Discovering and Managing Scientific Information

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Useful Links

• LibGuide: http://lib.guides.umd.edu/chemistryresources
   (Click on the tab “Course Materials” to find a specific course)

• Instructional materials and videos:
  http://lib.guides.umd.edu/chemistryresources/instructions

• STEM Library: https://www.lib.umd.edu/stem

• UMD Libraries Web page: http://www.lib.umd.edu

• Reload Button: http://lib.guides.umd.edu/reload-button

• Report a problem with online access:
  https://www.lib.umd.edu/about/contact-us/tech
Scientific communication

• Scholarly
  • Peer-review journals
  • Conferences
  • Scholarly books and book chapters

• Other venues:
  • Web sites
  • Blogs
  • Institutional repositories
  • Social media (Twitter, Facebook, Instagram)
  • Academic social sites (Academia.edu, ResearchGate, ResearcherID)
Finding scientific information on Twitter

• Twitter is increasingly popular among scientists as a place to share opinions and recent publications, with instant feedback possible from colleagues around the world (including people you may never have the chance to talk to in person!)

• Look for hashtags used in your field. You will encounter these terms, which begin with the hash or pound symbol (#). Click on a hashtag (such as #peerreview) to find out what people are saying about that topic.
Difference between a **Research** article and a **Review** article

Research articles, called **primary sources**, provide direct or firsthand evidence about an experiment, event, object, person, or work of art. They have a Materials & Methods section (it could be called just “Methods” or “Experimental”) that describes how the experiments were performed.

Review articles are **secondary sources**, as they describe, discuss, interpret, comment upon, analyze, evaluate, summarize, and process primary sources. They usually **DO NOT** have an experimental section.
Organization of a journal article

• Title, Author name(s), Abstract, Keywords
• Introduction (also called “Background”)
• Materials and Methods (also called “Methods, “Experimental”)
• Results, Discussion, Conclusion (separate or one section)
• References (cited literature)
• Supplementary Material (e.g., raw experimental data)
Handling of authors’ names

• Some databases (SciFinder) allow searching for alternate spellings of author names

• Unique identifiers:
  • ORCID is a persistent digital identifier, identifying any individual researcher. Anyone who registers for ORCID is assigned a unique number
  • ResearcherID
Strategies for discovering information

• Become an information-literate user (skills)
• Use relevant resources
• Understand how search engines and databases index and rank documents (Search Engine Optimization (SEO))
• Choose keywords carefully (perform keyword research)
• Use social sites and networks
• Communicate with peers
Alternative sources of information

• University repositories (DRUM)
• Web pages, Blogs
• Social media: Twitter, Facebook, Instagram
• Academic social sites: Academia.edu, ResearchGate, Mendeley
• Academic networks, peers
Finding scientific literature

Resources for literature
• Entrez (NCBI databases)
• Google Scholar
• PubMed Central
• PubMed
• ScienceDirect
• SciFinder
• Web of Science

Types of documents
• Books
• Clinical trials
• Conference
• Dissertation
• Editorial
• Journal article
• Patents
• Preprint
• Review
NCBI Databases

**Literature**

The World's largest repository of medical and scientific abstracts, full-text articles, books and reports

- **Bookshelf**
  Books and reports
- **MeSH**
  Ontology used for PubMed indexing
- **NLM Catalog**
  Books, journals and more in the NLM Collections
- **PubMed**
  Scientific and medical abstracts/citations
- **PubMed Central**
  Full-text journal articles

**Genes**

Gene sequences and annotations used as references for the study of gene structure, expression, and evolution

- **Gene**
  Collected information about gene loci
- **GEO DataSets**
  Functional genomics studies
- **GEO Profiles**
  Gene expression and molecular abundance profiles
- **HomoloGene**
  Homologous gene sets for selected organisms
- **PopSet**
  Sequence sets from phylogenetic and population studies
- **UniGene**
  Clusters of expressed transcripts

**Genetics**

Heritable DNA variations, associations with human pathologies, and clinical diagnostics and treatments

- **ClinVar**
  Human variations of clinical significance
- **dbGaP**
  Genotype/phenotype interaction studies
- **dbSNP**
  Short genetic variations
- **dbVar**
  Genome structural variation studies
- **GTR**
  Genetic testing registry
- **MedGen**
  Medical genetics literature and links
- **OMIM**
  Online mendelian inheritance in man
<table>
<thead>
<tr>
<th>Proteins</th>
<th>Genomes</th>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein sequences, 3-D structures, and tools for the study of functional protein domains and active sites</td>
<td>Genome sequence assemblies, large-scale functional genomics data, and source biological samples</td>
<td>Repository of chemical information, molecular pathways, and tools for bioactivity screening</td>
</tr>
<tr>
<td><strong>Conserved Domains</strong></td>
<td><strong>Assembly</strong></td>
<td><strong>BioSystems</strong></td>
</tr>
<tr>
<td>Conserved protein domains</td>
<td>Genome assembly information</td>
<td>Molecular pathways with links to genes, proteins and chemicals</td>
</tr>
<tr>
<td><strong>Identical Protein Groups</strong></td>
<td><strong>BioCollections</strong></td>
<td><strong>PubChem BioAssay</strong></td>
</tr>
<tr>
<td>Protein sequences grouped by identity</td>
<td>Museum, herbaria, and other biorepository collections</td>
<td>Bioactivity screening studies</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td><strong>BioProject</strong></td>
<td><strong>PubChem Compound</strong></td>
</tr>
<tr>
<td>Protein sequences</td>
<td>Biological projects providing data to NCBI</td>
<td>Chemical information with structures, information and links</td>
</tr>
<tr>
<td><strong>Protein Clusters</strong></td>
<td><strong>BioSample</strong></td>
<td><strong>PubChem Substance</strong></td>
</tr>
<tr>
<td>Sequence similarity-based protein clusters</td>
<td>Descriptions of biological source materials</td>
<td>Deposited substance and chemical information</td>
</tr>
<tr>
<td><strong>Sparcle</strong></td>
<td><strong>Genome</strong></td>
<td></td>
</tr>
<tr>
<td>Functional categorization of proteins by domain architecture</td>
<td>Genome sequencing projects by organism</td>
<td></td>
</tr>
<tr>
<td><strong>Structure</strong></td>
<td><strong>Nucleotide</strong></td>
<td></td>
</tr>
<tr>
<td>Experimentally-determined biomolecular structures</td>
<td>DNA and RNA sequences</td>
<td></td>
</tr>
<tr>
<td><strong>Probe</strong></td>
<td><strong>Proteome</strong></td>
<td></td>
</tr>
<tr>
<td>Sequence-based probes and primers</td>
<td>Protein sequence information</td>
<td></td>
</tr>
<tr>
<td><strong>SRA</strong></td>
<td><strong>Taxonomy</strong></td>
<td></td>
</tr>
<tr>
<td>High-throughput sequence reads</td>
<td>Taxonomic classification and nomenclature</td>
<td></td>
</tr>
</tbody>
</table>
# Finding properties of chemical compounds

## Resources
- ChemSpider
- PubChem
- CRC Handbook of Chemistry and Physics
- The Merck Index
- Reaxys
- SciFinder

## Search by
- Chemical Structure
- Molecular formula
- Property
- Reaction
- Substance Identifier
  - Chemical Name
  - CAS Registry Number
Bibliographic Management Programs

- EndNote
- Mendeley
- Papers
- Zotero

- Exporting references from databases, journals, web pages
- Maintaining a personal library with references
- Inserting citations from this library into documents
Collecting references with EndNote Online

**Collect—Online Search**: allows searching databases (e.g., PubMed) and library catalogs directly from EndNote Online
EndNote: Select a filter for a resource
PubMed search from EndNote

Step 2 of 3: Connecting to PubMed MEDLINE: PubMed (NLM)

- arachidonic acid
- oxidation
- Sprecher

Options:
- Retrieve all records
- Select a range of records to retrieve

Search
EndNote: Managing retrieved references
EndNote: Creating a **New Reference**
EndNote: Importing references (1)

Click on the tab “Collect” and then on “Import References”
EndNote: Importing references:
Selecting favorite databases
EndNote: Importing references

Once you select SciFinder as a Favorite, it will show up as an import option.

Import References

File: Browse... Reference_08_09_2017_161243.txt
Import Option: SciFinder (CAS)
To: New group

Import References

2 references were imported into "Cholesterol" group.

File: Browse... No file selected.
Import Option: Select...
To: Select...

Select Favorites

Import
EndNote: Creating a bibliography

Select a group with references from your EndNote Library

Select a bibliographic style (for example, ACS styles)
EndNote: Creating a bibliography in ACS Style

Once you have selected a style, it will show up in this pull-down menu.

Select a bibliographic style (e.g., one of the ACS styles and click on "Copy to Favorites.")

The selected style will be included in your Favorites list.
Downloading EndNote Word Plug-in Cite While You Write (CWYW) and Capture Button
Inserting Citations in a Word document: Cite While You Write (CWYW)
Finding Literature in PubMed

*General search* (see below; retrieves all articles that have the keywords)

*Advanced search* (Uses indexing; retrieves articles devoted to the topic)
PubMed: Advanced Search option

On the main PubMed page (https://www.ncbi.nlm.nih.gov/pubmed/), select "Advanced" to use the indexing capabilities of the database that will allow you to find works that are specifically devoted to the topic you are interested in.

Click on "Show index list" and select "enzyme inhibitors"
Efficient searching in PubMed:
Regular vs Advanced search

Regular search

Advanced search
PubMed: refining search results and exporting references to EndNote

Select references for export and click on the Capture Reference bookmarklet in your bookmarks toolbar.
PubMed Central (Full-text articles)
Finding literature and properties

• Produced by the Chemical Abstracts Service (CAS), a Division of ACS
• The most important resource for chemists
• Searches simultaneously two large literature databases, the Chemical Abstracts database and MEDLINE
• Provides access to the largest database for properties of chemical compounds, the CAS Registry File.
• Indexed by experts
• Can search using natural language
• Uses concepts
• Removes duplicates
• Searches for alternate spellings of author’s name
• Analyzes and Refines results
Searching for literature
Selecting “concepts”

<table>
<thead>
<tr>
<th>Select All</th>
<th>Deselect All</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 of 12 Research Topic Candidates Selected</td>
<td></td>
</tr>
<tr>
<td>☐ 5 references were found containing &quot;aspirin for prevention of cancer&quot; as entered.</td>
<td></td>
</tr>
<tr>
<td>☑ 961 references were found containing all of the concepts &quot;aspirin&quot;, &quot;prevention&quot; and &quot;cancer&quot; closely associated with one another.</td>
<td></td>
</tr>
<tr>
<td>☐ 4041 references were found where all of the concepts &quot;aspirin&quot;, &quot;prevention&quot; and &quot;cancer&quot; were present anywhere in the reference.</td>
<td></td>
</tr>
<tr>
<td>☐ 12280 references were found containing the two concepts &quot;aspirin&quot; and &quot;prevention&quot; closely associated with one another.</td>
<td></td>
</tr>
<tr>
<td>☐ 34838 references were found where the two concepts &quot;aspirin&quot; and &quot;prevention&quot; were present anywhere in the reference.</td>
<td></td>
</tr>
<tr>
<td>☐ 5500 references were found containing the two concepts &quot;aspirin&quot; and &quot;cancer&quot; closely associated with one another.</td>
<td></td>
</tr>
<tr>
<td>☐ 12837 references were found where the two concepts &quot;aspirin&quot; and &quot;cancer&quot; were present anywhere in the reference.</td>
<td></td>
</tr>
<tr>
<td>☐ 130175 references were found containing the two concepts &quot;prevention&quot; and &quot;cancer&quot; closely associated with one another.</td>
<td></td>
</tr>
<tr>
<td>☐ 374384 references were found where the two concepts &quot;prevention&quot; and &quot;cancer&quot; were present anywhere in the reference.</td>
<td></td>
</tr>
<tr>
<td>☐ 159933 references were found containing the concept &quot;aspirin&quot;.</td>
<td></td>
</tr>
<tr>
<td>☐ 4255093 references were found containing the concept &quot;prevention&quot;.</td>
<td></td>
</tr>
<tr>
<td>☐ 4988650 references were found containing the concept &quot;cancer&quot;.</td>
<td></td>
</tr>
</tbody>
</table>

[Get References]
Analyze and Refine results in SciFinder

**Analyze results**

- Author Name
- CAS Registry Number
- CA Section Title
- Company-Organization
- Database
- Document Type
- Index Term
- CA Concept Heading
- Journal Name
- Language
- Publication Year
- Supplementary Terms

**Refine results**

- Research Topic
- Author
- Company Name
- Document Type
- Publication Year
- Language
- Database
Removing duplicates, refining by research topic and by document type (Review)

1. The first 3500 years of aspirin history from its roots - A concise summary

A review. Aspirin is currently the most widely used drug worldwide, and has been clearly one of the most important pharmacol. achievements of the twentieth century. Historians of medicine have traced its birth in 1897, but the fascinating history of aspirin actually dates back >3500 years, when willow bark was used as a painkiller and antipyretic by Sumerians and Egyptians, and then by great physicians from ancient Greece and Rome. The modern history of aspirin precursors, salicylates, began in 1763 with Reverend Stone - who first described their
The first 3500 years of aspirin history from its roots - A concise summary

By Montinari, Maria Rosa; Minelli, Sergio; De Caterina, Raffaele
From Vascular Pharmacology (2018), Ahead of Print. | Language: English, Database: CAPLUS

A review. Aspirin is currently the most widely used drug worldwide, and has been clearly one of the most important pharmacological achievements of the twentieth century. Historians of medicine have traced its birth in 1897, but the fascinating history of aspirin actually dates back >3500 years, when willow bark was used as a painkiller and antipyretic by Sumerians and Egyptians, and then by great physicians from ancient Greece and Rome. The modern history of aspirin precursors, salicylates, began in 1763 with Reverend Stone - who first described their antipyretic effects - and continued in the 1...
Exporting references to EndNote

If you don't see this option, save the file to your computer and import it in EndNote
Importing references from SciFinder to EndNote (1)
Importing references from SciFinder into EndNote (2)
Finding properties of chemical compounds by chemical name

For every new chemical compound reported in the literature, CAS creates a unique number called CAS Registry Number.
Finding properties of chemical compounds by drawing a molecular structure
Reaxys: Finding properties/Structure searching

Click on “Create Structure or Reaction Drawing.”
Reaxys: Finding properties/Reaction searching
Web of Science: using a “wild card” (*)
Web of Science: refining search results

Results: 18,130
(from Web of Science Core Collection)

You searched for: TOPIC: (statin* cholesterol) ...More

Create Alert

Refine Results

adverse effects

A dual role of cholesterol in osteogenic differentiation of bone marrow stromal cells
By: Li, Kun; Xiu, Chunmei; Zhou, Qiang; et al.
JOURNAL OF CELLULAR PHYSIOLOGY Volume: 234 Issue: 3
Pages: 2058-2066 Published: MAR 2019

Times Cited: 0
(from Web of Science Core Collection)

Usage Count
Web of Science: Comparing results

**statin and cholesterol**

Web of Science

Search

Results: 12,330
(from Web of Science Core Collection)

You searched for: TOPIC: (statin cholesterol) ...More

**statin* and cholesterol**

Web of Science

Search

Results: 18,130
(from Web of Science Core Collection)

You searched for: TOPIC: (statin* cholesterol) ...More
Web of Science: Filtering results and exporting references to EndNote

[Image of Web of Science interface with highlighted features such as filtering results, exporting references to EndNote, and the EndNote interface with references exported to the UNFILED group.]
Journal Impact factors
Calculating the Journal Impact Factor (IF)

The data in the two graphs below and in the Journal Impact Factor calculation panels represent citation activity in 2017 to items published in the journal in the prior two years. They detail the components of the Journal Impact Factor. Use the "All years" tab to access key metrics and additional data for the current year and all prior years for this journal.

**Journal Impact Factor Calculation**

\[
\text{Journal Impact Factor} = \frac{68,470}{4,769} = 14.357
\]

**How is Journal Impact Factor Calculated?**

\[
\text{JIF} = \frac{\text{Citations in 2017 to items published in 2015 (37261) + 2016 (31209)}}{\text{Number of citable items in 2015 (2379) + 2016 (2390)}} = \frac{68,470}{4,769}
\]
ResearcherID: Subject areas

Citing Articles Network

The graph below displays (up to) the top 20 research areas for publications that have cited this researcher. Data is presented in descending frequency order.
Citing Articles Network

The graph below displays (up to) the top 20 authors that have cited this researcher's publication(s). Data is presented in descending frequency order.

Top: Authors | Research Areas | Countries/Regions | Institutions | Map | Years |
ResearcherID: Map

Citing Articles Network

The map graph below displays (up to) the top 500 geographic locations for publications that have cited this researcher. Scroll over the map and place your cursor on a pin to view city, state, and country/region information. Clicking on the pin will display bibliographic data for the paper that has cited the researcher's publication(s).

Top: Authors | Research Areas | Countries/Regions | Institutions | Map | Years |