



## *Institutional Animal Care and Use Committee Guidelines and Policies*

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### **CONSIDERATION OF ALTERNATIVES**

#### **1. Do I need this in my animal use application (and why)?**

A search is suggested for *all* protocols but is only *required* (by federal regulations and thus the IACUC) for those protocols which include *animals that may experience more than momentary or slight pain or distress* (e.g. Pain/Distress Categories D or E).

Category D: Any animals that will undergo procedures where pain-alleviating methods are used, such as anesthesia, analgesia. All surgical animals would fall into this category.

Category E: Any animals that will experience unalleviated pain and/or distress. (This should be considered only when the use of a pain alleviating strategy would seriously compromise the validity of the study, and no other option is available).

A literature search may identify new methods or strategies that not only reduce animal numbers (and costs) and may also improve the science by providing the PI with updates on techniques and approaches and methodology.

#### **2. What constitutes an appropriate “search for alternatives”?)**

“Alternatives” refers to the Three R’s: Replacement, Reduction, Refinement

**Replacement** *refers to the possible replacement of animal models with non-animal models such as computer models and cell or tissue culture.* Although most research cannot be replaced by the types of methods mentioned, consideration of non-animal systems should always be given through a literature search.

**Reduction** refers to any methods that might reduce the number of animals required for your study. There is a section in the protocol that refers to the justification of animal numbers which is different from addressing the second R (the justification section involves establishing that you are using an appropriate number of animals to obtain scientific and statistical validity). “Reduction” in the alternatives search section of the protocol form *refers to specific measures that could help minimize the number of animals required to accomplish the scientific goals.* Some examples of methods that could be used to reduce animal numbers: 1) using new instrumentation that improves precision and therefore reduces the number of animals needed for the study, 2) sharing tissues with other researchers 3) designing experiments in which animals serve as their own controls (e.g. using the contralateral side of the brain as an internal control after a unilateral lesion or treatment).

**Refinement** *refers to any modifications that will reduce pain and distress in the animals.* Examples of refinements include: using the most up-to-date methods of anesthesia,



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surgery and analgesia, assuring specific training in particular surgeries or other potentially painful procedures by consulting experts in the field, providing a list of any continuing education courses or conferences that will enhance the scientist's abilities to do the procedures more effectively and which can substantiate that the latest techniques are used for the protocol.

### **The following information must be included in the Alternatives section of the protocol:**

- The **date** that the literature searches were performed.
- The **time period** covered by the search.
- The **keywords** and/or strategy used for the searches. Note that this should include the names of each procedure which potentially causes more than momentary or slight pain or distress even if analgesia or anesthesia is provided. Always include the word "alternatives" in the keyword list!
- The **names of the databases** used for the search. Use relevant scientific databases and include at least two (see below). Note that if attendance at conferences is used as a source for the search, then the name and date of the meeting must be provided. If consulting with experts is used, then the experts name, qualifications, the date of the consultation and the content of the consultation needs to be provided in the protocol.
- A **narrative** should be provided to address whether alternatives (e.g. the "3 R's" - replacements, reductions or refinements) were (or were not) found in the database search. If alternatives were found but are not being implemented then scientific justification must be provided. If replacement methods are not feasible without compromising scientific results then describe the measures that will be implemented to reduce the number of animals as well as to refine the methods used to minimize pain and discomfort to the animals for each procedure that potentially causes more than momentary or slight pain or distress.

### Websites for Additional Information/Searches

Animal Welfare Information Center: <http://www.nal.usda.gov/awic/> has an extensive listing of appropriate databases for alternatives searches.

Altweb: <http://www.altwebsearch.org/>

### **3. Example of Alternative Search section for an animal research protocol:**

Date of the search: October 25, 2005

Databases searched and dates covered by the search: Medline (1995-2005), Animal Welfare Information Center (1990-2005), Agris (1991-2005), Altweb (1990-2005), Biosis (1993-2005).

Keywords: alternatives, rat, animal model, neurological, neuralgia, surgery, sciatic nerve



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Narrative: Based on the search results, REPLACEMENT of the proposed animal model with a non-animal system is not feasible. The search did not generate any additional techniques to further REDUCE the number of animals however the number of animals has been reduced to half the initial number we planned to use. The numbers were reduced by choosing to do a unilateral lesion rather than bilateral limb lesions. The unaffected limb will be use as a control instead of using a separate control group of animals. The number of animals is still sufficient to allow proper and rigorous statistical analyses. Performing a unilateral lesion is also a REFINEMENT that will result in less discomfort to the animal than bilateral lesions. Further refinements to prevent pain and discomfort will be implemented through the use of current aseptic surgical techniques performed by experienced surgeons recently trained to use a minimally invasive approach. Modern anesthetic equipment will be used during general anesthesia and the animals will be carefully monitored throughout the procedure. Pre-emptive and post operative analgesia will be administered and the animals will be carefully monitored for signs of discomfort twice daily by trained personnel for the first 3 days post-operative. Arrangements have been made to provide the animals with an easily accessible food source post operatively.