

University of Rochester Medical Center
Edward G. Miner Library

Searching for Animal Testing Alternatives

This handout was developed to assist investigators with meeting the information requirements of the Animal Welfare Act and the University of Rochester's University Committee on Animal Resources (UCAR). The goal of the handout is to provide help with searching the literature for animal testing alternatives. While we recognize that many investigators prefer to do their own searches, we encourage them to contact the Reference Department for assistance with designing their search strategies. Investigators can also choose to have their searches done by a Reference Librarian, or through the Animal Welfare Information Center (AWIC) at the National Agricultural Library.

Miner Library Reference Department –
Contact: Margaret Chretien, Reference Librarian
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Animal Welfare Information Center (AWIC) – Phone: (301) 504-6212

Reduction, Refinement, Replacement

The alternatives to animal testing concept incorporates the 3R's introduced by W.M.S. Russell and R.L. Burch (1959) in their book *The Principles of Humane Experimental Technique*.¹ The 3R's represent: **reduction** of the number of animals used, **refinement** of techniques and procedures to reduce pain and distress, and **replacement** of animal with non-animal techniques.

Database Selection and Access

The **Miner Library website** <http://www.urmc.rochester.edu/hslt/miner/> provides access to the library's databases and other electronic resources. When connecting to most Miner electronic resources from outside the University of Rochester, a Miner password is needed. UR affiliates can obtain a password by filling out the electronic application form at <http://eg.miner.rochester.edu/apply>. For assistance with obtaining passwords contact Miner's Computing Center at 275-6865.

Many investigators routinely do literature searches on Ovid MEDLINE or PubMed, but may not be aware of other databases that can be useful in determining if animal testing alternatives are available. Since no single database is likely to include all pertinent literature on a topic, the use of multiple databases is recommended by AWIC for a thorough literature search. Determining which databases to use depends on the individual research topic. Some databases to consider include:

Ovid MEDLINE - MEDLINE is a large database covering biomedical journal literature. Ovid MEDLINE is available on the Miner Library website to search MEDLINE using the Ovid interface. The interface includes Ovid MEDLINE

1950-Present with Daily Update, and a separate file for MEDLINE In-Process and Other Non-Indexed Citations.

PubMed - Includes MEDLINE plus additional citations such as In-Process citations and some from additional life sciences journals. PubMed@UR provides access to PubMed and is available on the Miner Library website.

Web of Science - Includes Science Citation Index Expanded which contains science, technology, and biomedical information. Access the Web of Science on the Miner Library website.

PsycINFO - Accesses worldwide literature in psychology and related disciplines. Part of its coverage includes experimental human and animal psychology, physiological psychology, and psychological disorders. This database can be particularly useful to find information about behavioral research. Access PsycINFO via the Miner Library website.

PrimateLit – provides bibliographic access to the scientific literature on non human primates for the research and educational communities. Some subject areas covered are disease models, behavior, physiology, genetics, veterinary science, and colony management. PrimateLit is a free database linked on the Miner Library website under Quick Links “more”.

EMBASE – (fee based) A large database providing international coverage of biomedical and pharmaceutical literature. Contact a Miner Reference librarian for more information.

For further information about a specific database or for information on additional databases, please contact a Reference librarian.

Searching Tips

1. **3R's** - Consider all of the 3 R's (reduction, refinement, replacement) and not only if the use of animals necessary.
2. **Questions** -- Examples of questions to consider when searching for animal testing alternatives:
 - Is it feasible to use in vitro techniques?
 - Can the analgesic regimen be improved to control pain?
 - Are there computer simulations available that can be used to replace animals?
 - Is there literature on experimental design or statistical models that can lead to a reduction in the number of animals needed?
 - Are there environmental enrichment methods that may lessen animal stress?
 - Can cultured cells or tissue culture be utilized?
 - If the use of animals is necessary, is it possible to use a lower species?

3. **Search strategies** - Research protocols need to be searched on an individual basis. Most searches will require at least two strategies. The first is designed to prevent “unnecessary” duplication of research and should be specific to the protocol. The second strategy should incorporate subject headings/keywords relevant to animal testing alternatives, which may be applicable to your research. Examples of these subject headings and keywords are listed later in the handout.
4. **Subject headings** – Citations in databases such as Medline and PsycINFO are assigned subject headings from a thesaurus. Medline uses Medical Subject Headings (MeSH). Indexers assign subject headings based on the content of each article. Ovid and PubMed help you by mapping your search terms to appropriate subject headings. Databases using subject headings can often also be searched by keyword (see tip #5). It is important to use subject headings when appropriate ones are available.
5. **Keywords** - Words or phrases are searched in parts of a record such as the title and abstract. It is necessary to include synonyms and various forms of a word (ex. singular and plural) in your search. The Web of Science database is an example of databases that needs to be searched using keywords.
6. **Animal testing alternatives** is a subject heading used in the Medline database. **Unfortunately, it is not sufficient to just use this heading in combination with your research topic to complete an alternatives search.** The heading is primarily used to search the topic in general rather than related to specific research.
7. **Multiple databases** - A single database is not likely to provide all of the pertinent information on a topic. For a thorough search, consider the use of multiple databases.
8. **Documentation** - It is a good idea to keep a copy of your search history (strategy).

Subject Headings and Keywords for Animal Testing Alternatives

Depending on the topic and database being searched keywords, subject headings or a combination of both will be needed for an animal testing alternatives search.

Examples of MEDLINE Medical Subject Headings (MeSH) to use in Searching for Animal Testing Alternatives:

in vitro	animal testing alternatives
cells, cultured	anesthetics
tissue culture	analgesics
organ culture	"hypnotics and sedatives"
computer simulation	pain
computer assisted instruction	pain, postoperative
software	stress
artificial intelligence	stress, psychological
manikins	disease models, animal
animal welfare	models, animal
animal husbandry	models, anatomical
housing, animal	models, biological

models, cardiovascular
models, genetic
models, immunological

models, neurological
models, statistical

Examples of Keywords to use in Searching for Animal Testing Alternatives

model(s)	mannequin(s)
alternative(s)	virtual (surgery, reality)
culture (cell, tissue, organ)	training, train
vitro (“in” is often a stop word)	education, educate
caging	software
housing	simulator(s)
pain, painful	simulation(s)
stress, stressful	replace, replacement, replacing
distress	reduction, reducing
handling	refine, refinement
enrich, enrichment (environmental, behavioral)	
anesthetic(s), anaesthetic(s) (also include specific drugs)	
analgesic(s), analgesia (also include specific drugs)	
computer aided instruction	

Saved Medline Search Strategy

Many of the subject headings and keywords that can be useful in searching Medline for animal testing alternatives have been gathered together by Miner’s Reference Librarians and saved for your use on Ovid. Further information about this is contained in the handout entitled "Saved Search for Animal Testing Alternatives on Medline".

References

1. Russell, W. And R. Burch (1959) *The Principles of Humane Experimental Technique*. Methuen and Company, London.