

Performing a Literature Search

Goal: To perform a refined search in order to obtain relevant results. This may require multiple search strings using syntax tools.

Characteristics of Incomplete versus Complete Search Strings

- Incomplete or unrefined search
 - Not including search tools/syntax
 - Throwing keywords into the search with no specific order
 - Using only terms like replacement, reduction, refinement, or alternatives
- Complete or refined search
 - Synonymous terms groups with parentheses
 - Use of search tools/syntax
 - Not only using the procedure/method you're trying to replace, but rather using a combination of search terms

Syntax Tools

- Truncation
 - A symbol (usually an asterisk) added to the root of a word to represent extra characters
 - Example: behave* = behavior, behaves, behave, behaving, behaved, etc.
- Boolean Logic
 - Allows you to link terms in specific ways, using AND, OR, and NOT
 - Example: (heart OR cardiac) AND (pig OR swine) NOT (guinea)
- Parenthesis
 - Used to combine synonymous terms in a search string
 - Example: (dog OR dogs OR canine) AND (pain OR discomfort OR distress)
- Proximity Operators
 - Searching for words in the same sentence, or within a certain number of words of one another
 - Example: blood N3 collect* = blood collection, collection of arterial blood, collection blood
- Quotation Marks
 - Used to search for exact phrases within literature and internet search engines
 - Example: "animal welfare" OR "animal health"

Coming Up with Search Terms

- Construct a search string using concepts:
 - Disease keywords
 - Animal keywords
 - 3Rs keywords
- Come up with synonyms/equivalents of the search terms
- Combine the disease, animal, and 3Rs terms in one search string using Boolean AND and OR.

Example One (Disease Model):

- Step 1

Concept/Keyword Type	Search Terms
Disease	Inflammatory bowel disease

Animal	mice
3Rs	Humane endpoint

- Step 2

Concept/Keyword Type	Search Terms
Disease	"inflammatory bowel disease" OR IBD OR colitis
Animal	Murine OR mouse OR mice OR mus
3Rs	"animal welfare" OR "humane endpoint" OR "non-invasive" OR imag* OR biomarker*

- Step 3: Combined as a set in PubMed in Advanced Search

- (("animal welfare"(Title/Abstract) OR "humane endpoint*" (Title/Abstract) OR "non-invasive"(Title/Abstract) OR "noninvasive"(Title/Abstract) OR biomarker*(Title/Abstract) AND (mice(Title/Abstract) OR mouse(Title/Abstract) OR murine(Title/Abstract)) AND ("inflammatory bowel disease"(Title/Abstract) OR IBD(Title/Abstract) OR colitis(Title/Abstract))

Example Two (Organism Model):

- Step 1

Concept/Keyword Type	Search Terms
Organism	"Cryptosporidium spp."
Immune Response	"Mucosal immune response"
Anatomy	"Small intestine"
Non-animal model	"Intestine-on-a-chip"

- Step 2

Concept/Keyword Type	Search Terms
Organism	"Cryptosporidium spp." OR helminth* OR parasite* OR hookworm* OR "crypto" OR "cryptosporidium" OR "microparasite*"
Immune Response	"Mucosal immune response" OR "intestinal mucosa" OR "mucosal immune system" OR "mucosal immunity" OR "Th2 immunity" OR "intestinal tuft cells" OR "tuft cell*" OR "host-pathogen interaction*" OR "type 2 inflammatory response*" OR "intestinal inflammation"
Anatomy	"Small intestine*" OR intestinal OR gastrointestinal OR "GI tract"
Non-animal model	"Intestine-on-a-chip" OR organoid* OR enteroid* OR "microfluidic device*" OR "gut-on-a-chip" OR "cell culture" OR "cell assay" OR "non-animal" OR "animal use replacement"

- Step 3: Combined as a set in PubMed in Advanced Search

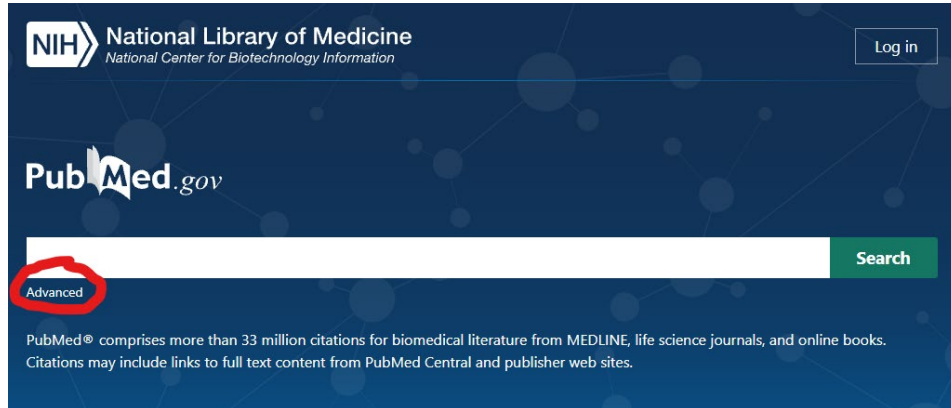
- (("small intestine*" OR intestinal OR gastrointestinal OR "GI tract") AND ("intestinal mucosa" OR "mucosal immune system" OR "mucosal immunity" OR "Th2 immunity" OR "mucosal immune response" OR "Intestinal tuft cells" OR "tuft cell*" OR "Host-pathogen interaction*" OR "Type 2 inflammatory response*" OR "Intestinal inflammation") AND (organoid* OR enteroid* OR "3-D cell culture*" OR "3D cell culture*" OR "gut-on-a-chip" OR "intestine-on-a-chip" OR "microfluidic device*" OR "non-animal" OR "animal use replacement" OR "cell culture" OR "cell assay") AND (helminth* OR parasit* OR hookworm* OR "crypto" OR "cryptosporidium" OR "cryptosporidium spp." OR "microparasite*"))

Database Examples

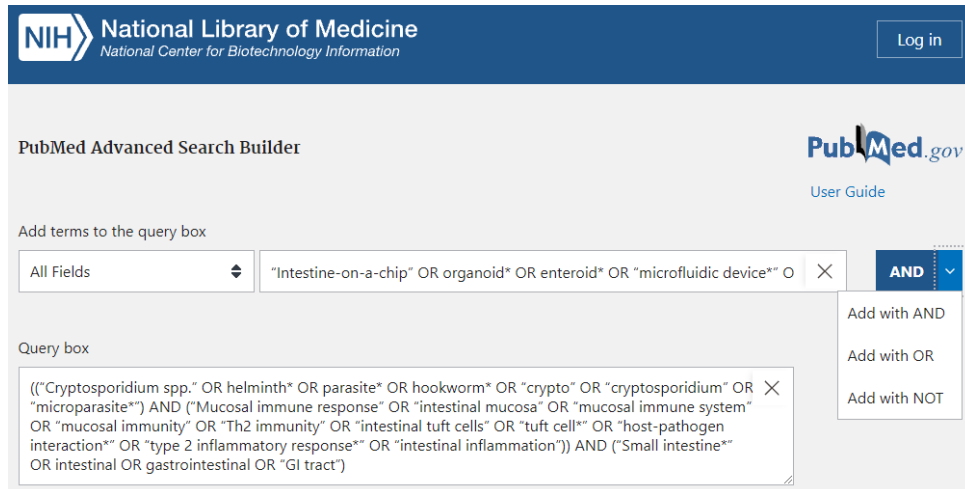
How to perform an advanced search will vary by database. Below are examples of two common databases.

PubMed

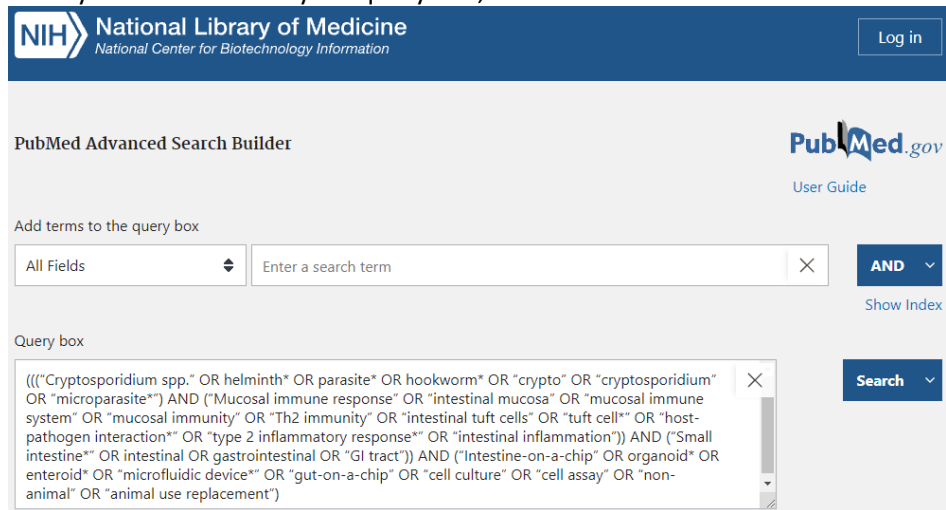
- Click “Advanced”



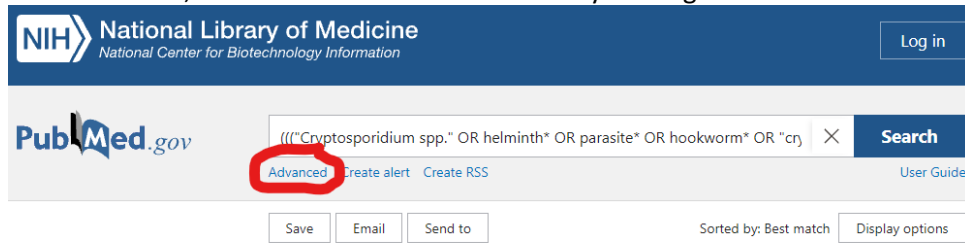
- Build search terms by selecting which field to search, entering the search term, and then selecting how to add. Once you select your add method, the query box will build your combination of search terms for you. See below for an example using Example 2 from above. Search terms for each concept are entered into the search term field together, and then added.



- Once you have finalized your query box, click the search button.



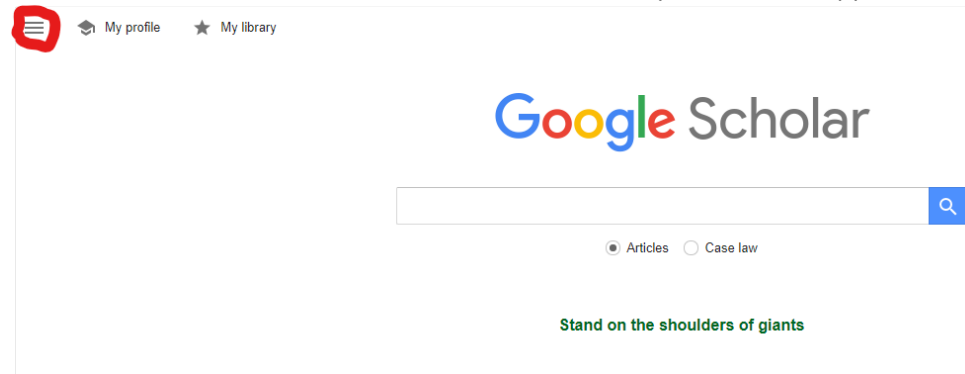
- Once searched, the search terms can be edited by clicking the “Advanced” link.



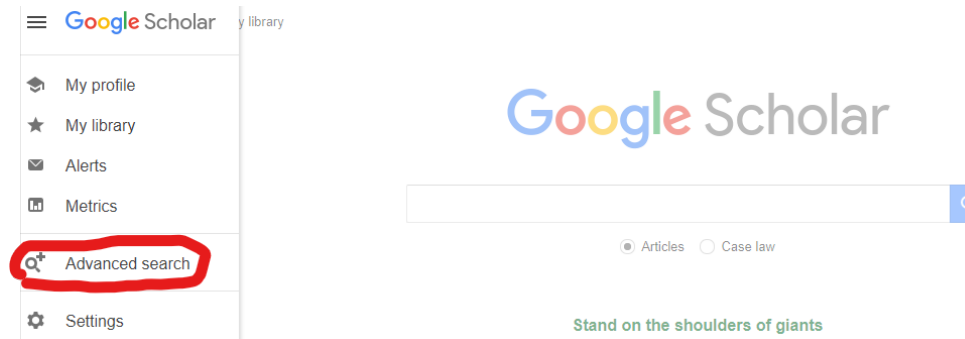
MY NCBI FILTERS 69 results

Google Scholar

- To access the advanced search function, select the dropdown in the upper left



- Then select the Advance Search link



- Pop-up will appear. Less capability to build complex combinations, as there is a limit to the size of the text field. Type terms into appropriate text field.

×
Advanced search
Q

Find articles

with **all of the words**

with the **exact phrase**

with **at least one of the words**

without the words

where my words occur

anywhere in the article

in the title of the article

Return articles **authored by**

e.g., "PJ Hayes" or McCarthy

Return articles **published in**

e.g., J Biol Chem or Nature

Return articles **dated between** —

e.g., 1996

- Can filter searches on the left side of the screen, such as limiting to "Review articles".

☰ Google Scholar

Q

Articles

About 14,600 results (0.14 sec)

Any time

Since 2021

Since 2020

Since 2017

Custom range...

Sort by **relevance**

Sort by date

Any type

Review articles

Create alert

[HTML] **Host–pathogen interactions in urinary tract infection**

GR Nielubowicz, HLT Mobley - Nature Reviews Urology, 2010 - nature.com

The urinary **tract** is a common site of bacterial infections; nearly half of all women experience at least one urinary **tract** infection (UTI) during their lifetime. These infections are classified based on the condition of the host. Uncomplicated infections affect otherwise healthy ...

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Human enteroids as an *ex-vivo* model of **host–pathogen interactions in the gastrointestinal tract**

J Foulke-Abel, J In, O Kovbasnjuk ... - Experimental ..., 2014 - journals.sagepub.com

Currently, 9 out of 10 experimental drugs fail in clinical studies. This has caused a 40% plunge in the number of drugs approved by the US Food and Drug Administration (FDA) since 2005. It has been suggested that the mechanistic differences between human ...

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