure below – and a **sound searching strategy targets these resources**.



Quality levels of information

As your objective is to efficiently and effectively retrieve quality customised information about relevant alternative methods, your starting point will typically be a value-added 3Rs specific database. The number of available documents in these databases is easy to handle (sometimes < 1,000), the context is already assumed and some expert review has already taken place, and the resulting searching strategy and selection of search terms is relatively straightforward.

Sometimes all that may be necessary to obtain all you need is **simply trying out several search terms**, or even just **browsing through the inventory**. In some cases your information needs may be satisfied at this point.

step 6

LIMIT SEARCH RESULTS FROM MORE EXTENSIVE RESOURCES

In the event that added-value databases are not suited to your needs, then you should use a **lower ranking, broader coverage, biomedical database**. Always choose one that allows you to use appropriate tools to limit the pool of searchable documents to the subset relevant to the 3Rs.

Using 3Rs-relevant thesaurus-derived terms (see Section Thesauri with Relevance to the 3Rs Principle, p. 49) **in an advanced mode query** (see Section Basic Search Principles, p. 33) will only retrieve documents that have been assigned to the respective headings by professional indexing systems.

Example: In February 2011 the thesaurus-derived search term *animal use alternatives* (MeSH) yielded 2,292 3Rs-related documents in PubMed. Such relatively non-specific (regarding a specific scientific objective) list of nevertheless relevant documents can be made shorter and more specific by then using search terms addressing the respective objective.

To experience the full potential of MeSH-terms PubMed provides the option to search the MeSH-tree (<http://www.ncbi.nlm.nih.gov/mesh?itool=sidebar>, Accessed February 28, 2011). (see p.51) This identifies the most appropriate MeSH-terms for the topic of interest, and then uses these to search PubMed. The product is a list of topic-restricted documents. Most search engines provide options to **arrange this list** in different ways. In PubMed, you can sort documents according to publication date, journal, author name or title.

Arranging the documents according to the publishing journal, allows to focus on publications from 3Rs relevant journals (see Section Journals of the ECVAM Search Guide Volume: Data Sheets, p. 3).

At this stage the content of the retrieved and sorted **documents has to be evaluated** by scanning the title, the abstract and the assigned keywords. Remember the main limitations of “abstract-only” documents as outlined on page 83 (Volume “Data Retrieval Procedures”) and remember that when the information source has been working with full text documents that the *material and methods* section may be of special interest.

step 7

BROADEN THE SEARCH HORIZON

Too little information?

If you get this far, but have found little or no relevant information for your specific information you need then stop and think about possible deficiencies in your search. Some of the commoner problems include:

- selecting search terms which are too specific, or having chosen the most unusual synonyms
- inappropriate usage of Boolean operators, context operators or parenthesis
- being too prescriptive about search limitations (e.g. publication year, publication type etc.)

The most relevant documents of the first list may render some clues for an improved search terminology.

Having reflected on the reasons for too little (just as in the case of retrieving too much) information, you will be in a good position to **conduct a supplementary search**.

Techniques to improve the completeness of a search include broadening the search horizon by using larger sources of information, and lessening the restrictions on the information to be excluded from the search. Repeat Step 6 in the broad coverage resources with fewer limitations.

You might then proceed to resources with even broader coverage (e.g. meta-databases).

You may ultimately end up combining previously successful search terms using either a more general database or an all-purpose internet search engine: make sure you also find a way of specifying the appropriate context. Also consider limiting the documents as described, or make use of innovative **semantic search tools** like “Go3R” (see Section Web Search Engines of The ECVAM Search Guide Volume: Data Sheets, p. 50).



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SEVEN GOLDEN STEPS to Successful Searching

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Joint
Research
Centre

step 1

CLEARLY DEFINE AND BE AWARE OF YOUR SPECIFIC INFORMATION NEED

Level of Knowledge and the State of the Art

An essential part of the planning of any research or testing programme is gathering and reviewing available information about the current level of **knowledge about the specific research objective, potential research strategies and methods** – with a view to identifying and making appropriate use of appropriate methods to replace, reduce or refine proposed animal use. Unless and until this has been done, documentation cannot be prepared for evaluation for funding, local ethical approval, or national regulatory approval.

Indispensability

When a research proposal involving the use of animals requires regulatory approval, the onus is on the applicant to exercise due diligence with respect to demonstrating that all reasonable efforts have been made to find and take account of 3Rs opportunities.

The key aims of information searches undertaken at the planning stage is to both determine the availability and suitability of alternatives, and provide evidence to make the case that the proposed animal use is the most humane way of meeting the scientific objectives.

An animal experiment to achieve any defined scientific objective cannot be deemed to be indispensable unless and until the non-availability of suitable alternatives is established.

Scientists have to supply information on the non-availability of alternative methods according to the 3Rs principle (see Annex I - Legal Background for Information Requirements, The ECVAM Search Guide Volume "Data Retrieval Procedures", p. 109). In addition they may have to justify why some seemingly relevant alternatives are not suitable.

step 2

IDENTIFY THE FUNDAMENTAL COMPONENTS OF YOUR SCIENTIFIC APPROACH

Any search for specific information starts with a sheet of paper!

Before using the computer to access search engines or database hosts, the specific scientific objectives being pursued, and all the potential strategies and methods of achieving these objectives need to be clearly defined and committed to paper. This is part of the prospective planning of your search.

Field of Investigation

The specific field of investigation (e.g. animal health, risk assessment, education, or gene function studies) is relevant to the choice of preferred information sources. Therefore, begin by **considering the coverage of different sources in relation to your field of investigation and information need** (see Step 3) Individual sources generally focus on certain fields and are weak in others.

Objectives

Relevant search terms cannot be selected until the specific objectives of a research project are clearly defined. Focusing at this stage on the scientific objectives rather than the preferred animal model, allows for **search queries** that will also **elicit information on different methodical approaches**, particularly replacement options, potentially relevant to the defined scientific objective but not previously known to the enquirer.

Methods and Models

A specification of the strategy, study design and the models used also helps in deducing relevant search terms. In contrast to scientific objective-derived search terms, **method-derived terms** are particularly relevant retrieving documents that report **variations and derivations of a given methodical approach**. As a result the documents found are likely to be a particularly good source of reduction and refinement options. In a 3Rs specific search environment however, method-derived search terms can also be used to target replacement methods developed to substitute for the relevant animal methods.

step 3

CHOOSE THE MOST APPROPRIATE INFORMATION RESOURCES

The choice of information sources follows the information needs being defined.

Appropriate **added-value resources should always be the first choice**: these provide information evaluated by experts in a systematic fashion, making it easier to retrieve the documents most suited to your needs.

Section Information Resources – General Considerations (see ECVAM Search Guide Volume "Data Retrieval Procedures", p. 28) introduces 3Rs-relevant information resources categorised according to the quality and type of information they contain. The Information Resource Inventories in Section Information Resources: Inventories and Tables (see The ECVAM Search Guide Volume "Data Retrieval Procedures", p. 101) provide clearly presented overviews to assist in choosing the best information resources for particular information needs.

To support scientists find and evaluate relevant 3Rs information **Section Information Resources of the ECVAM Search Guide Volume "Data Sheets" offers structured summaries of the most important features of key information resources** for different classes of animal use.

step 4

COMPILE RELEVANT AND NECESSARY SEARCH TERMS

Search terms are chosen according to their **relevance** and **specificity**.

Ideally relevant terms must also be unique identifiers of the basic components of your scientific approach (see Step 2) to discriminate it from similar but non-relevant approaches.

You need consider when and whether to **employ combinations of search terms, predetermined by context** (with information resource):

- If you have chosen a 3Rs specific resource, further addition of "3Rs-topic-defining-terminology" (see Section Search Terms and their Use, The ECVAM Search Guide Volume "Data Retrieval Procedures", p. 41) to context-dependent terms is unnecessary as the context of your search is already assumed by the resource.
- If you prefer resources that cover a wide variety of the biomedical literature you will have to limit your search to that subset of documents categorised as relevant to the 3Rs by expert review (see Section Basic Search Principles, advanced mode, The ECVAM Search Guide Volume "Data Retrieval Procedures", p. 40). Thereafter, the deployment of additional "3Rs-topic-defining-terminology" is unnecessary.
- In "broad-coverage" environments which do not have an established 3Rs category, context-dependent terms must be combined with 3Rs-topic-definers.
- In some circumstances combinations of context-dependent terms only may be tried in an attempt to target potentially relevant information that stems work not otherwise associated with the 3Rs. With this method there is no certainty that relevant material will be found – but you can be sure that much which is irrelevant will be found.

Advice on proven "3Rs-topic-defining-terms" and "context-dependent terms" are given in Section Search Terms and their Use (Page 41).



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TABLE OF ORGANISATIONS CATEGORISED by their Features for the 3Rs and their Type

Organization	Features for the 3Rs						Type				
	Research Funding	Research & Validation	Education	Documentation & Information	Newsletter	Communication	Academia	Governmental Organization	Industry	Joint Organization	Non-Governmental Organization
3R Research Foundation Switzerland	•		•		•					•	
Akademie für Tierschutz		•		•							•
AltTox.org				•		•				•	
Altweb				•	•		•				
AWIC			•	•	•			•			
CAAT	•		•	•	•		•				
CARDAM		•	•	•							•
Dr Hadwen Trust	•			•	•						•
ECEAE				•	•						•
ecopa				•	•					•	
ECVAM		•		•	•			•			
EPAA				•	•					•	
ESTIV				•	•	•					•

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Organization	Features for the 3Rs						Type				
	Research Funding	Research & Validation	Education	Documentation & Information	Newsletter	Communication	Academia	Governmental Organization	Industry	Joint Organization	Non-Governmental Organization
eurca			•	•			•				
FRAME		•		•	•						•
HSUS				•							•
ICCVAM		•		•				•			
IIVS		•	•	•	•						•
InterNICHE			•	•							•
IVTIP				•					•		
JSAAE		•		•			•				
NC3Rs	•			•	•			•			
NCA				•	•		•				
UCCAA				•			•				
UFAW			•	•							•
ZEBET	•	•		•				•			
zet		•		•							•



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TABLE OF DATABASE FEATURES

Database	Subject Coverage					Type		Access
	Agriculture	Biomedicine	Education	Pharmacology & Toxicology	Veterinary medicine	Bibliographic database	Added-value database	Free-of charge database
AGRICOLA	•	•			•	•		•
AGRIS	•	•			•	•		•
ALTBIB		•		•		•		•
AnimAlt-ZEBET		•		•	•		•	•
BIOSIS Previews	•	•		•	•	•		
CAB Abstracts	•	•			•	•		
DB-ALM				•			•	•
EMBASE		•		•		•		
HSVMA'S Alternatives in Education Database			•				•	•
LAD		•			•	•		•
MEDLINE		•		•	•	•		•
NORINA			•				•	•
PED		•			•	•		•
ScienceDirect	•	•		•				
SciSearch	•	•		•		•		



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TABLE OF JOURNALS relevant to the 3Rs indexed by Databases and Meta-Databases

Journal	Databases							Meta-Databases		
	AGRICOLA	BIOSIS Previews	CAB Abstracts	EMBASE	MEDLINE	ScienceDirect	SciSearch	PubMed	Scopus	Web of Science
Alternative Approaches to Animal Testing, AATEX										
Alternativen zu Tierexperimenten, ALTEX				•	•		•	•	•	•
Alternatives to Laboratory Animals, ATLA				•	•		•	•	•	
Animal Technology and Welfare ATW										
Animal Welfare Journal			•	•			•	•	•	
Institute of Laboratory Animal Resources, ILAR	•			•	•			•		•
Journal of Animal Science, JAS	•	•	•		•			•		•
Journal of Applied Animal Welfare Science, JAAWS		•	•		•		•	•	•	•
Lab Animal	•				•			•	•	•
Laboratory Animals			•	•	•			•	•	•
Toxicology in vitro		•		•	•	•		•	•	

