Searching for Alternatives to Potentially Painful Procedures Used on Research Animals

Principal Investigators (PIs) and IACUC members are encouraged to use this guide when considering research alternatives to potentially painful or distressful procedures on animals. This guide serves as a tip sheet for preparation of the Literature Search for Alternatives to Painful Procedures item in the UGA Animal Use Protocol (AUP).


Distress
“A state in which an animal cannot escape from or adapt to the external or internal stressors or conditions it experiences, resulting in negative effects upon its well-being.”

Painful Procedure
Code of Federal Regulations, Title 9, Chapter I, Subchapter A, Animal Welfare
“...as applied to any animal means any procedure that would reasonably be expected to cause more than slight or momentary pain or distress in a human being to which that procedure was applied, that is pain in excess of that caused by injections or other minor procedures.”

Alternatives
- **Reduction** - Minimize the number of animals used.
- **Refinement** - Techniques to reduce pain and distress.
- **Replacement** - Substitute animal with non-animal methods.

Searching for Alternatives
Search Strategy

Two Phases
- Phase I: Reduction and refinement- citations pertinent to PI’s field of study.
- Phase II: Replacement- use of non-animal or alternative animal models.

Alternative Terms

The following words may help narrow your alternatives search. Choose words for your particular study. Place the truncation symbol where the parentheses () are, for a specific database, to get variant endings of terms.

*Commonly used truncation symbols:*
EMBASE or MEDLINE/Science Direct = exclamation point (!)
  - behav! finds behave, behavior, behavioral, behaviour, behavioural, etc.
Ovid = dollar sign ($) or colon (:
  - disease$ or disease: retrieves disease, diseases, diseased, etc.
PubMed and Web of Science = asterisk (*)
  - bacter* finds bacteria, bacterium, bacteriophage, etc.
Reduction and Refinement
- advers()
- analgeses
- anesthe(), anasthe(), anaesthe()
- anxiolytic
- environment(), enrich()
- euthanasia, euthanize()
- handl(), hous(), cag()
- monitor(), device()
- pain(), distress(), stress(), welfare
- positive reinforce()
- reduc(), refin()
- restrain(), restrict(), immobility()
- technique(), method(), procedur(), assay()
- train(), educat(), teach(), instruct()
- tranquiliz()

Replacement
- alternative()
- animal testing alternative()
- animal use alternative()
- assay(), technique(), method()
- bacter()
- cadaver()
- culture() (cell, tissue, organ)
- fish(), cephalopod()
- handl(), hous(), cag()
- invertebrate()
- isolated (cell, tissue, organ)
- mannequin() or manikin()
- model()
- replac()
- simulat()
- software, computer()
- train(), educat(), teach(), instruct()
- virtual (surgery, reality)
- vitro (method, model, technique)

AWIC Tips for Searching for Alternatives
- General area of study
- Species being used
- Describe protocol
- Organ systems involved
- Acronyms
- Names of hormones, enzymes, CAS#, trade names, etc.
- Prominent authors in field including work published by investigator
- How is the proposed study unique
- Is the investigator aware of any possible alternatives
- Any previous searches conducted—keywords used

Databases

Biomedical and Biological
- AGRICOLA
- ASFA
- BIOSIS+/Biological Abstracts
- CAB Abstracts
- Current Contents
- EMBASE
- Life Sciences
- MEDLINE
- Pascal
- PsycINFO
- SciSearch/Web of Science
- TOXLINE
- Zoological Record

Pharmaceutical and Technological
- Compendex Plus
- Gale Group Computer Database
- INSPEC
- International Pharmaceutical Abstracts
- Japanese Science and Technology
- Micro Software Guide
- NTIS
- Pharmaceutical News Index
Additional Websites and Databases

- Altweb: http://altweb.jhsph.edu/
- DoD Biomedical Research Database: http://www.scitechweb.com/acau/brd
- John's Hopkins Center for Alternatives to Animal Testing: http://caat.jhsph.edu/
- Norwegian Reference Centre Alternatives Database: http://oslovet.veths.no/databasesintro.html
- UC Davis Center for Animal Alternatives Information: http://www.vetmed.ucdavis.edu/Animal_Alternatives/main.htm

Animal Care Policy #12
Written Narrative for Alternatives to Painful Procedures, April 14, 1997

The minimal written narrative should include:
- databases searched or other sources consulted
- date of the search and years covered
- key words and/or search strategy used

The IACUC should be able to readily assess:
- appropriateness of search topics
- thoroughness of the search

Search Evaluation
The PI Role
- Check terminology, strategy, sources, and dates of search
- Need to review the search before completing the protocol
- Assess and evaluate the alternative possibilities
- Be prepared to support the use or non-use of any alternatives in writing
- Keep a copy of strategy, databases searched, and years of search for future use

Red Flags
- Only 1 database searched
- Terms only for painful aspects
- The term “alternative” used alone with no other alternative terms
- Keywords listed not relevant to protocol
- Keywords and concepts linked in an incorrect manner
- Search doesn’t cover adequate time period (5-10 years)

*Much of the information used in this tip sheet is compliments of AWIC.