

**PCOM IACUC
Use of Animals in Research
Literature Search Requirements
September 2007**

The Animal Welfare Act C.2.31.e states "A proposal to conduct an activity involving animals, or to make a significant change in an ongoing activity involving animals, must contain the following: (1) Identification of the species and the approximate number of animals to be used; (2) A rationale for involving animals, and for the appropriateness of the species and numbers of animals to be used.

This is the implementation of the 3 Rs: reduction, refinement, and replacement.

The Animal Welfare Act C.2.31.d.1.ii states "The principal investigator has considered alternatives to procedures that may cause more than momentary or slight pain or distress to the animals, and has provided a written narrative description of the methods and sources, e.g., the Animal Welfare Information Center, used to determine that alternatives were not available."

I. NEW PCOM INVESTIGATORS and INVESTIGATORS ENTERING A NEW AREA OF RESEARCH (all others may skip to Section II.)

A. Purpose of Literature Search

The purpose of the literature search is to:

1. search for alternatives to specific, potentially painful and/or distressful procedures
2. search for alternatives to animal use
3. ensure that proposed research does not unnecessarily duplicate previous experiments.

B. Background of the 3 Rs Concept of Alternatives

The 3 Rs were outlined by Russell and Burch in 1959 in their book *The Principles of Humane Experimental Technique*, available at http://altweb.jhsph.edu/publications/humane_exp/het-toc.htm.

1. Replacement: to substitute animal with non-animal methods such as cell or tissue culture, mathematical, or computer models, or to use a species that is lower on the phylogenetic scale
2. Refinement: to use procedures, techniques, and drugs that minimizes stress and/or pain to the animals

3. Reduction: to utilize the minimum number of animals needed to yield statistical data.

C. Search Background – The Essentials of the Research Proposal

Complete the **Worksheet and Instructions for Alternatives Literature Searching Animal Welfare Information Center Searching**. The instructions that follow the worksheet and are very helpful.

<http://www.nal.usda.gov/awic/alternatives/searches/altwksht.pdf>

II. ALL INVESTIGATORS

A. Select Databases

1. It is critical to thoughtfully select the databases to be searched. Search more than one database. MEDLINE alone is inadequate. The most commonly searched databases are:
 - a. OVID, MEDLINE, or PubMed
 - b. AGRICOLA <http://agricola.nal.usda.gov/>
 - c. TOXNET <http://www.toxnet.nlm.nih.gov/altbib.html>
 - d. European Centre for the Validation of Alternative Methods (ECVAM) <http://ecvam-dbalm.jrc.cec.eu.int/>
2. AltWeb Databases <http://altweb.jhsph.edu/searchaltdata.htm> lists free, government, and licensed databases.
3. UC Davis Guide to Bibliographic Databases for Alternatives Searching is particularly helpful and lists databases available without subscription by animal model and topic: http://www.vetmed.ucdavis.edu/Animal_Alternatives/databaseapproach.html
4. The PCOM Digital Library website provides access to licensed databases MEDLINE. For behavioral research with animals, PsycINFO (through OVID), and ERIC (through EBSCOhost) are also available through the PCOM Digital Library.

B. Select Search Terms

1. Identify as many synonyms, alternate spellings, acronyms, abbreviations, useful truncations as possible for each concept. Combine them using the Boolean operator OR (cardiac or heart or cardi*)
2. In addition to using keywords that reflect your research project, review the **Examples of 3 Rs Keywords for Alternatives Literature Searches** (also posted in the IACUC section of the Nucleus Research and Sponsored Prog group) to broaden your search to include keywords for potential alternatives such as “vitro,” “culture,” or “simulation.”
3. The **Animal Use Alternatives Thesaurus Terminology - National Agriculture Library** is a useful resource for AGRICOLA search terms: <http://www.nal.usda.gov/awic/alternatives/alternativeanimalusetheasaurus.htm>.

C. Create Search Strategies

NOTE: stringing together keywords (i.e. dogs or cats and cardiac or thoracic and stent or device and alternative) is not a proper search strategy and results in a poor search with inaccurate results.

1. **Search concepts as separate search statements. Combine them making appropriate use of Boolean operators AND and OR.** It sounds simple but many a search has been ruined by a misused OR or AND. A simple graphic representation of Boolean operators is available at <http://kathyschrock.net/rbs3k/boolean/>.
 - A strategy that searches each concept separately is flexible. Concepts can be combined in different ways. If too many records are retrieved, additional relevant terms may make the results fewer and more useful; if too few results are retrieved, fewer terms and a more conceptual approach may identify the relevant material.
 - Examples of appropriate search strategies can be found at: **University of California Davis Center for Animal Alternatives**
http://www.vetmed.ucdavis.edu/Animal_Alternatives/protocol_ind.html

D. Saving Search Strategies (optional)

Be sure to capture databases searched, years covered, and date of search.

1. In general, open a Word document, copy and paste search histories.
2. In OVID MEDLINE, click "Save search history" when saving or exporting citations.
3. In PUBMED, click on **History**, highlight, copy and paste; note date & database.

The required application completed by the principal investigator must include adequate information to allow the IACUC to determine that proper searches for alternatives to animal use AND alternatives to painful procedures were performed.

Red Flags

- Only 1 database searched
- Terms only for painful aspects or only for alternatives to animal use
- The term "alternative" used alone with no other terms
- Keywords listed not relevant to protocol
- Keywords and concepts linked in an incorrect manner, i.e., inappropriate use of AND and OR
- Search doesn't cover adequate time period (5-10 years)

ADDITIONAL USEFUL LINKS

ALTBIB – NLM's alternatives to animal testing database on the web

<http://toxnet.nlm.nih.gov/altbib.html>

Alternatives in Education resources from the USDA

http://awic.nal.usda.gov/nal_display/index.php?info_center=3&tax_level=2&tax_subject=183&level3_id=0&level4_id=0&level5_id=0&topic_id=1093&placement_default=0

Altweb, the Alternatives to Animal Testing Web Site, a clearinghouse for alternatives news, information, and resources on the Internet and beyond.

<http://altweb.jhsph.edu/>

AltWeb Worksheet Essentials <http://altweb.jhsph.edu/searchalt/essentials.pdf>

AWIC Tips for Searching for Alternatives to Animal Research and Testing

<http://www.nal.usda.gov/awic/alternatives/tips.htm>

[Center for Animal Alternatives](#), University of California - Davis

Report and Recommendations of the International Workshop "Retrieval Approaches for Information on Alternative Methods to Animal Experiments" held in Berlin in 2003 at ZEBET, Centre for Documentation and Evaluation of Alternative Methods to Animal Experiments, in the BfR, the German Federal Institute for Risk Assessment

http://www.altex.ch/pdf/artikel/altex_3_2004_Grune.pdf