Food & Genes

How to find scientific literature?

How to read a scientific article?

Katarzyna (Kasia) Rybak

21.10.19

What is a scientific article?

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What is the role of a scientific article?

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What is a scientific article?

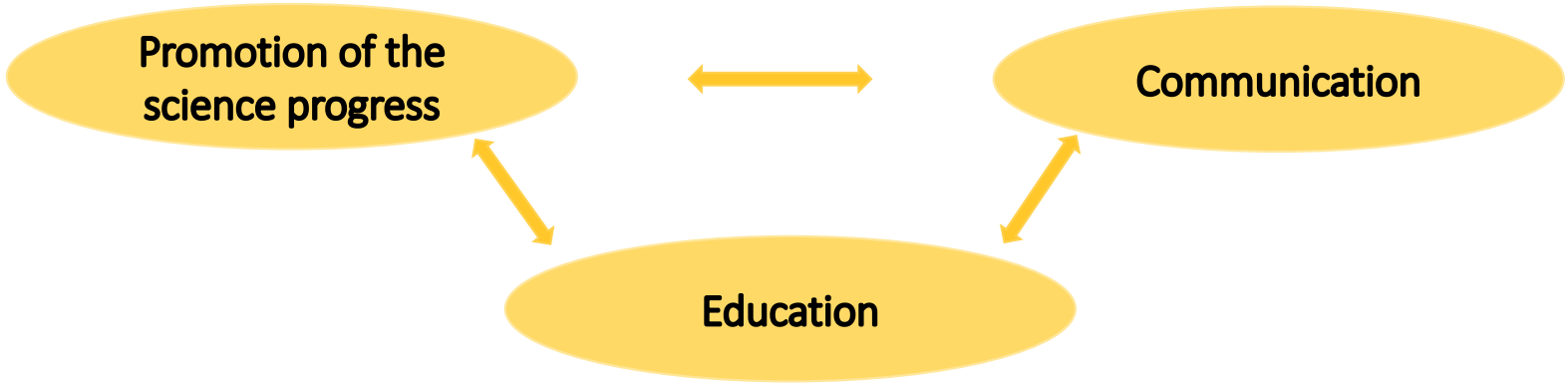
A written and published report describing original research results

What is the role of a scientific article?

What is a scientific article?

A written and published report describing original research results.

What is the role of a scientific article?



Types of scientific articles

-primary literature-

Research Articles

- Present new and original scientific findings
- Explain research methodology and provide data
- Useful when you need primary sources

Review Articles

- Provide an overview of a field or subject
- Synthesize previous research
- Useful when you need background information and additional references

News Articles

- Provide a brief overview of scientific findings for a general audience
- Useful when you are searching for the latest scientific research

Meeting Abstracts, Papers, and Proceedings

- Provide brief descriptions of original research presented at conferences
- Useful when you are looking for recent research in the scientific literature

Peer-reviewed vs popular science

Peer-reviewed articles

- Are written by scholars and researchers (look for a university or laboratory affiliation in the article)
- Include an abstract and a bibliography or cited list of references Have a specialized format
- Use discipline-specific language
- Maintains high quality of published articles

Popular/news articles

- Are written by journalists or writers who may or may not have expertise on the article's subject
- Rarely have an abstract or bibliography
- Do not follow a specialized format
- Use language understandable by the general public
- Undergo a limited editorial review

While popular magazines can be a good source for general information on topics, they may not be the most appropriate source for your research.

Peer-reviewed vs. non peer-reviewed publications

	Peer-Reviewed	Not Peer-Reviewed	
	Scholarly Journal	**Popular Magazine**	**Trade Magazine/Journal**
Audience	Researchers and professionals	General public	Members of a specific business, industry or organization
Author(s)	Scholars/professors (usually a required part of their job at 4-year universities-not paid by journals)	Staff writers and journalists (often paid by magazines)	Experts in a field
Content	Longer articles Research projects, methodology, and theory Use subject-specific language and terms	Short articles of general interest, with a focus on current events, news, and personalities.	Short articles with an emphasis on industry trends, new products, techniques and organizational news.
Sources	Sources cited in bibliographies and/or footnotes	Rarely cited Information is usually second or third hand	Sources mentioned occasionally with bibliographies
Purpose	To share facts with other scholars/researchers in that same field of study	To entertain, inform, evoke emotional response	To share the latest information and news with others in the same trade
Advertisements	Few to None	Heavy	Moderate-Almost all or most are trade related
Examples	*American Literature, New England Journal of Medicine, Current History*	*Glamour, Time, Newsweek*	*Police Chief, Advertising Week, Tech Directions*

https://www.nacc.edu/Content/Uploads/nacc.edu/files/Library/PeerReviewed.pdf

Peer-review process

Step 1: Author writes and submits article manuscript to journal

Step 2: Journal editor sends manuscript to expert reviewers to evaluate quality of research, writing, and conclusions

Step 3: Expert reviewers return manuscript to editor with suggested changes, as well as a recommendation to publish or not publish the article

Step 4: Editor reviews suggestions and returns the manuscript to the author for revision

Step 5: Author revises and resubmits the article to the editor

Step 6: The article is published in the journal

Scientific article composition (peer-reviewed)

Title

- Short, eye catching, all-encompassing

Abstract

- Summary of introduction, methods, results, and discussion (statement of **why** the research was done and with emphasis on **why** the results are significant)

Introduction

- **When** was past work done, by **whom**, **why** was their work important, **what** you plan to do in your paper, and **why** what you did is important

Results

- **What** you found

Materials and methods

- **How** the experiments where done, **what** materials were used

Discussion

- **Why** the data show what they show, and **how** your analysis relates back to your objectives from the introduction

Bibliography

Journal Impact Factor

the number of citations, received in that year, of articles published in that journal during the two preceding years, divided by the total number of articles published in that journal during the two preceding years

frequently used as the primary parameter to assess scientific quality of individuals and institutions

as calculated by Thomson Reuters, was originally created as a tool to help librarians identify journals to purchase

$$\text{IF2014} = \text{a mean value} = \frac{\text{\# citations in 2014 of papers published in 2012 \& 20013}}{\text{\# citable papers published in 2012 \& 2013}}$$

How do you look for the scientific literature?

What literature search engines do you use?



Scientific literature search engines

- PubMed

https://www.ncbi.nlm.nih.gov/pubmed

Tutorials: http://www.ncbi.nlm.nih.gov/books/NBK3827/

- Google Scholar

https://scholar.google.com/

- Web of Science

http://apps.webofknowledge.com

via LMU E-media: https://www.ub.uni-muenchen.de/aktuelles/archiv/meldungen/web_of_science/index.html

Tutorials: http://wokinfo.com/training_support/training/web-of-knowledge/

PubMed

- **PubMed** is a **free** database accessing the MEDLINE database of citations, abstracts and some full text articles on life sciences and biomedical topics
- Focus on medicine and biomedical journals

- DOI –
- PMID –

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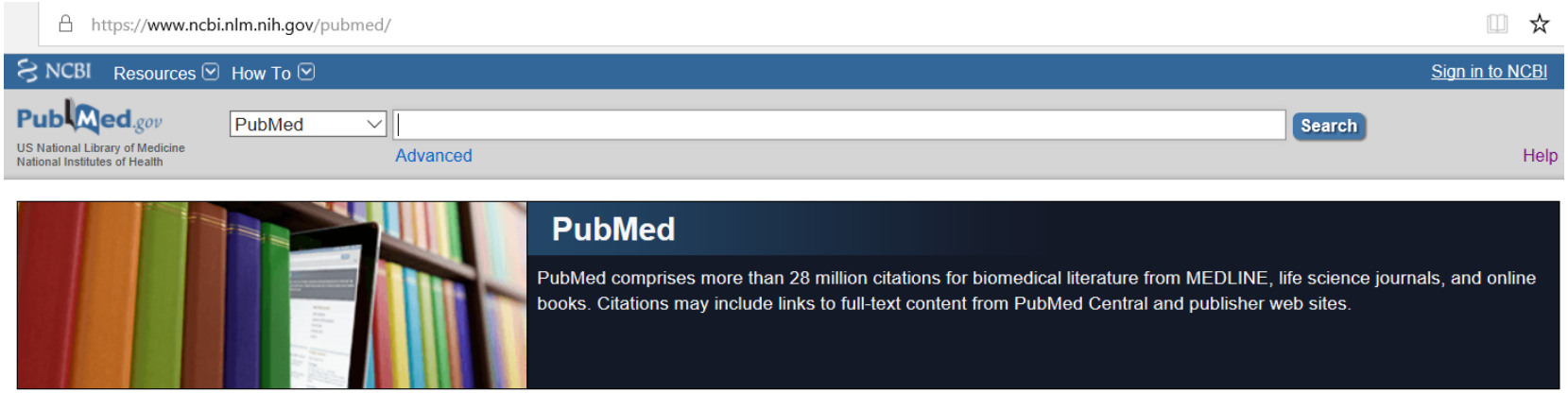
PubMed

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- DOI – Digital Object Identifier
- PMID – PubMed Unique Identifier

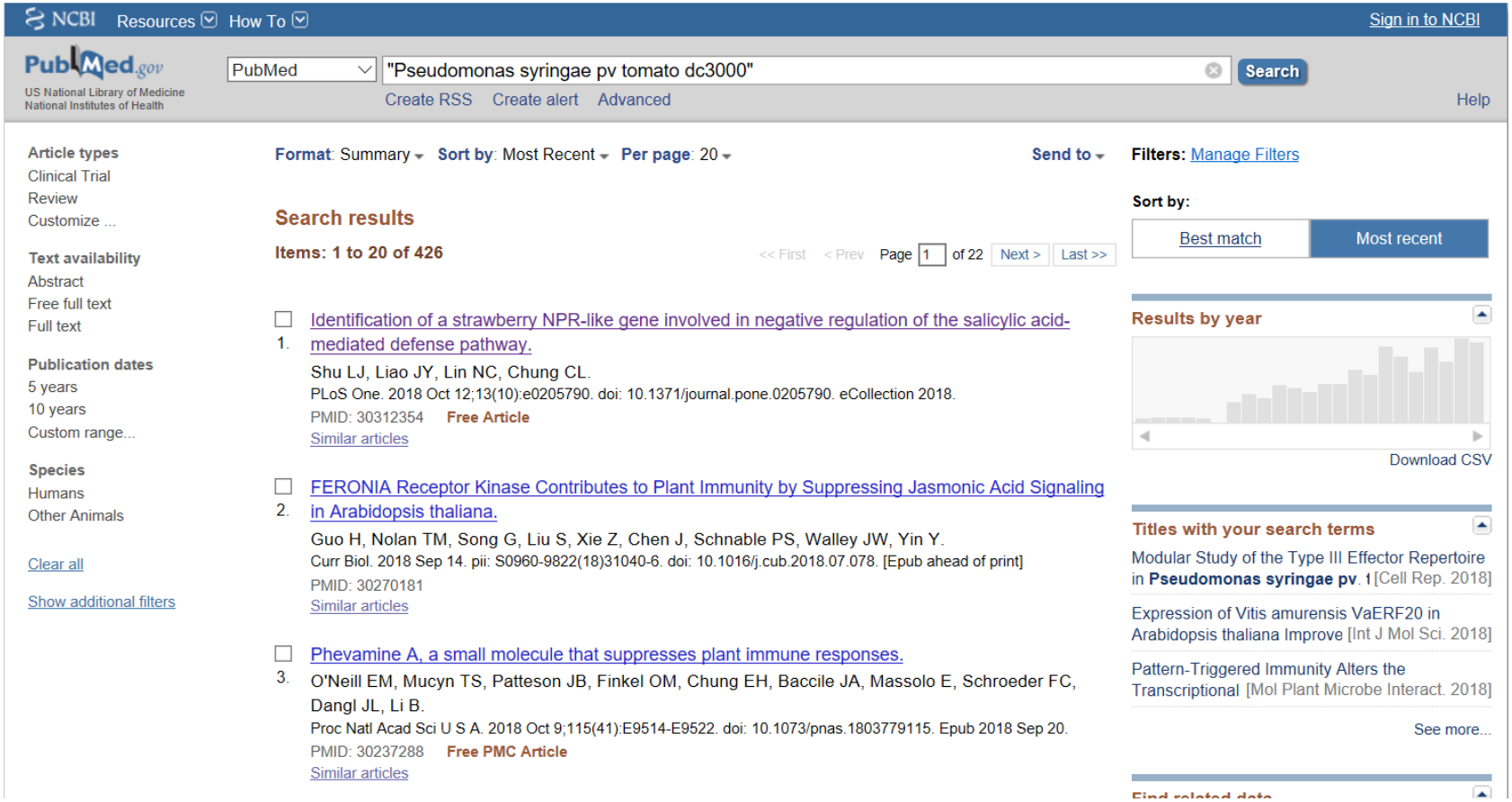
PubMed

https://www.ncbi.nlm.nih.gov/pubmed



PubMed

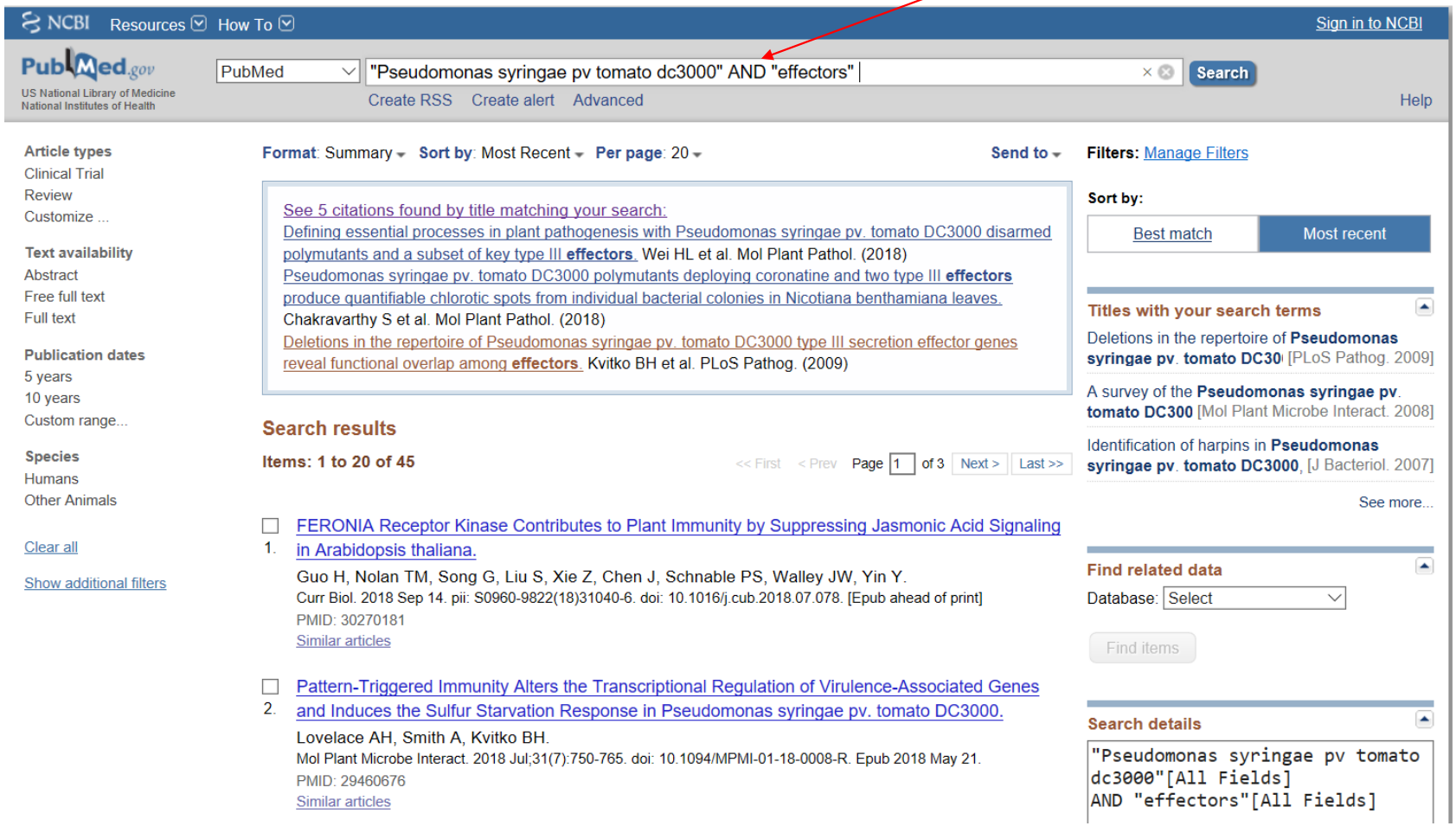
-basic search-



PubMed

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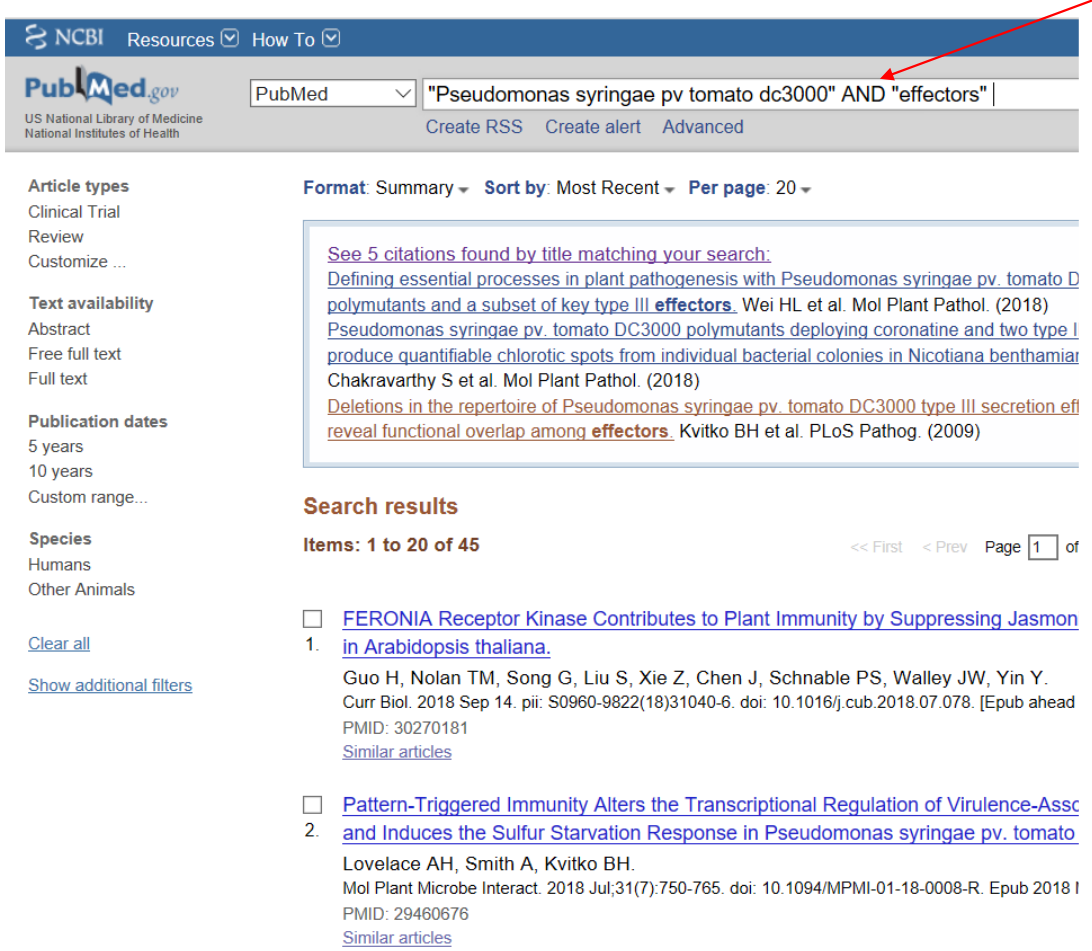
Boolean operators: AND, OR, NOT

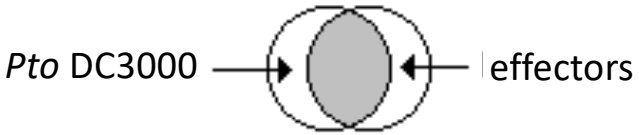


PubMed

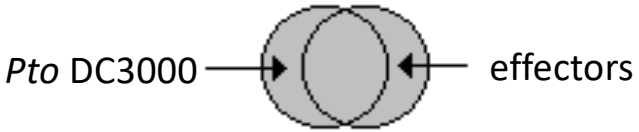
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Boolean operators: AND, OR, NOT

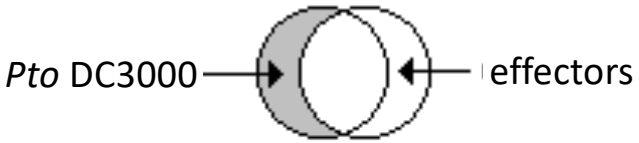




Pto DC3000 **AND** effectors



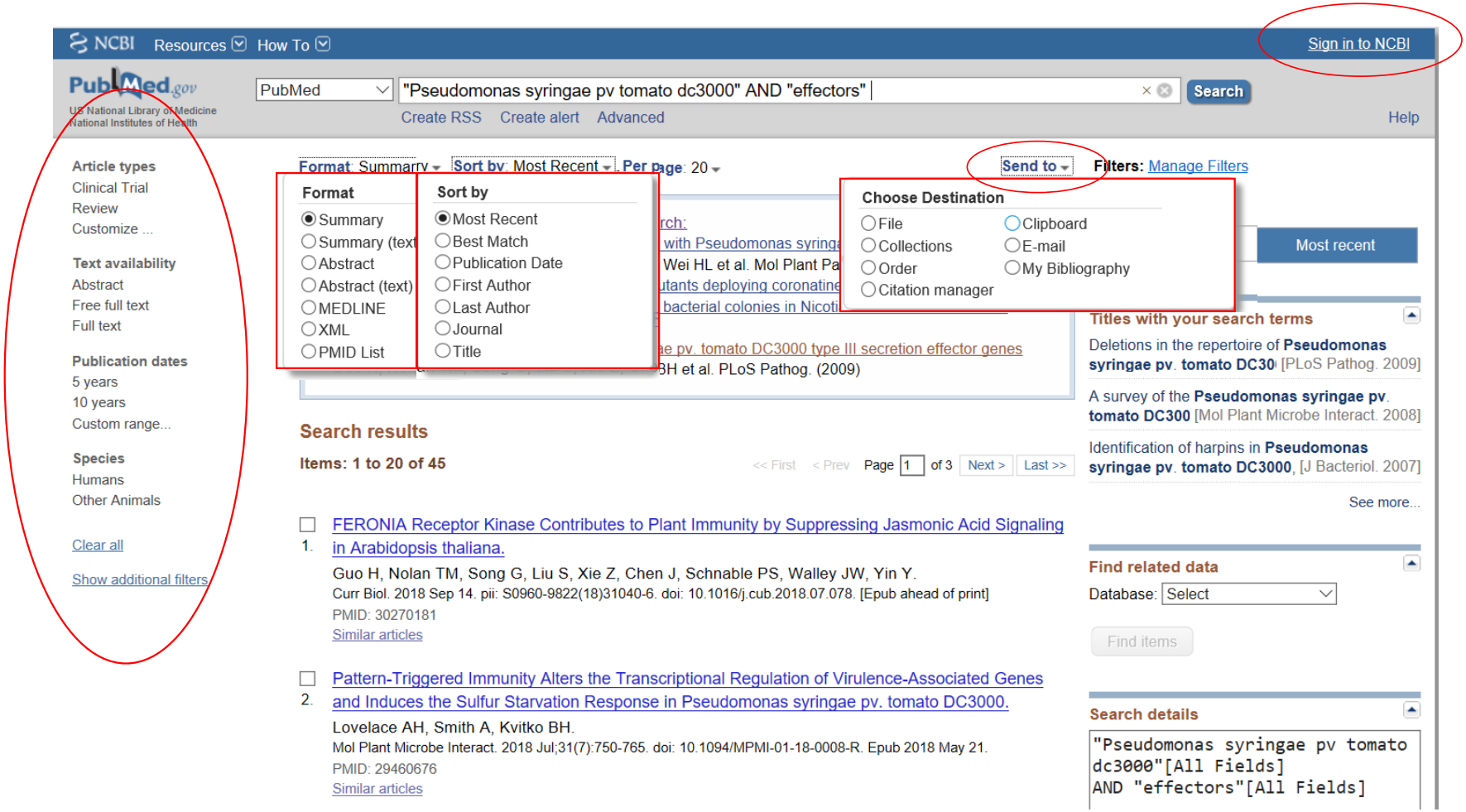
Pto DC3000 **OR** effectors



Pto DC3000 **NOT** effectors

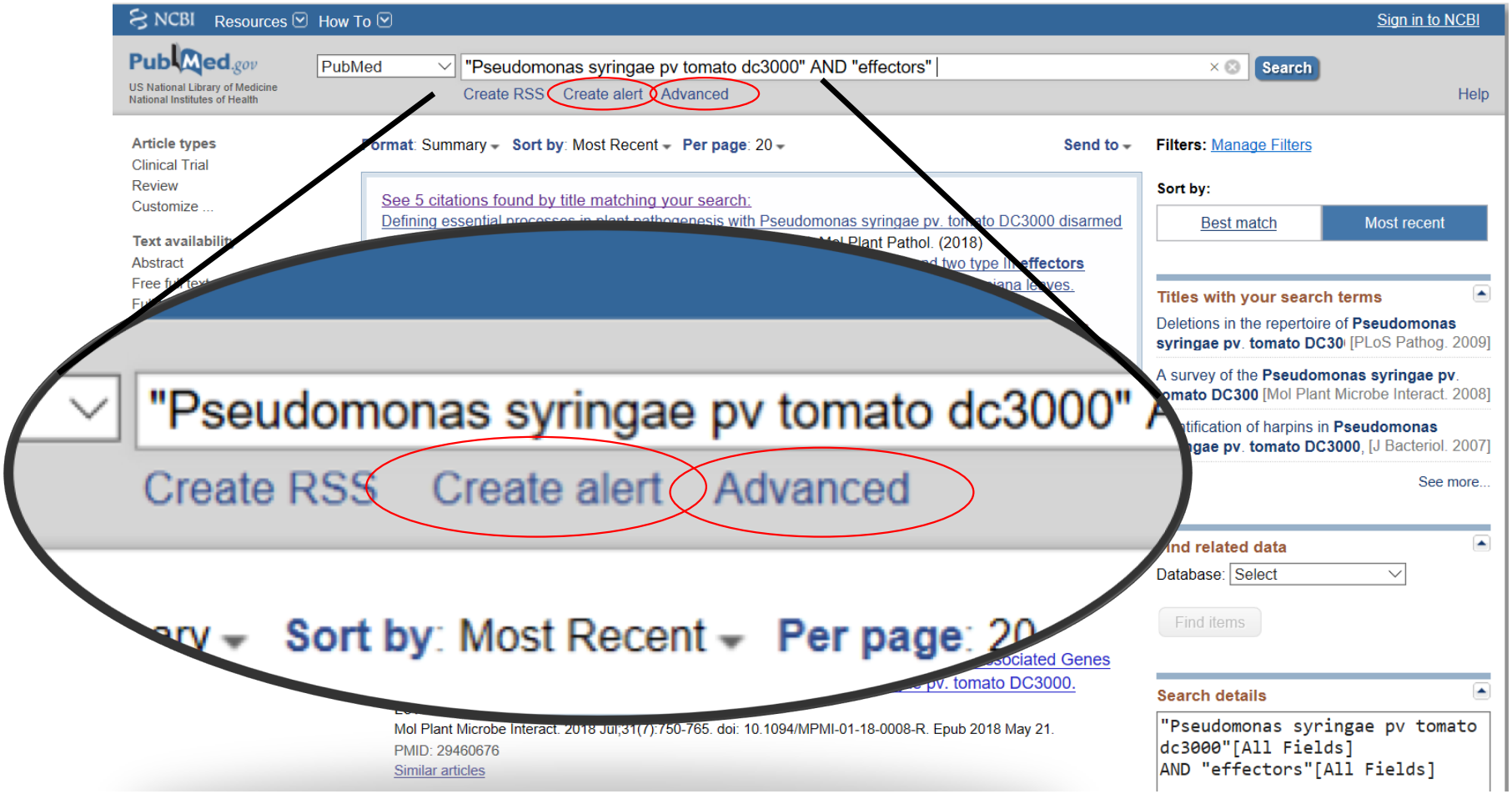
PubMed

-filter options-



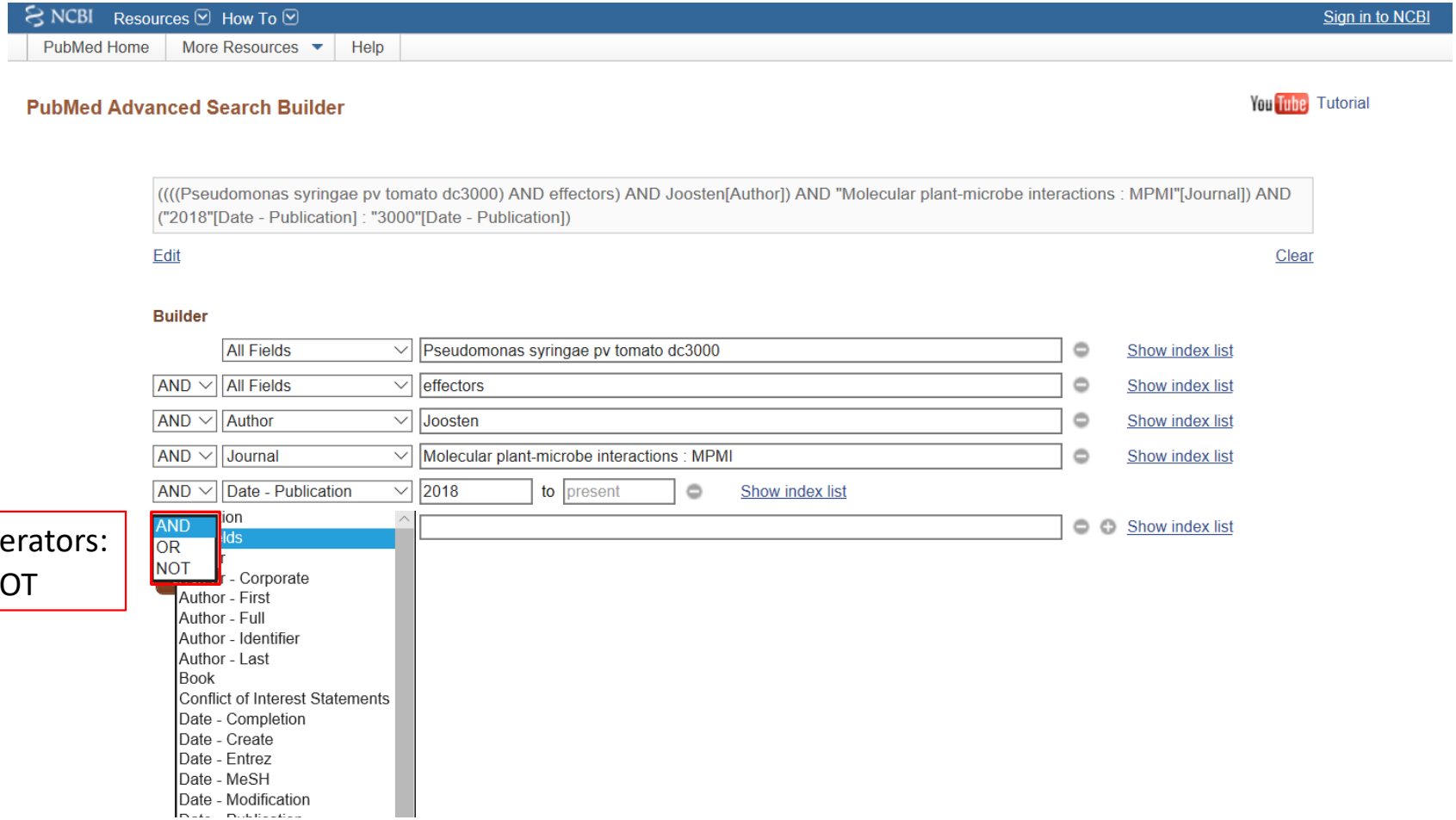
PubMed

-automatic e-mail alerts-



PubMed

-advanced search-



Boolean operators:
AND, OR, NOT

PubMed

-advanced search-



Google Scholar

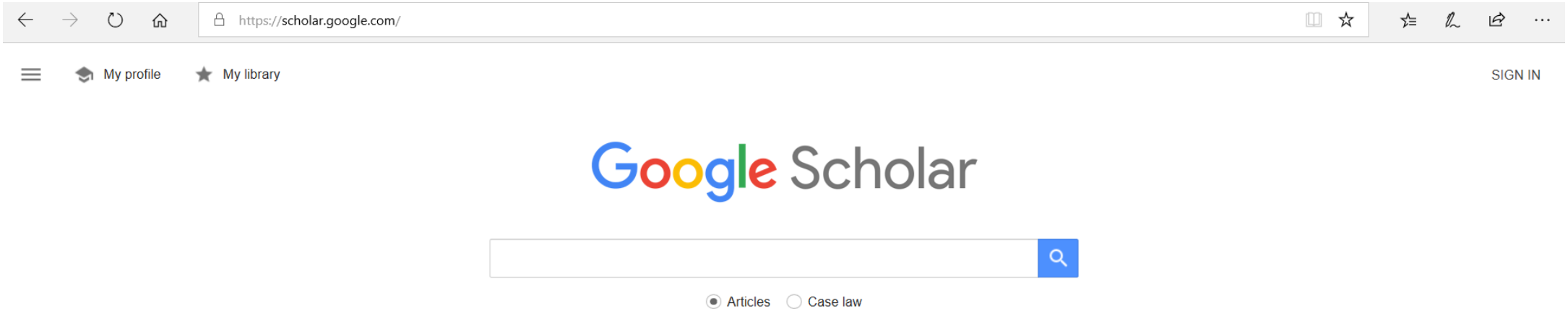
- provides a simple way to broadly search for scholarly literature

  (search across many disciplines and sources: articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites. Full text search of articles)

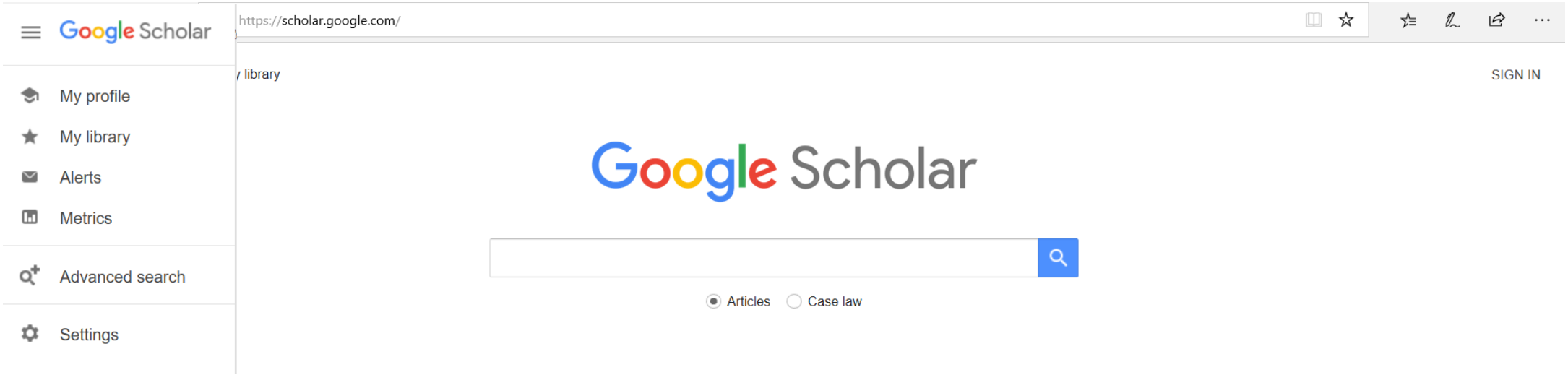
- uses automated algorithmic search of the whole web
- locate the complete document through your library or on the web
- explore related works, citations, authors, and publications
- high coverage and a large number of hits, but not all are always relevant or scientifically controlled material
- most flexible spelling and highest tolerance for spelling mistakes

Google Scholar

https://scholar.google.com/

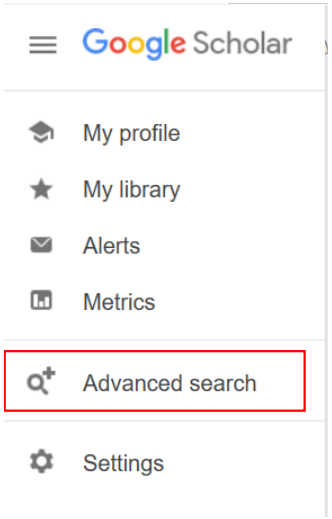


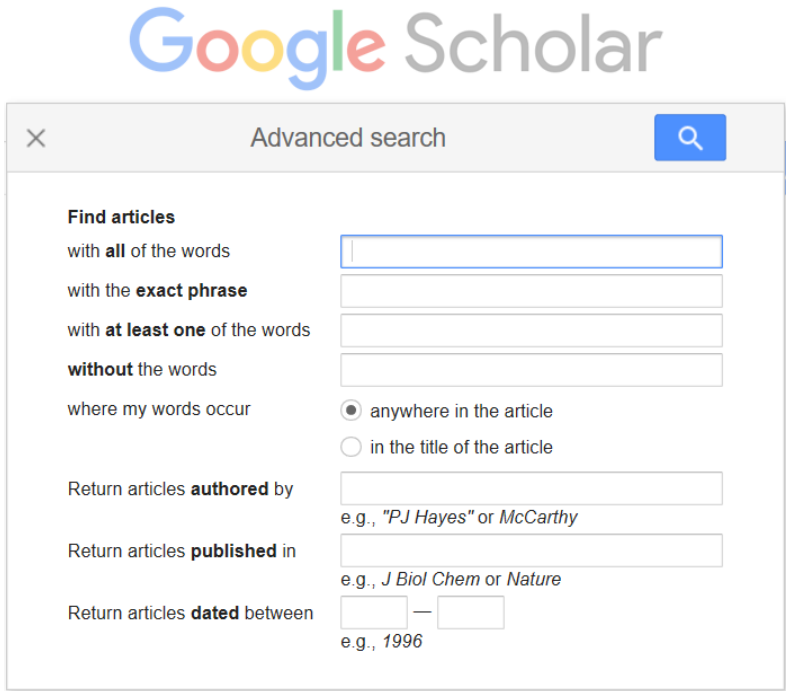
Google Scholar



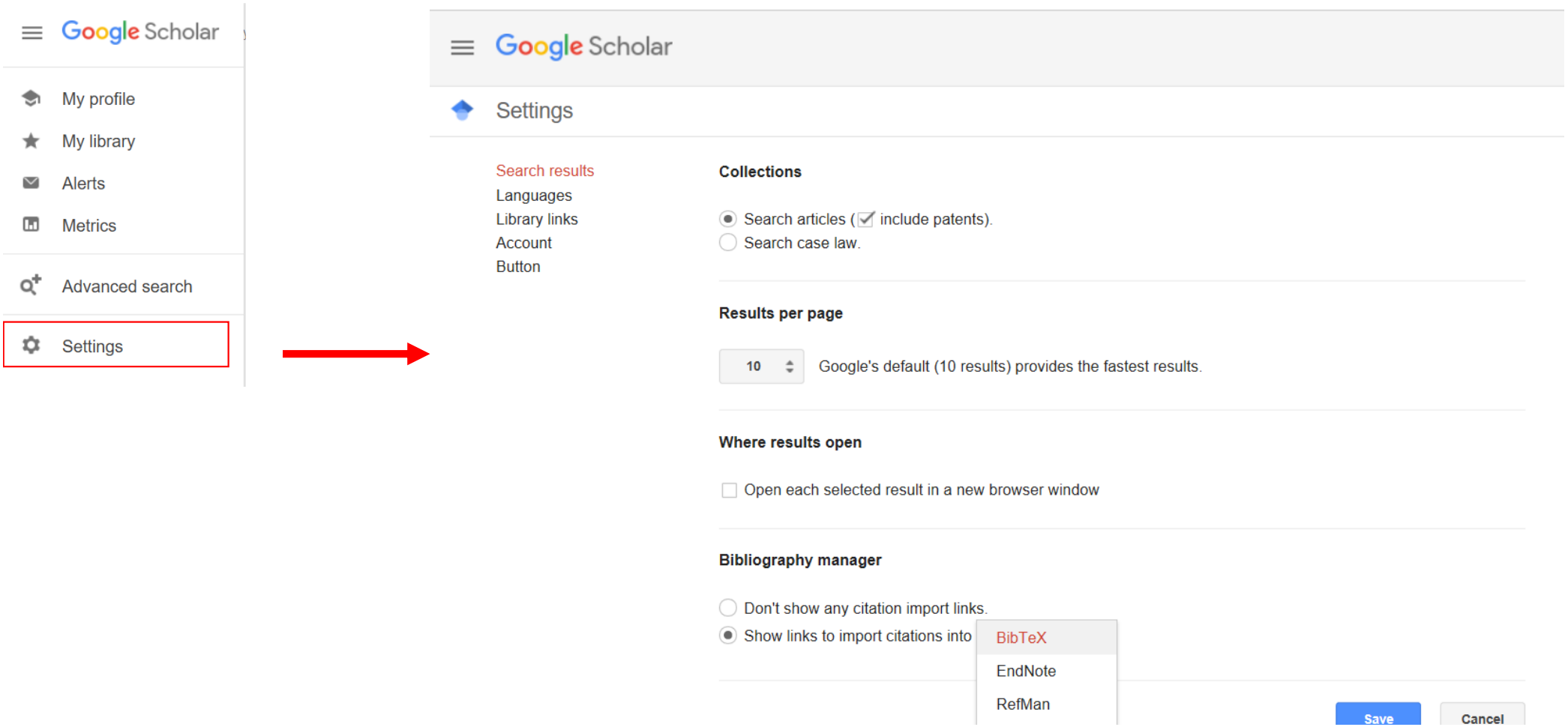
Google Scholar

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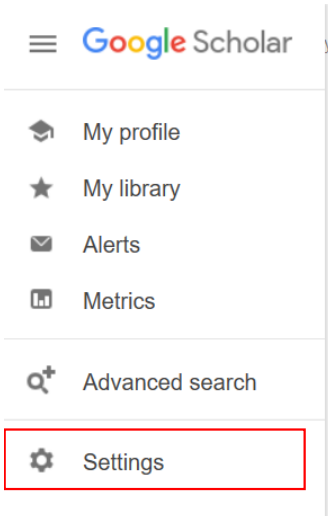


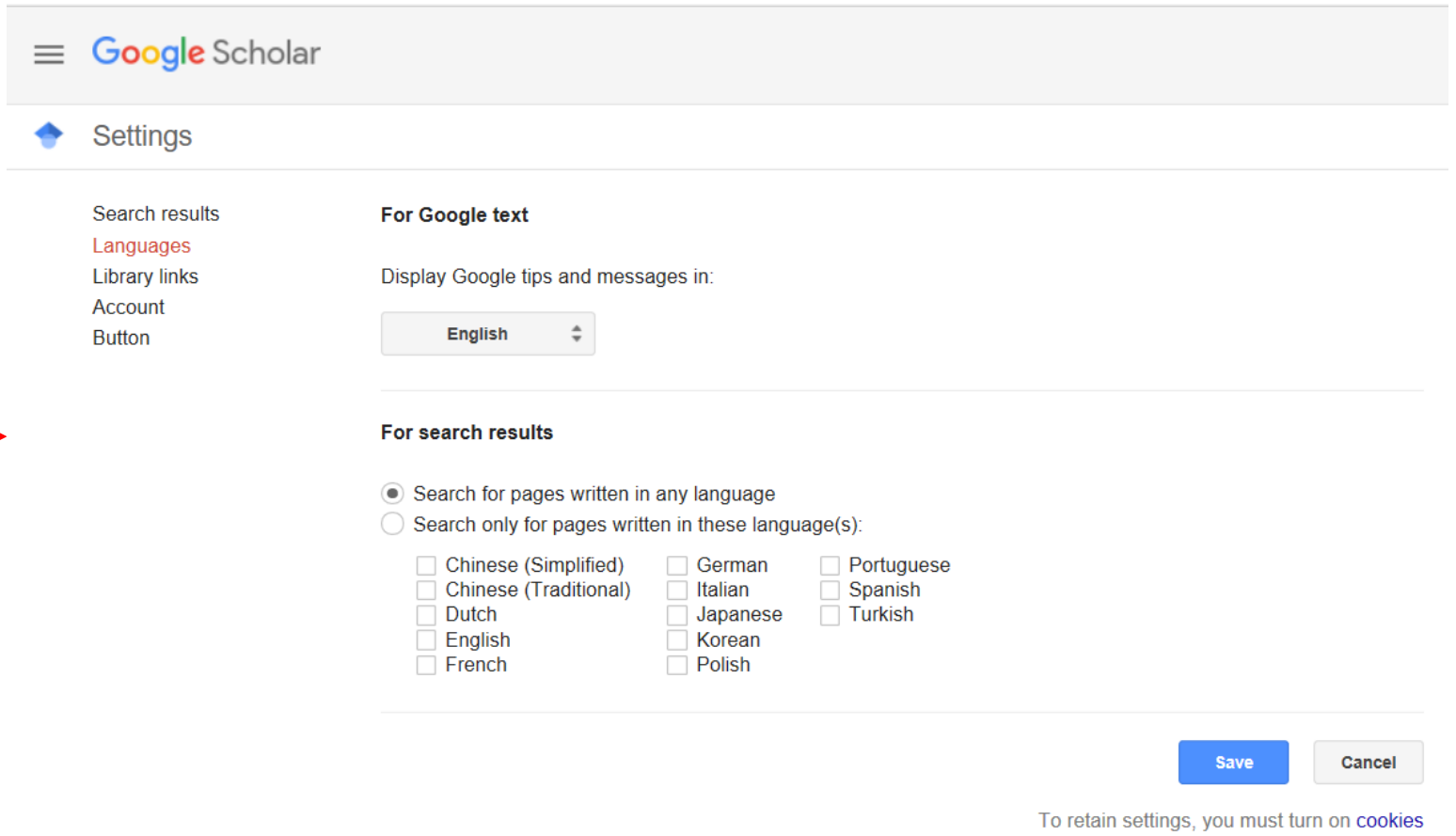


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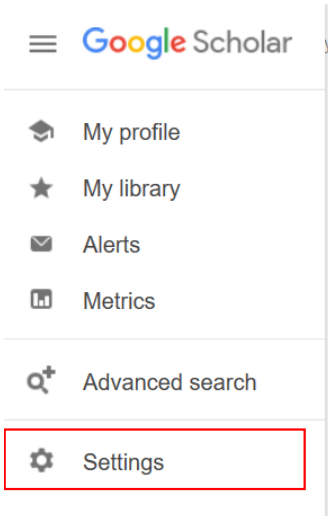
Google Scholar

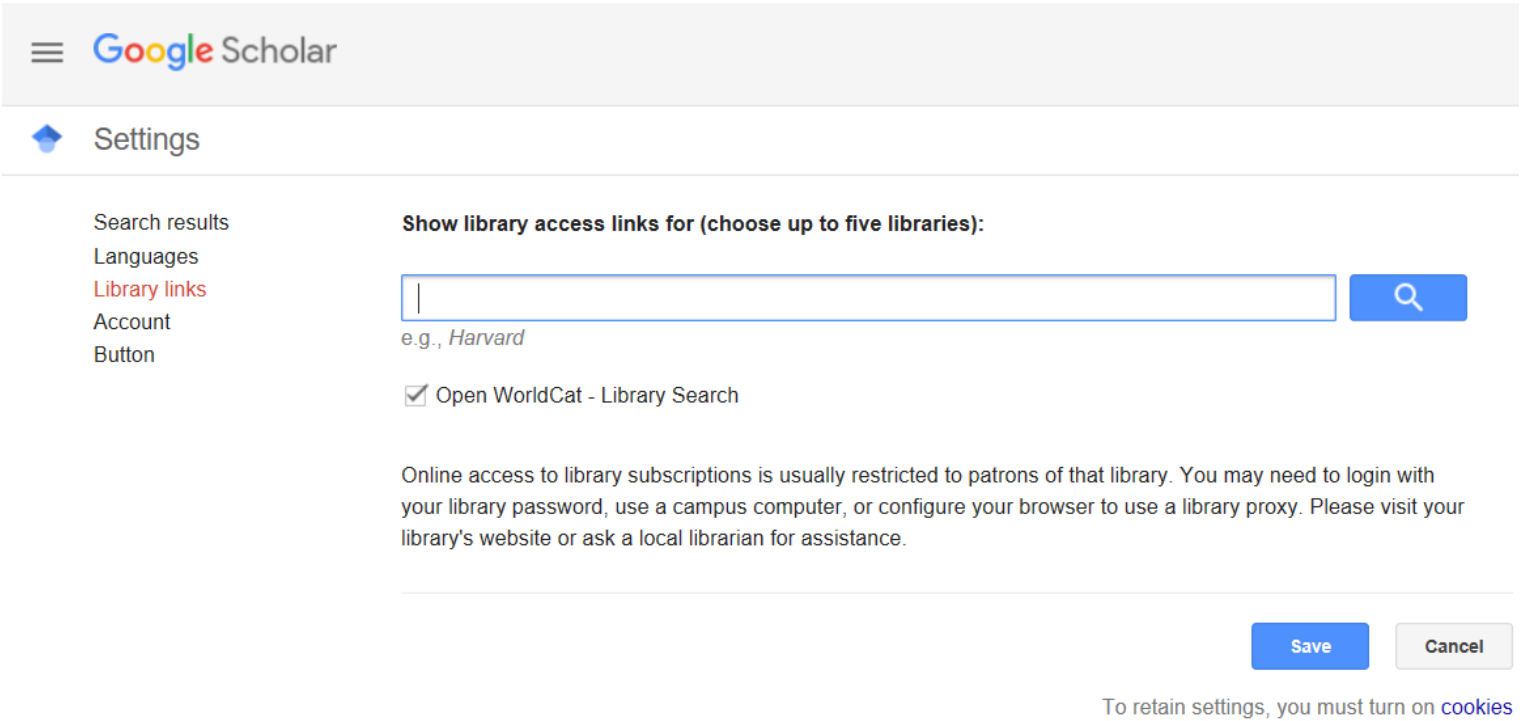




Google Scholar

-Google Scholar configuration with LMU library - SFX@LMU connection-



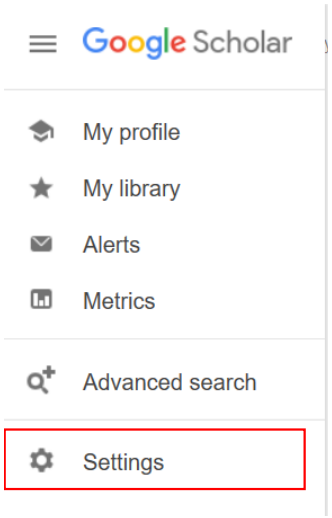


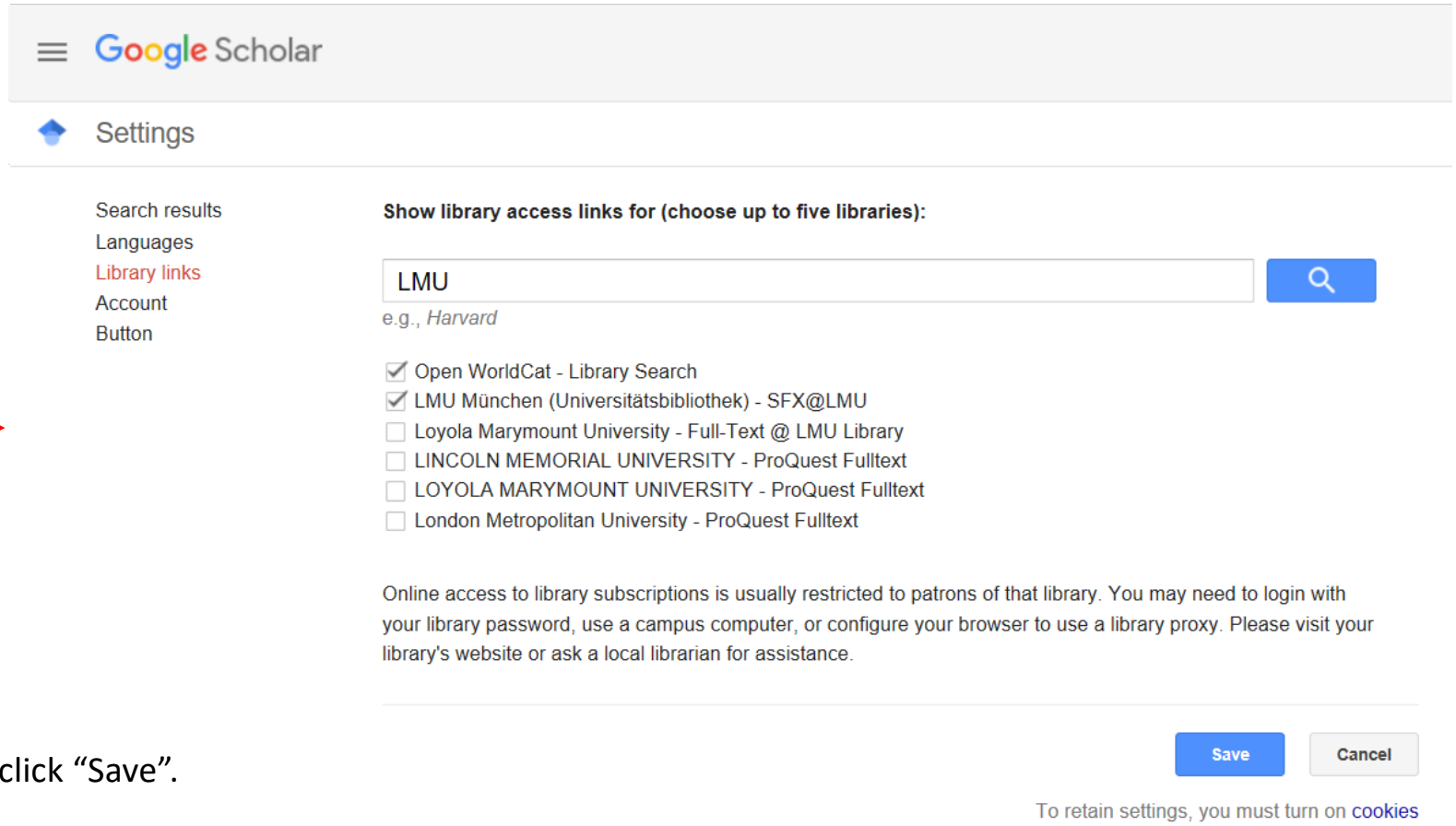
<u>In Google Scholar:</u>

1.Click “Settings”.
2.Click “Library links”.
3.Search for “LMU”.
4.Select all that match and click “Save”.

Google Scholar

-Google Scholar configuration with LMU library - SFX@LMU connection-



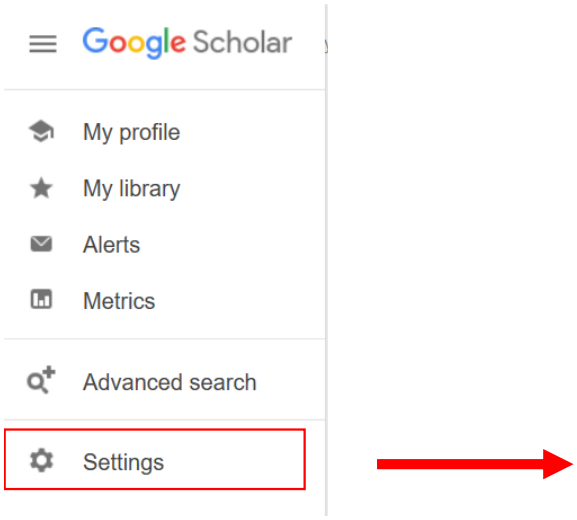


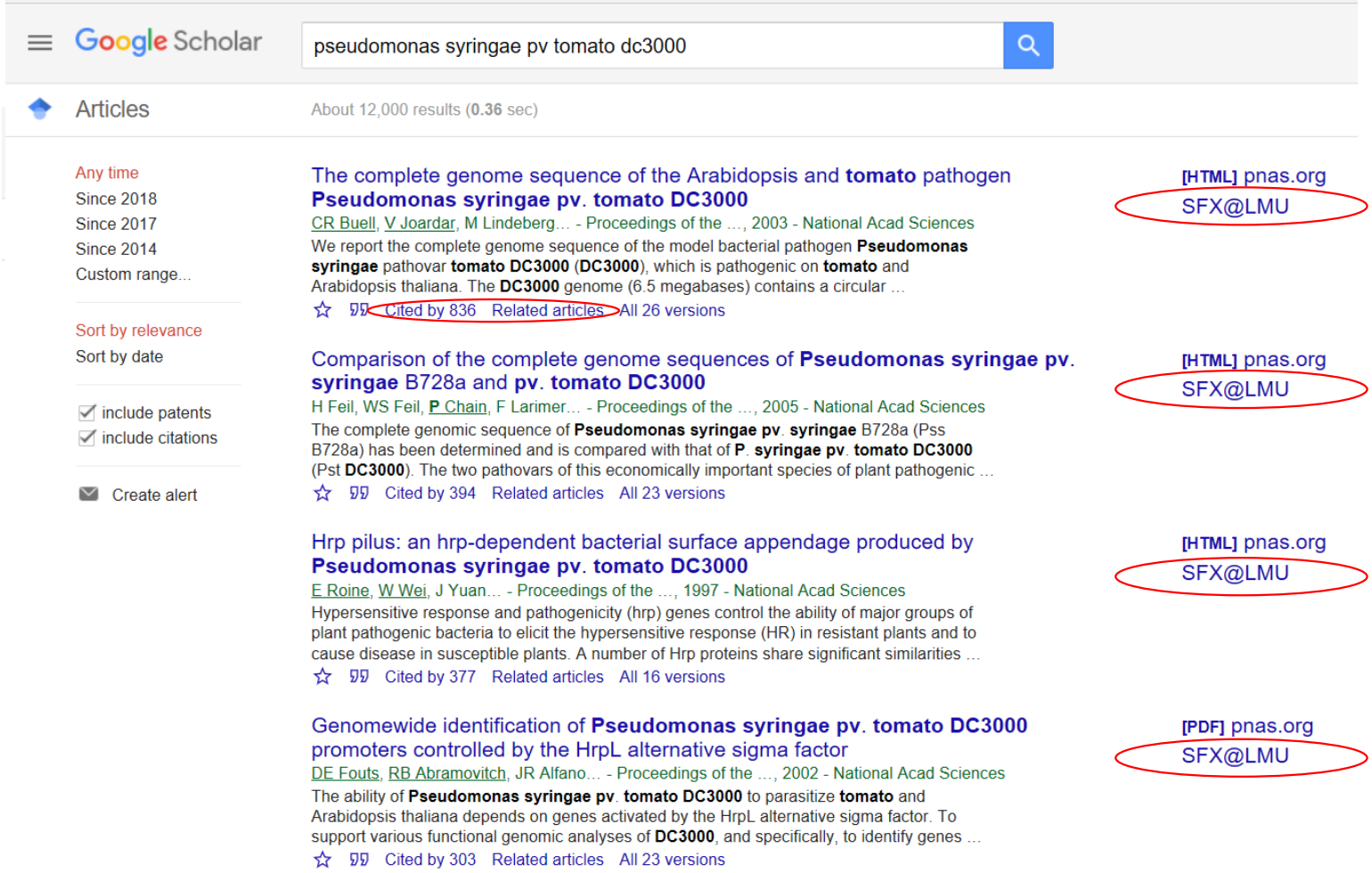
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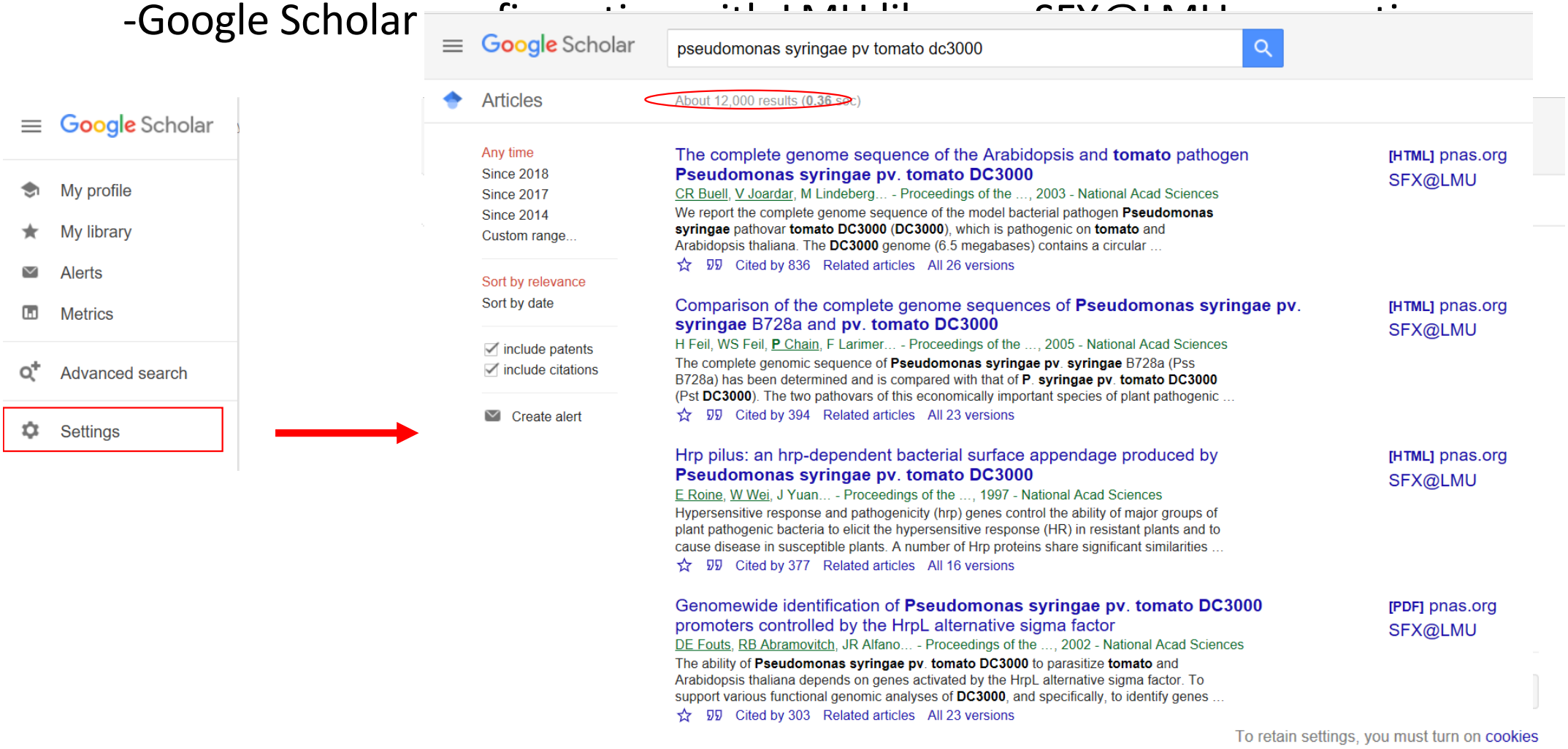
-Google Scholar





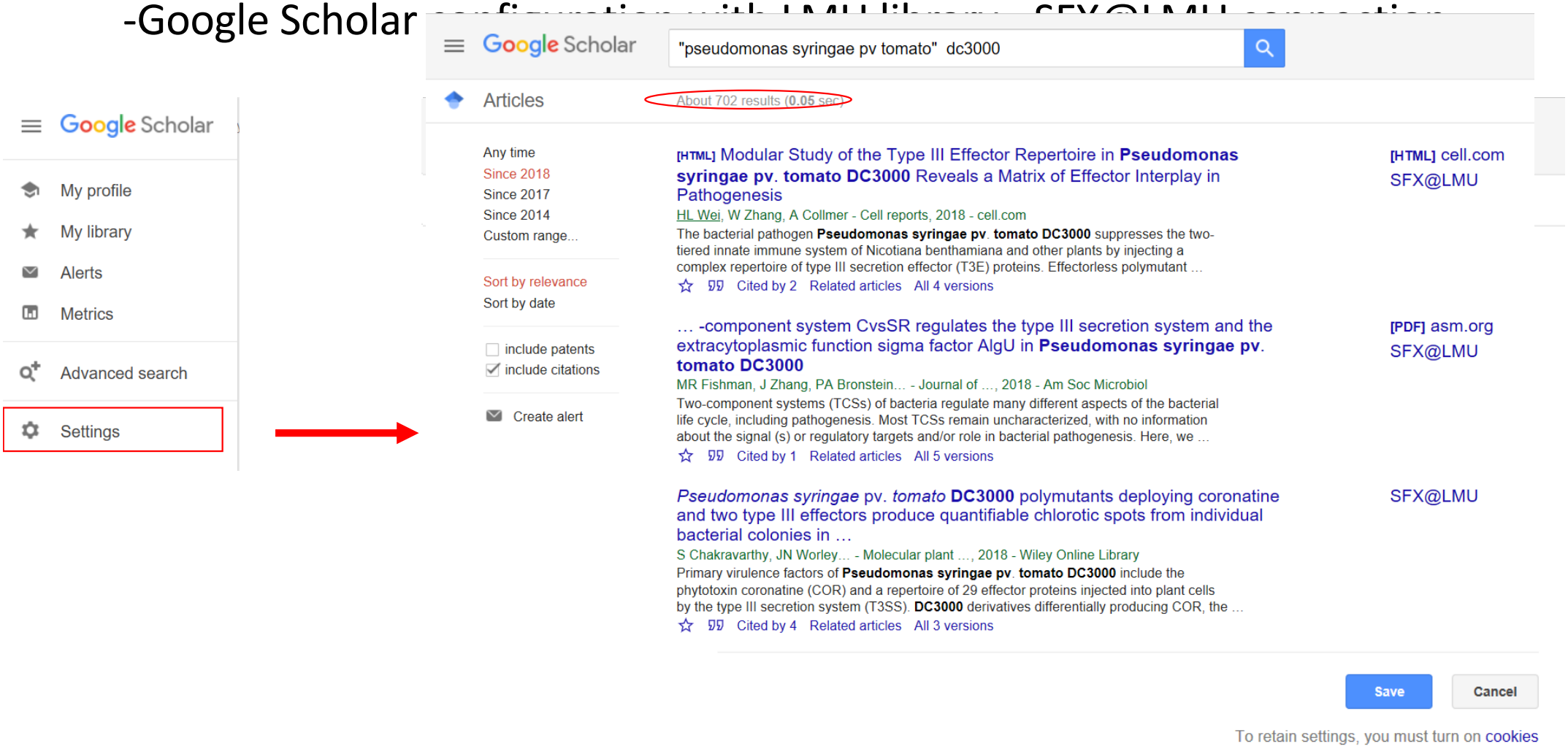
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-Google Scholar

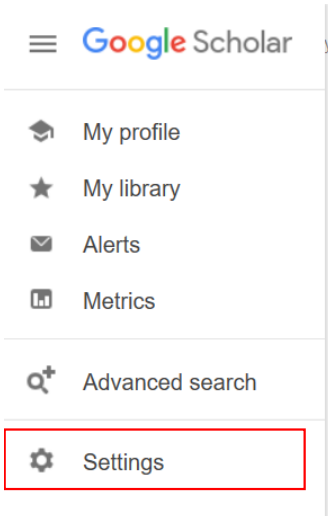


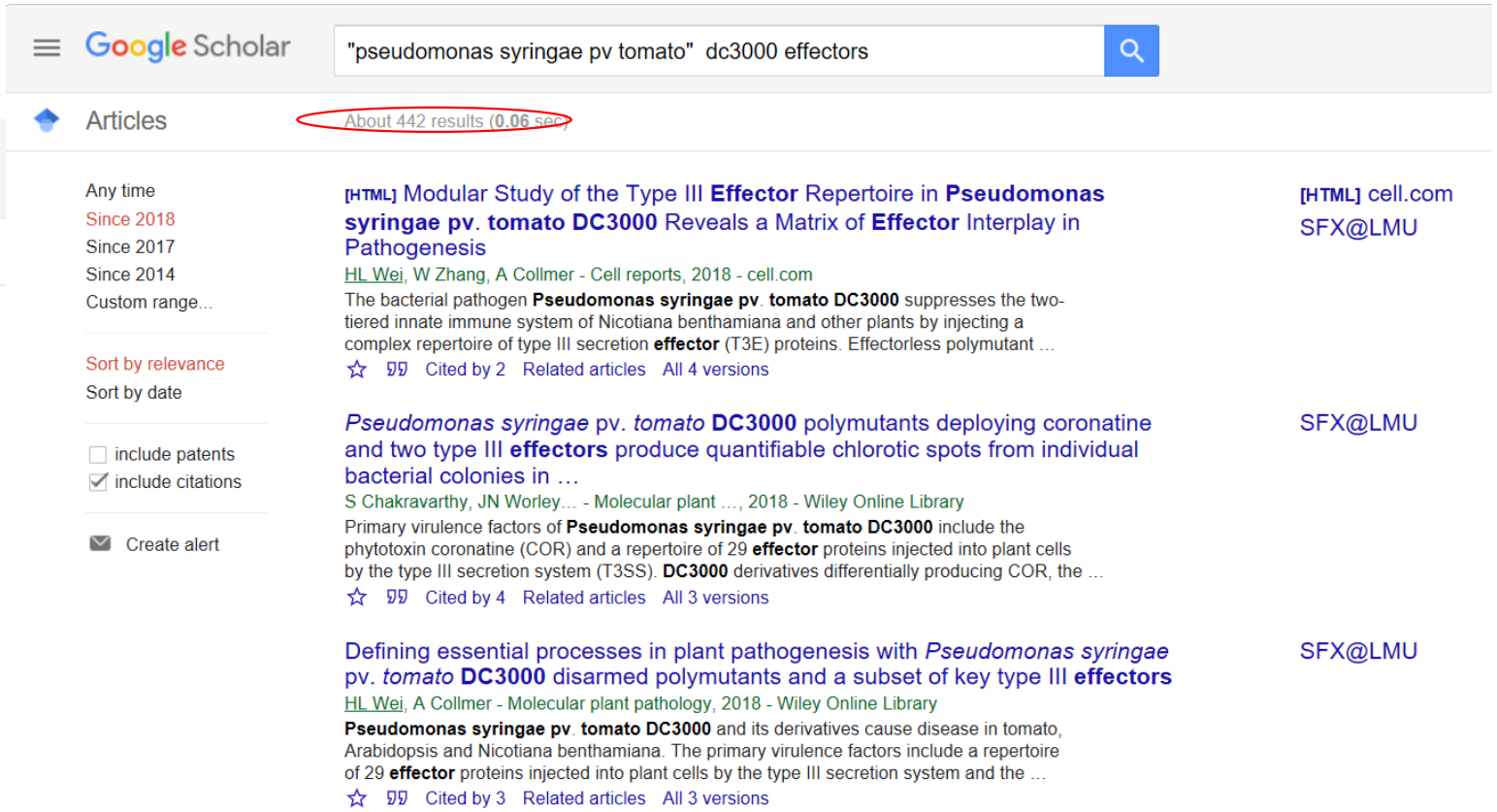
Google Scholar

-Google Scholar configuration with LMU library - SFX@LMU connection

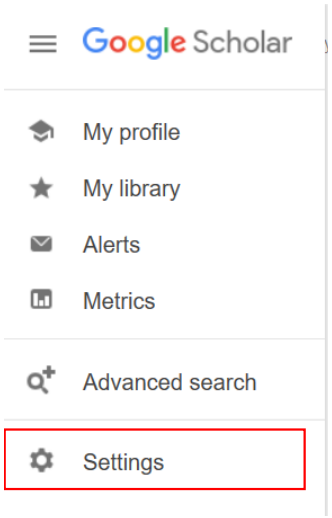


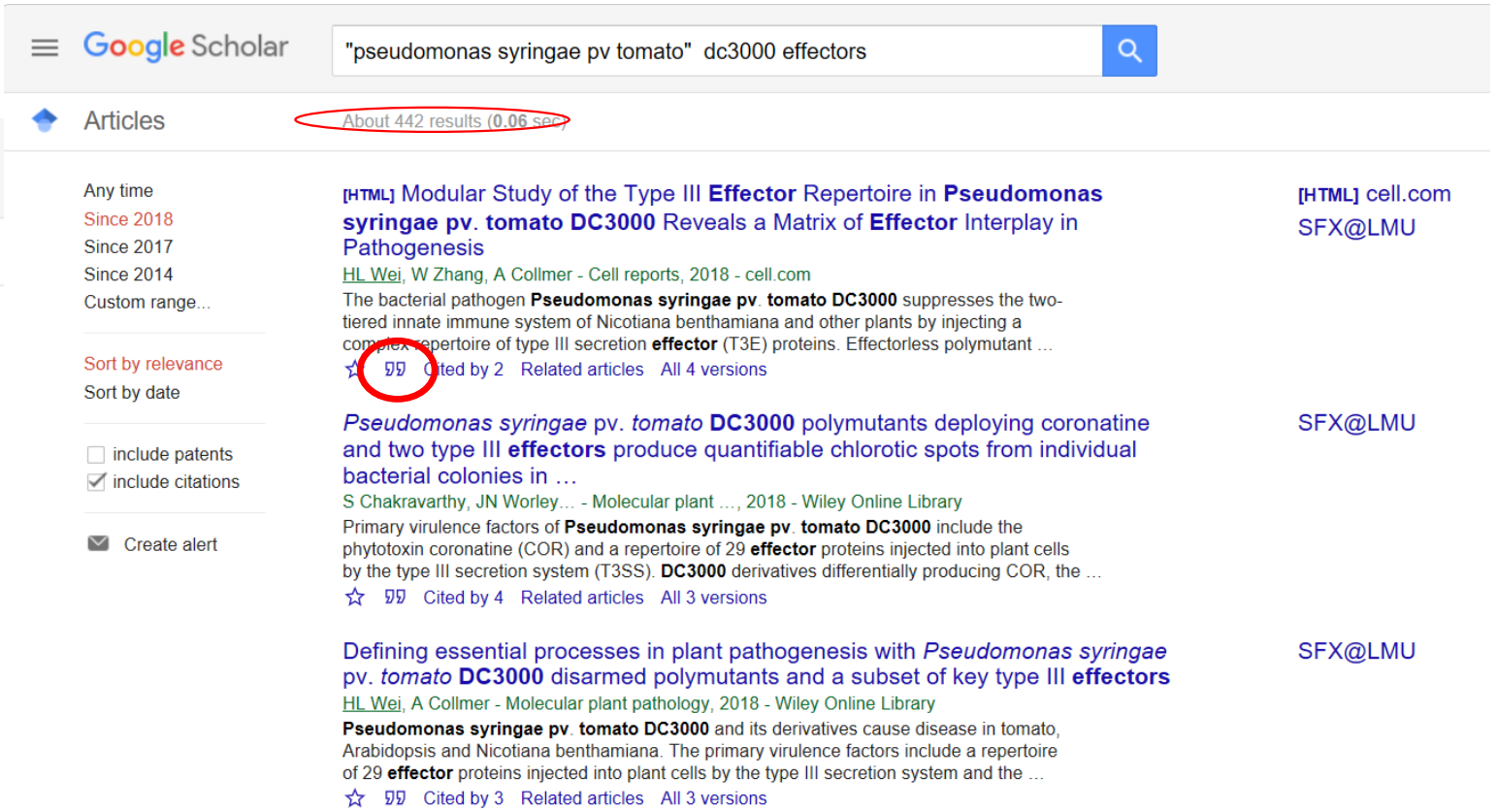
Google Scholar





Google Scholar





Google Scholar



Web of Science (former ISI Web of Knowledge)

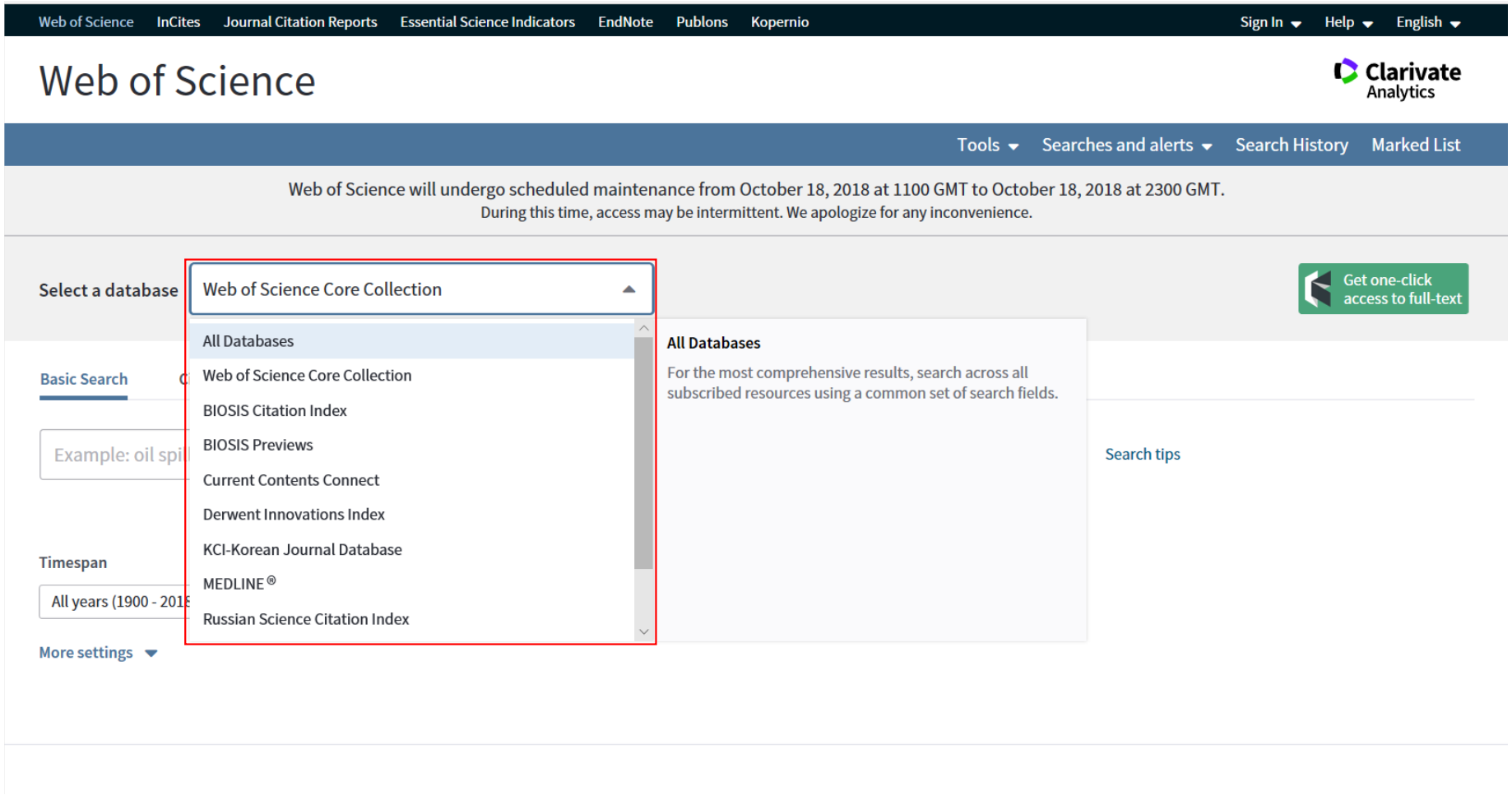
- Covers a wide range of journals
- Commercial product with license fees, but a license is available via the LMU
- Different from PubMed Web of Science includes tools for Science Citation Indexing

<u>Web of Science additional options:</u>

- How often was a paper or author or journal cited?
- Who cited which work?
- Visualize researchers' networks by citation networks.
- How is a researcher "performing" over the years?
- How is a journal "performing" over the years

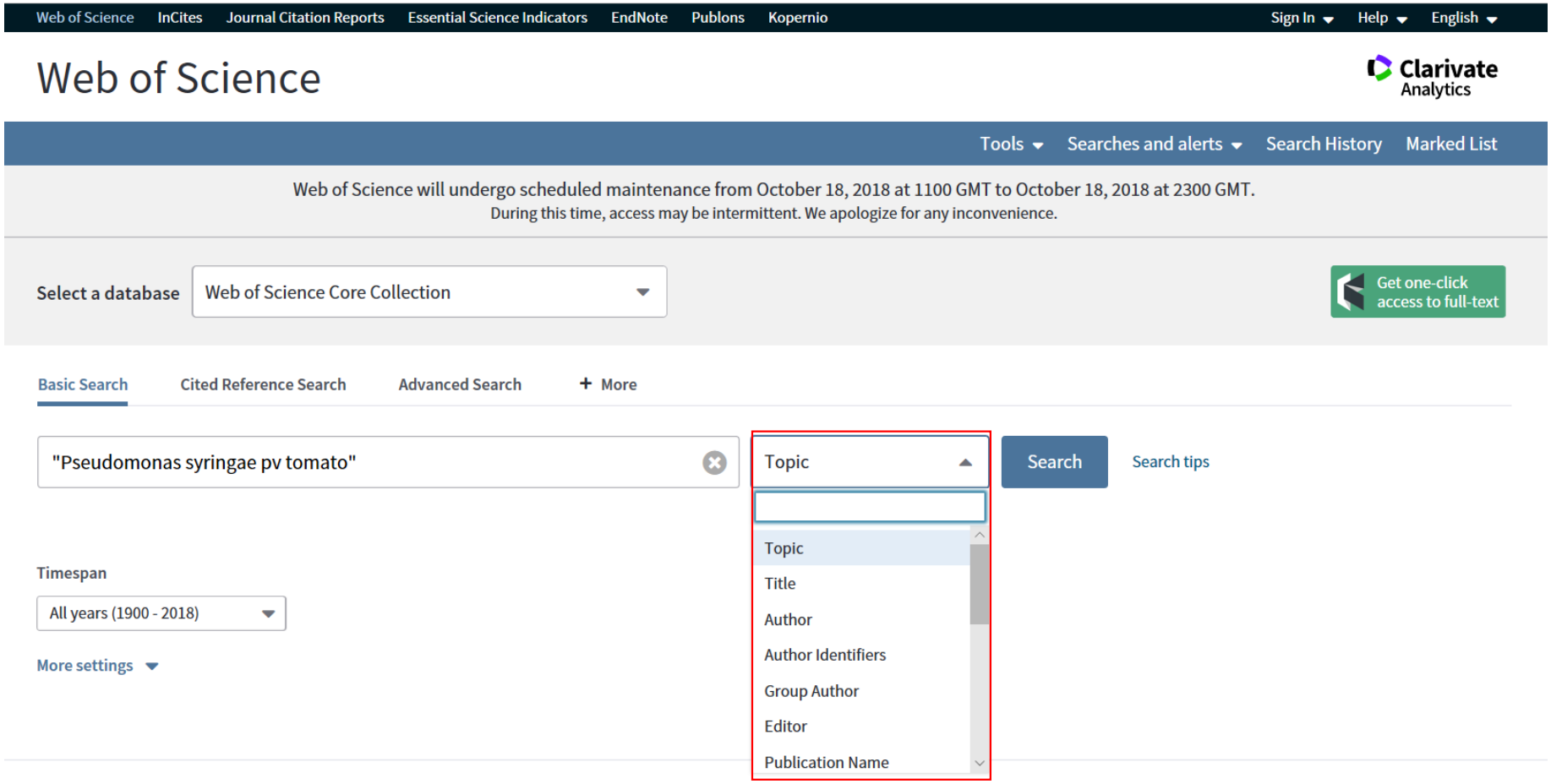
Web of Science

https://www.ub.uni-muenchen.de/aktuelles/archiv/meldungen/web_of_science/index.html



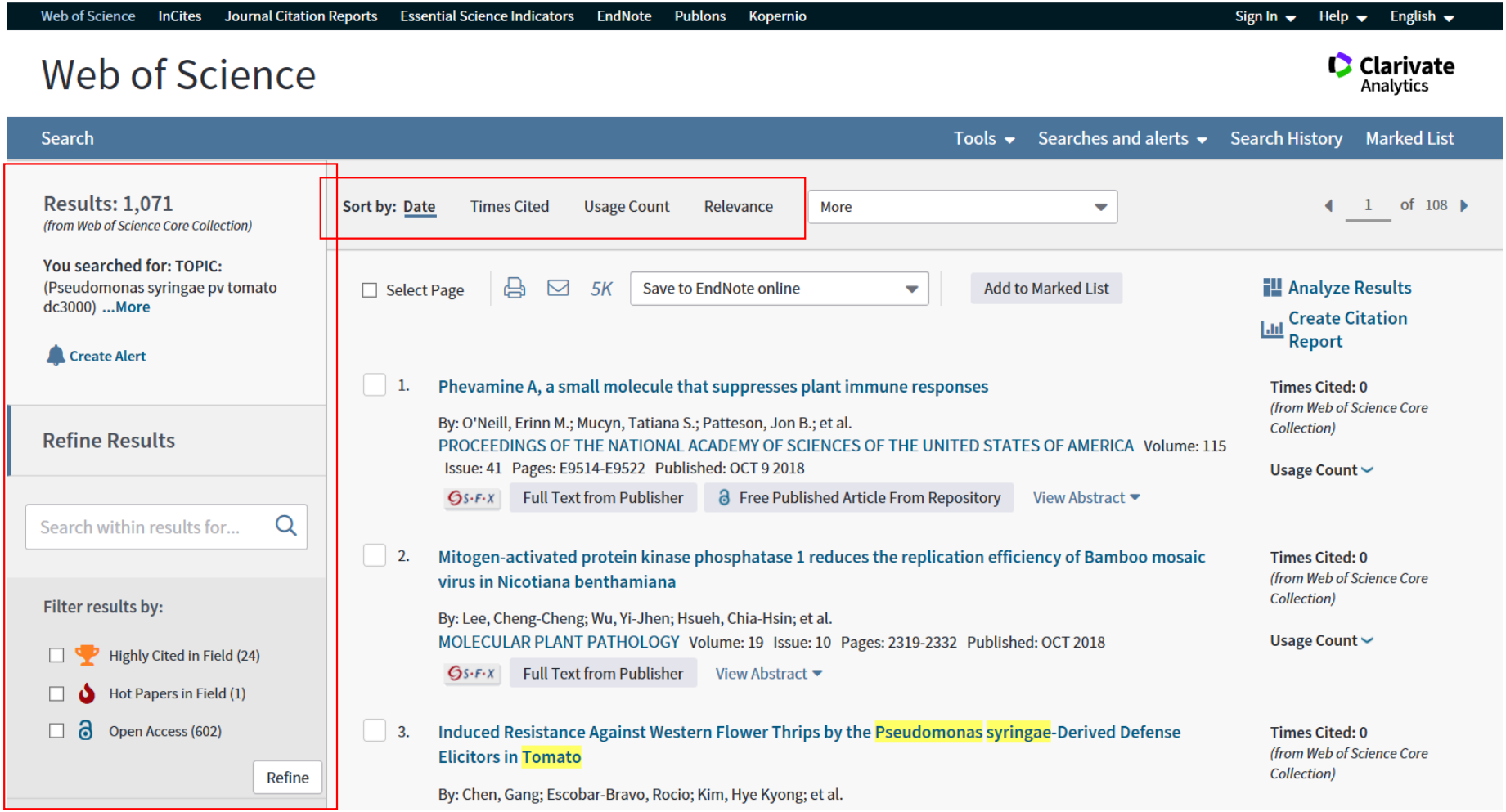
Web of Science

-basic search-



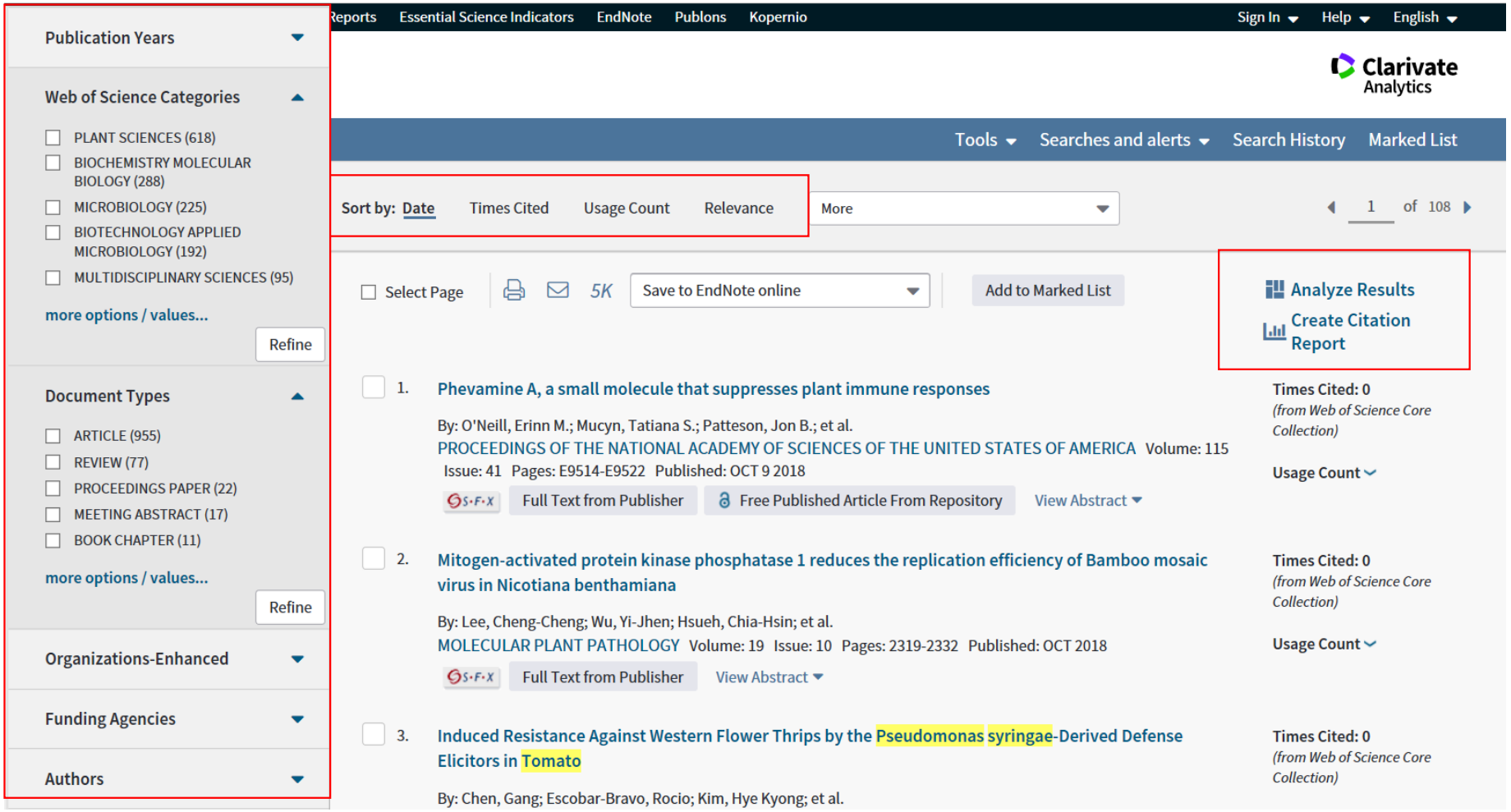
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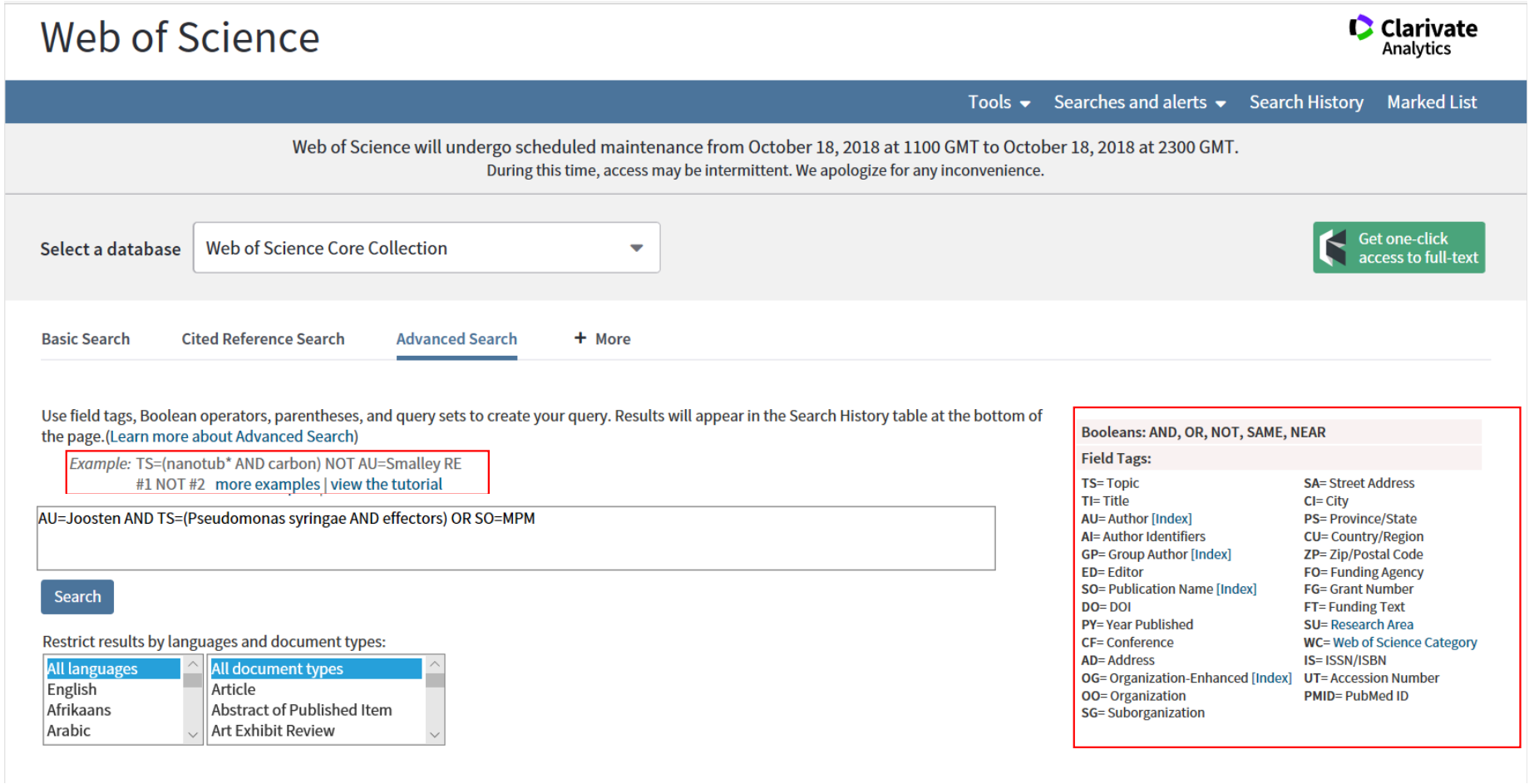
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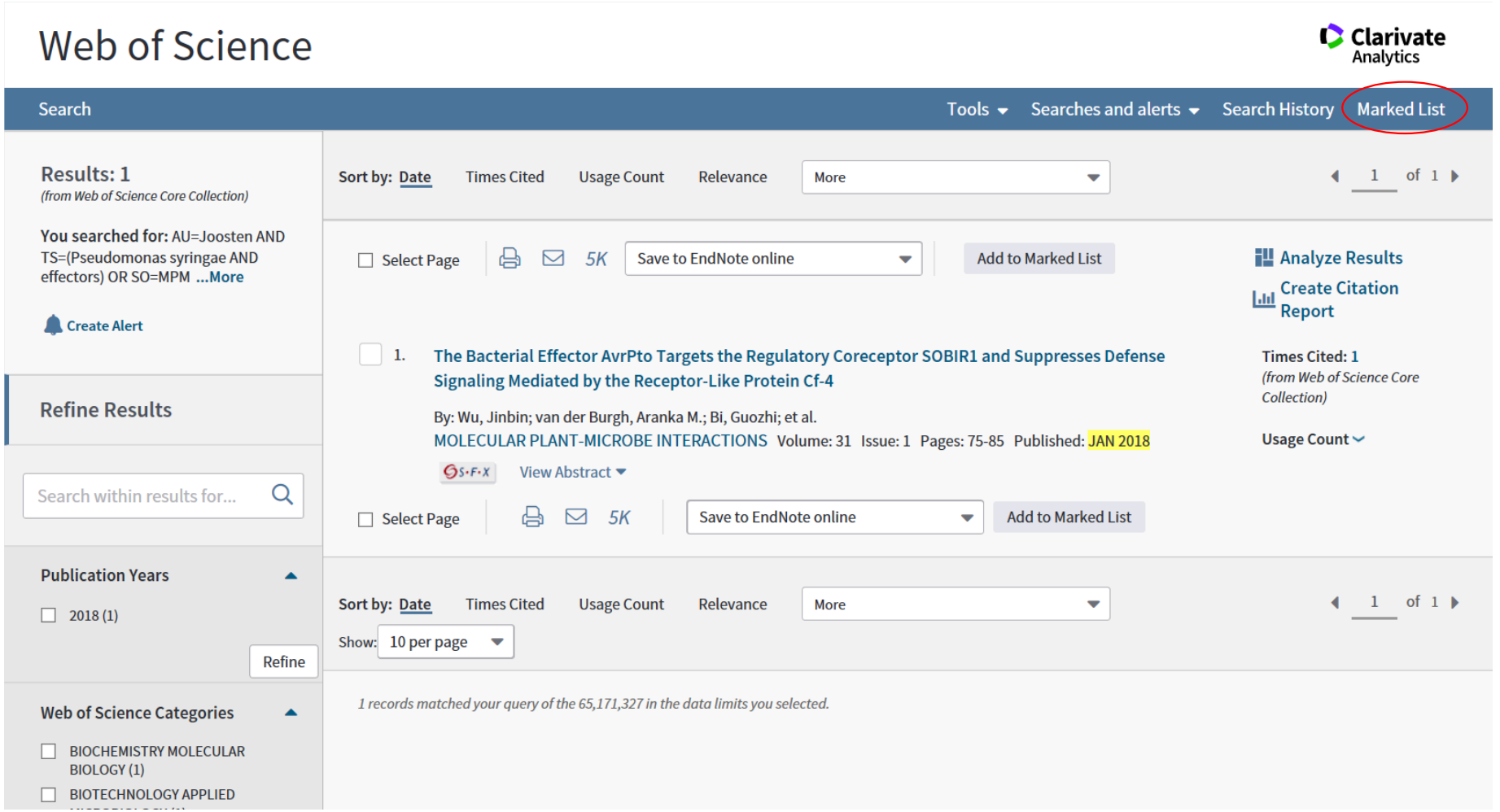
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-advaned search-



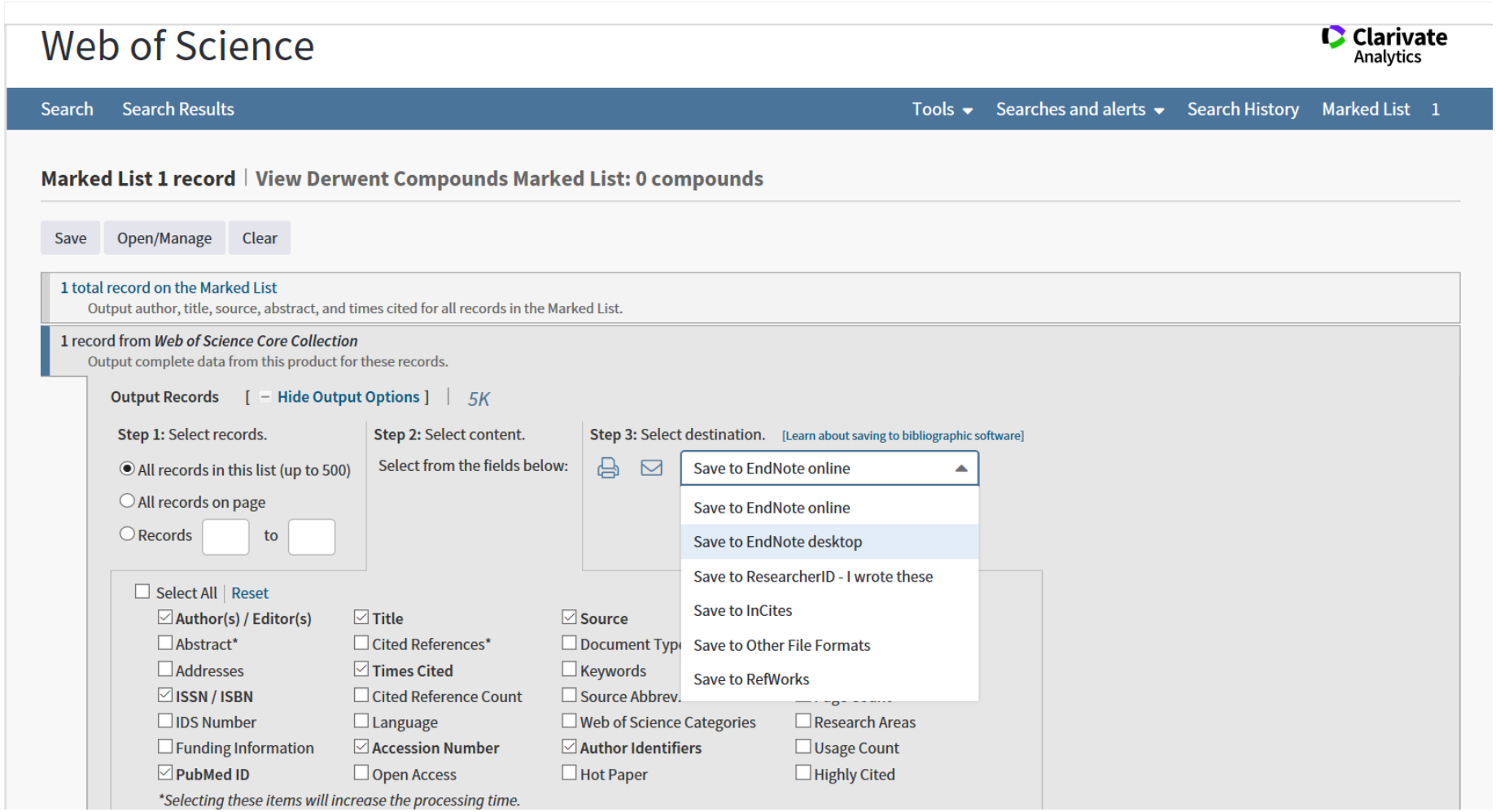
Web of Science

-bibliographic software option-



Web of Science

-bibliographic software option-



Characteristic	Pub Med	Scopus	Web of Science	Google Scholar
Date of official inauguration	06/1997[a]	11/2004	2004[b]	11/2004
Content				
No. of journals	6000 (827 open access)	12,850 (500 open access)	8700	No data provided (theoretically all electronic resources)
Languages	English (plus 56 other languages)	English (plus more than 30 other languages)	English (plus 45 other languages)	English (plus any language)
Focus (field)	Core clinical journals, dental journals, nursing journals, biomedicine, medicine, history of medicine, bioethics, space, life sciences	Physical sciences, health sciences, life sciences, social sciences	Science, technology, social sciences, arts and humanities	Biology, life sciences and environmental sciences, business, administration, finance and economics, chemistry and materials science, engineering, pharmacology, veterinary science, social sciences, arts and humanities
Period covered	1950–present	1966–present	1900–present	Theoretically all available electronically
Databases covered	Medline (1966–present), old Medline (1950–1965), PubMed Central, linked to other, more specialized, NLM databases	100% Medline, Embase, Compendex, World textile index, Fluidex, Geobase, Biobase	Science citation index expanded, social sciences citation index, arts and humanities citation index, index chemistry, current chemical reactions	PubMed, OCLC First Search
No. of keywords allowed	No limit	30	15	Theoretically no limit
Search				
Abstracts	(+)	(+)	(+)	(+)
Authors	(+)	(+)	(+)	(+)
Citations	(−)	(+)	(+)	(+)
Patents	(−)	(+)	(+)	(−)
Uses	Links to related articles, links to full-text (5426 journals), links to free full text articles for a subset of journals (827 open access journals)	Links to full-text articles and other library resources	Links to full-text, links to related articles	Links to full-text articles, free full-text articles, links to journals, links to related articles, links to libraries
Updating	Daily	1–2 times weekly	Weekly	Monthly on average
Developer/owner (country)	National Center for Biotechnology Information (NCBI), NLM (US)	Elsevier (Netherlands)	Thomson Scientific and Health Care Corporation (US)	Google Inc. (US)
Citation analysis	None	Total number of articles citing work on a topic or by an individual author	As for Web of Science plus the total number of articles on a topic or by an individual author cited in other articles	Next to each paper listed is a "cited by" link; clicking on this link shows the citation analysis

[a] PubMed was created by the NLM of the United States with the intention of making the content of Medline accessible *via* the Internet.
[b] Web of Science was created by Thomson Scientific to make citation indices (that E. Garfield assessed since the early 1960s) accessible *via* the Internet.

Falagas et al., 2008

Literature search engines

-comparison-

PubMed

Google scholar

WEB OF SCIENCE

1. Both Pubmed and Web of Science are human-curated databases. Google Scholar is not. This is the key to most of the differences you will find in your search results.

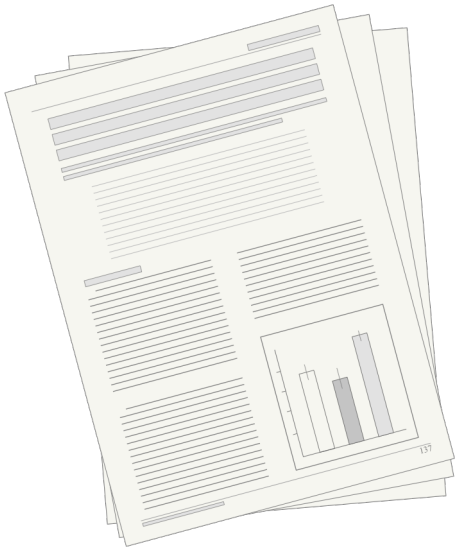
2. Web of Science and Google Scholar track citations, but PubMed does not.

University library access

-useful links-

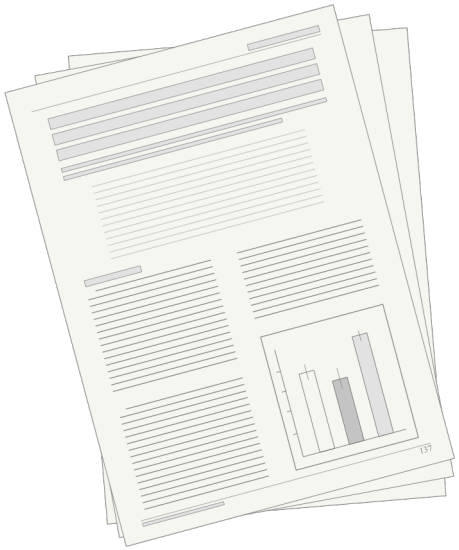
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http://www.ub.uni-muenchen.de/suchen/datenbanken/index.html

How to read scientific article



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How to read scientific article



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How to read a scientific article?



Identify the „big question”

Quickly scan the publication – focus on headings, subheadings and figures; summarise the background in five sentences

Active reading

take notes, put question marks, use highlighter, underline text – it helps improving comprehension and helps you to remember the key points

Re-read

scientific article contain very condensed information, uses a specific science language (ask other people, discuss)

Ask questions

just because something is published it does not mean it is right, nit-pick, doubt everything, read commentaries

What question/ questions does the publication address?

descriptive research, comparative research, hypothesis-driven research, methodical research, combine of all above

What are the main conclusions of the publication?

do the authors answer addressed question?
are these important?
are these convincing?



Do the data actually support the conclusions?

do you agree with the conclusions of the publication? look at results section, tables and figures, many lines of evidence/ many different approached to support a particular conclusion, try to interpret graphs and tables first before looking into text;
data might be repeatable, of good quality but might not be enough to support stated conclusion, multiple approaches, multiple lines of evidence

What is the quality of the conclusions?

what methods did the authors use? need of understanding of methods, need to know the limits of the method, look at details, assess them for plausibility, do they use controls, are there any controls, statistics, significant or non-significant, biological and technical repeats, sample size – gold standard