

Animal Use Protocol Literature Search Guidelines

Purpose: The goal of conducting a comprehensive literature search is for research involving animals to *avoid unnecessary duplication* and *inform experimental design*. The literature search must explore animal *alternatives* as well as to identify and incorporate modifications that can *minimize* animal *pain and distress*.

This is directly tied to “The 3Rs”, first described by Russell and Burch in 1959. Scientific methods must incorporate some aspect of *replacement, reduction, or refinement* of animal use in pursuit of the minimization of animal pain and distress consistent with the goals of the research.

Requirements:

- Names of the databases utilized for the search
- The dates covered in the search
 - **Note:** The dates must cover a minimum of 5 years inclusive of the current year
- Search strategies must include the principles of The 3Rs
- Key words used in the literature search are provided

Process:

1. **Develop a Search Strategy:**
 - a. Identify the key words and subject headings (described below) of the experiment
 - b. Identify painful or potentially painful procedures
 - c. Consider other animal or non-animal models
 - d. Think about how to combine the key words and subject headings (see “Boolean Logic Searching” below)
 - e. Choose your databases
2. **Search:**
 - a. Document your search
 - b. Use 3Rs principles
 - c. Utilize one or multiple of the “General Literature Search Strategies” described below
3. **Evaluate:**
 - a. If the results are too broad, consider limits: publication year, specific fields (e.g., title, keywords)
4. **Manage & Report:**
 - a. Construct the literature search narrative that will be apart of the protocol submission

Use of The 3Rs:

- 1. Replacement-** Substituting sentient animals with insentient material, or using a lower animal whenever possible

<p><i>Replacement Search Terminology Examples:</i></p> <ul style="list-style-type: none"> • in vitro • cell culture or cell line • computational methods or models (in silico) • computer (simulation or application or model) • mathematical (computational biology or model or simulation)
--

- 2. Reduction-** Reduction in the number of animals required per experiment/study while still achieving robust results

<p><i>Reduction Search Terminology Examples:</i></p> <ul style="list-style-type: none"> • auto control (using animal as its own control) • pilot study • experimental or statistical design (pilot study, variation, sample size, etc.) • data repositories or reuse data
--

- 3. Refinement-** Methods that minimize animal suffering and improve animal welfare

<p><i>Refinement Search Terminology Examples:</i></p> <ul style="list-style-type: none"> • environmental enrichment • euthanasia or humane endpoint • non-invasive or less invasive • handling or humane handling or humane restraint or humane treatment
--

Literature Search General Do’s & Don’ts:

Do’s	Don’ts
Use The 3Rs principles in your literature search	Search terms only for painful aspects
Document your literature search in real-time. This step will help you remember the exact keywords, concepts, and search strategies were used in the search.	Use the term “alternative” alone with no other 3Rs terms
Conduct the literature search before developing your experimental design. This will help to better inform the design of the experiment.	List keywords that not relevant to protocol

General Literature Search Strategies:

- **Boolean Logic Searching:**

- Utilizes the following Boolean operators: “AND” “OR” and “NOT”. Use of Boolean logic allows for tactful narrowing or expanding of the literature search.

▪ When to use “ AND ”- Use tell the database that ALL search terms must be present in the resulting records. For example, “cancer AND mice AND tumors”.
--

▪ When to use “ OR ”- Use to connect two or more similar concepts (synonyms). For example, “genetics OR reproduction”.

▪ When to use “ NOT ”- Use to completely exclude words from your search. For example, “cancer NOT tumors”.

- **Phrase Searching:**

- For example, by enclosing a term in quotation marks the search will only provide those two terms when paired together in text. For example, “tissue culture”.

- **Truncation “Wild Card” Searching:**

- This method will retrieve all variations of a word that have the same initial stem. For example, the search term “handl*” (with use of the “*”) will retrieve information on “handler”, “handle”, and “handling”.

- **Key Words vs. Subject Headings:**

- Key Words – language used to describe concepts
- Subject Headings – specific words used to describe the main concept of the literature
 - **Note:** To find subject headings, start with a keyword search, using words/phrases that describe your topic. Browse the results; choose 2 or 3 that are relevant. Next, look at the Subject or Descriptor field and note the terms used (write them down). Redo your search using those terms and your results will be more precise than your initial keyword search.

Recommended Databases:

- AGRICOLA
- PubMed
 - Medline
 - PubMed Central
- Scopus

References & Resources:

- **(Ohio University)** Subject Librarians, Archivists, and Regional Campus Librarians:
 - <https://www.ohio.edu/library/about/subject-librarians-archivists>
 - <https://www.ohio.edu/library/help>
- **(NIH-OLAW)** Best Practices for Conducting a Search for Alternatives and Finding Animal Model/Model Organism Information
 - https://olaw.nih.gov/sites/default/files/Slides%2012_09_2021.pdf
- **(National Agricultural Library)** Animal Use Alternatives Thesaurus Terminology: Alphabetical Listing (pdf)
 - <https://naldc.nal.usda.gov/catalog/7085299>
- **(NIH-OLAW)** Online Seminar - Meeting Requirements for Alternatives Searches
 - <https://www.youtube.com/watch?v=I-I-3ZG1e0w>
- **(Database) AGRICOLA**
 - Ohio University Login Link: <https://alice.library.ohio.edu:443/record=e1000107~S7>
 - <https://agricola.nal.usda.gov/>
- **(Database) PubMed**
 - Ohio University Login Link: <https://alice.library.ohio.edu:443/record=e1000095~S7>
 - <https://pubmed.ncbi.nlm.nih.gov/>
- **(Database) Scopus**
 - Ohio University Login Link: <https://alice.library.ohio.edu:443/record=e1001019~S7>
 - <https://www.scopus.com/home.uri>