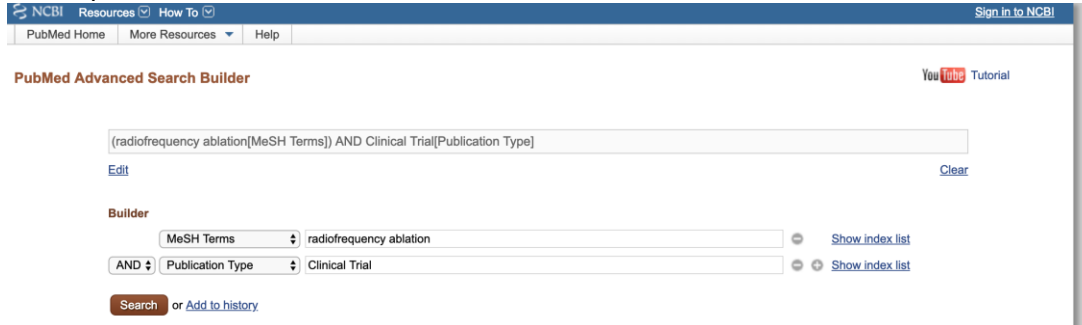


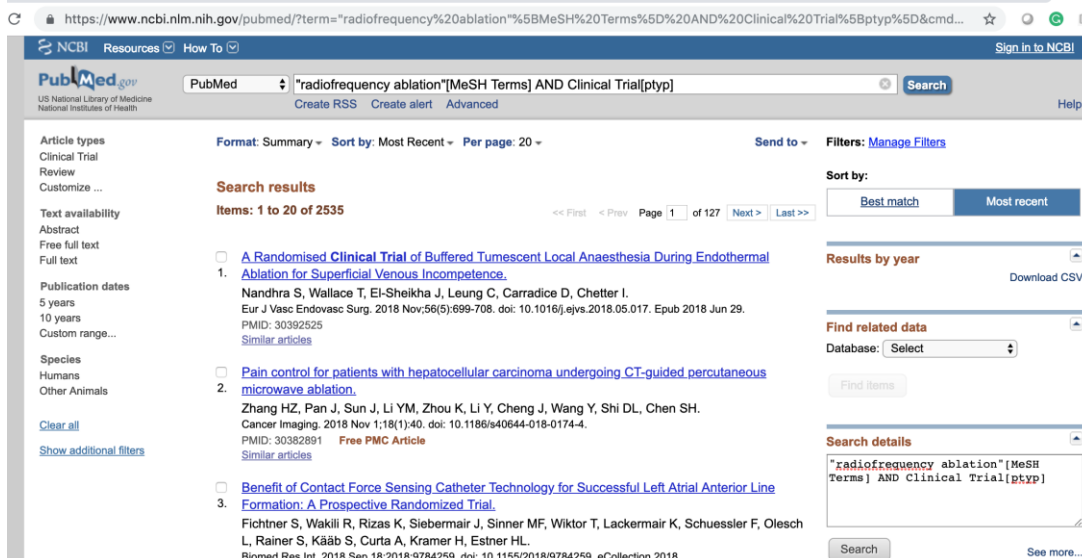
## How to use pubmed API:

### 1. Brief guide: this is how to search in pubmed for common user:

For example, we want to search clinical trial of radiofrequency ablation.  
In the pubmed advance search:



Search Result (2535 results, first PMID is 30392525):



Search details of the right lower corner:

radiofrequency ablation"[MeSH Terms] AND Clinical Trial[ptyp]

### 2. How to use pubmed API to search

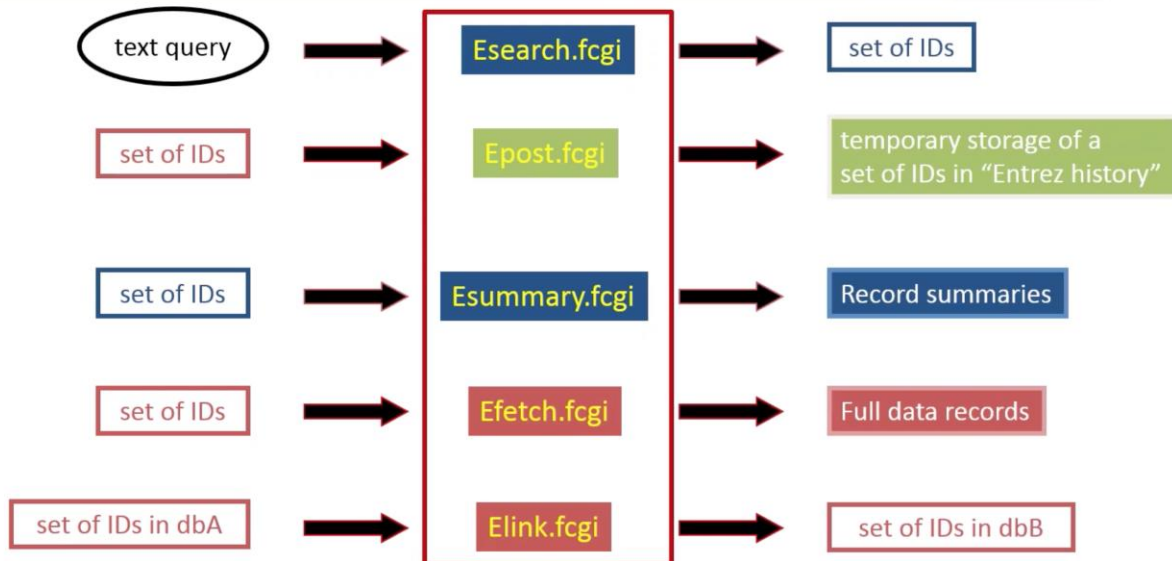
according to the pubmed API, link:

[https://www.ncbi.nlm.nih.gov/books/NBK25498/#chapter3.Application\\_4\\_Finding\\_unique\\_se](https://www.ncbi.nlm.nih.gov/books/NBK25498/#chapter3.Application_4_Finding_unique_se)

it is the NCBI site-wide API : Entrez Programming Utilities(EUtils), use a set of structured URL-based calls to access the NCBI Entrez search system and databases.

## VERBS (*do what?*) AND NOUN (*with what?*)

<https://eutils.ncbi.nlm.nih.gov/entrez/eutils/> .fcgi?



## EUtils API Examples

Getting ESummary information for Gene with a Gene ID of 3269 (Human Histamine Receptor H1)

<https://eutils.ncbi.nlm.nih.gov/entrez/eutils/summary.fcgi?db=gene&id=3269>

**BASE URL CALL** Perform this **action** on this **database** with this **term**  
(return the information in this **format**)

Getting ESummary information for Gene with a Gene ID of 3269 (Human Histamine Receptor H1)

<https://eutils.ncbi.nlm.nih.gov/entrez/eutils/summary.fcgi?db=gene&id=3269>

Linking to Find PubMed Record IDs (PMIDs) for Gene ID 3269

[/efetch.fcgi?dbfrom=gene&id=3269&dbto=pubmed](https://eutils.ncbi.nlm.nih.gov/entrez/eutils/efetch.fcgi?dbfrom=gene&id=3269&dbto=pubmed)

Getting ESummary or Efetch information for PMID 24236486 (which was linked to Gene ID 3269)

[/summary.fcgi?db=pubmed&id=24236486](https://eutils.ncbi.nlm.nih.gov/entrez/eutils/summary.fcgi?db=pubmed&id=24236486) (retype= xml is the default)

For our project, we can search Pubmed with a term(i.e: radiofrequency ablation, pain management, patient's diagnoses, clinical trial) and retrieve PMIDs(unique ID for each paper). We can also get summary for each paper using PMID.

there is an example how to search a term in pubmed from  
<https://www.ncbi.nlm.nih.gov/books/NBK25497/>

## ESearch – ESummary/EFetch

---

**Input:** Entrez text query

**ESummary Output:** XML Document Summaries

**EFetch Output:** Formatted data records (e.g. abstracts, FASTA)

```
use LWP::Simple;

# Download PubMed records that are indexed in MeSH for both asthma and
# leukotrienes and were also published in 2009.

$db = 'pubmed';
$query = 'asthma[mesh]+AND+leukotrienes[mesh]+AND+2009[pdat]';

#assemble the esearch URL
$base = 'https://eutils.ncbi.nlm.nih.gov/entrez/eutils/';
$url = $base . "esearch.fcgi?db=$db&term=$query&usehistory=y";

#post the esearch URL
$output = get($url);

#parse WebEnv and QueryKey
$web = $1 if ($output =~ /<WebEnv>(\S+)<\/WebEnv>/);
$key = $1 if ($output =~ /<QueryKey>(\d+)<\/QueryKey>/);

### include this code for ESearch-ESummary
#assemble the esummary URL
$url = $base . "esummary.fcgi?db=$db&query_key=$key&WebEnv=$web";

#post the esummary URL
$docsums = get($url);
print "$docsums";

### include this code for ESearch-EFetch
#assemble the efetch URL
$url = $base . "efetch.fcgi?db=$db&query_key=$key&WebEnv=$web";
$url .= "&rettype=abstract&retmode=text";

#post the efetch URL
$data = get($url);
print "$data".
```

I used to same way to search for radiofrequency ablation"[MeSH Terms] AND Clinical Trial[ptyp]  
Here is the url I used:

[https://eutils.ncbi.nlm.nih.gov/entrez/eutils/esearch.fcgi?db=pubmed&term=%22radiofrequency%20ablation%22\[mesh\]+AND+%22Clinical%20Trial%22\[ptyp\]](https://eutils.ncbi.nlm.nih.gov/entrez/eutils/esearch.fcgi?db=pubmed&term=%22radiofrequency%20ablation%22[mesh]+AND+%22Clinical%20Trial%22[ptyp])

then the output is XML format, which has exactly the same number of ID as we search in the website.

Use the first ID as example, we can use summary to get summary of each ID on the list,using the following url:

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<SummaryResult>
  <DocSum>
    <Id>30392525</Id>
    <Item Name="PubDate" Type="Date">2018 Nov</Item>
    <Item Name="EpubDate" Type="Date">2018 Jun 29</Item>
    <Item Name="Source" Type="String">Eur J Vasc Endovasc Surg</Item>
  </DocSum>
  <Item Name="AuthorList" Type="List">
    <Item Name="Author" Type="String">Mandhara S</Item>
    <Item Name="Author" Type="String">Wallace T</Item>
    <Item Name="Author" Type="String">El-Sheikha J</Item>
    <Item Name="Author" Type="String">Leung C</Item>
    <Item Name="Author" Type="String">Carradice D</Item>
    <Item Name="Author" Type="String">Chetter I</Item>
  </Item>
  <Item Name="LastAuthor" Type="String">Chetter I</Item>
  <Item Name="Title" Type="String">
    A Randomised Clinical Trial of Buffered Tumescent Local Anaesthesia During Endothermal Ablation for Superficial Venous Incompetence
  </Item>
  <Item Name="Volume" Type="String">56</Item>
  <Item Name="Issue" Type="String">5</Item>
  <Item Name="Pages" Type="String">699-708</Item>
  <Item Name="LangList" Type="List">
    <Item Name="Lang" Type="String">English</Item>
  </Item>
  <Item Name="NmUniqueID" Type="String">9512728</Item>
  <Item Name="ISSN" Type="String">1078-5884</Item>
  <Item Name="EISSN" Type="String">1532-2165</Item>
  <Item Name="PubTypeList" Type="List">
    <Item Name="PubType" Type="String">Journal Article</Item>
    <Item Name="PubType" Type="String">Randomized Controlled Trial</Item>
  </Item>
  <Item Name="RecordStatus" Type="String">PubMed - indexed for MEDLINE</Item>
  <Item Name="PubStatus" Type="String">ppublish+publish</Item>
  <Item Name="ArticleIds" Type="List">
    <Item Name="pubmed" Type="String">30392525</Item>
    <Item Name="pii" Type="String">S1078-5884(18)30312-5</Item>
    <Item Name="doi" Type="String">10.1016/j.ejvs.2018.05.017</Item>
    <Item Name="rid" Type="String">30392525</Item>
    <Item Name="eid" Type="String">30392525</Item>
  </Item>
  <Item Name="DOI" Type="String">10.1016/j.ejvs.2018.05.017</Item>
  <Item Name="History" Type="List">
```

Useful tutorial video:

Learn more:

Where to learn more?

<https://www.ncbi.nlm.nih.gov/books/NBK25501/>

### **YouTube Videos:**

2012 (4 min): <https://www.youtube.com/watch?v=BCG-M5k-gvE>

2014 (1 hour): <https://www.youtube.com/watch?v=iCFVVexp30o>

**MORE VIDEOS**

<https://ncbiinsights.ncbi.nlm.nih.gov/2017/11/14/five-new-videos-on-youtube-apis-pubmed-refseq-more/>