20181116b Import PubMed Data

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### Load the drugs first

library(readr)  
L\_type\_calcium\_channel\_combined\_post <- read\_csv("L-type calcium channel combined post.csv")

## Parsed with column specification:  
## cols(  
## DBID = col\_character(),  
## Name = col\_character(),  
## Status = col\_character(),  
## Known\_action = col\_character(),  
## Mechanism = col\_character()  
## )

drugs = L\_type\_calcium\_channel\_combined\_post  
head(drugs)

## # A tibble: 6 x 5  
## DBID Name Status Known\_action Mechanism  
## <chr> <chr> <chr> <chr> <chr>   
## 1 DB01388 Mibefradil investigational, withdrawn yes inhibitor  
## 2 DB00270 Isradipine approved, investigational yes inhibitor  
## 3 DB00661 Verapamil approved yes inhibitor  
## 4 DB00381 Amlodipine approved yes inhibitor  
## 5 DB01023 Felodipine approved, investigational yes inhibitor  
## 6 DB01115 Nifedipine approved yes inhibitor

### Storing the name of the drugs to a vector

name = as.vector(sapply(drugs$Name, as.character))  
name

## [1] "Mibefradil" "Isradipine" "Verapamil" "Amlodipine"   
## [5] "Felodipine" "Nifedipine" "Nimodipine" "Nisoldipine"   
## [9] "Nitrendipine" "Cinnarizine" "Nilvadipine" "Barnidipine"   
## [13] "Aranidipine" "Propiverine" "Nicardipine"

### Loading the RISmed

library(RISmed)

### Setting (and revising) the query

library(tidyverse)

drug\_string = ''; i=0  
for (i in 1:length(name)) {  
 if (i<length(name)) {  
 drug\_string = str\_c(drug\_string, name[i], ' OR ')  
 } else {  
 drug\_string = str\_c(drug\_string, name[i])  
 }  
}  
drug\_string = str\_c('(',drug\_string,')')  
drug\_string

## [1] "(Mibefradil OR Isradipine OR Verapamil OR Amlodipine OR Felodipine OR Nifedipine OR Nimodipine OR Nisoldipine OR Nitrendipine OR Cinnarizine OR Nilvadipine OR Barnidipine OR Aranidipine OR Propiverine OR Nicardipine)"

query = str\_c(drug\_string,' AND ','Schizophrenia')  
query

## [1] "(Mibefradil OR Isradipine OR Verapamil OR Amlodipine OR Felodipine OR Nifedipine OR Nimodipine OR Nisoldipine OR Nitrendipine OR Cinnarizine OR Nilvadipine OR Barnidipine OR Aranidipine OR Propiverine OR Nicardipine) AND Schizophrenia"

fit = EUtilsSummary(query,db='pubmed')  
sink('fit.txt')  
fit

## [1] "((\"mibefradil\"[MeSH Terms] OR \"mibefradil\"[All Fields]) OR (\"isradipine\"[MeSH Terms] OR \"isradipine\"[All Fields]) OR (\"verapamil\"[MeSH Terms] OR \"verapamil\"[All Fields]) OR (\"amlodipine\"[MeSH Terms] OR \"amlodipine\"[All Fields]) OR (\"felodipine\"[MeSH Terms] OR \"felodipine\"[All Fields]) OR (\"nifedipine\"[MeSH Terms] OR \"nifedipine\"[All Fields]) OR (\"nimodipine\"[MeSH Terms] OR \"nimodipine\"[All Fields]) OR (\"nisoldipine\"[MeSH Terms] OR \"nisoldipine\"[All Fields]) OR (\"nitrendipine\"[MeSH Terms] OR \"nitrendipine\"[All Fields]) OR (\"cinnarizine\"[MeSH Terms] OR \"cinnarizine\"[All Fields]) OR (\"nilvadipine\"[Supplementary Concept] OR \"nilvadipine\"[All Fields]) OR (\"mepirodipine\"[Supplementary Concept] OR \"mepirodipine\"[All Fields] OR \"barnidipine\"[All Fields]) OR (\"aranidipine\"[Supplementary Concept] OR \"aranidipine\"[All Fields]) OR (\"propiverine\"[Supplementary Concept] OR \"propiverine\"[All Fields]) OR (\"nicardipine\"[MeSH Terms] OR \"nicardipine\"[All Fields])) AND (\"schizophrenia\"[MeSH Terms] OR \"schizophrenia\"[All Fields])"

sink()  
fit

## [1] "((\"mibefradil\"[MeSH Terms] OR \"mibefradil\"[All Fields]) OR (\"isradipine\"[MeSH Terms] OR \"isradipine\"[All Fields]) OR (\"verapamil\"[MeSH Terms] OR \"verapamil\"[All Fields]) OR (\"amlodipine\"[MeSH Terms] OR \"amlodipine\"[All Fields]) OR (\"felodipine\"[MeSH Terms] OR \"felodipine\"[All Fields]) OR (\"nifedipine\"[MeSH Terms] OR \"nifedipine\"[All Fields]) OR (\"nimodipine\"[MeSH Terms] OR \"nimodipine\"[All Fields]) OR (\"nisoldipine\"[MeSH Terms] OR \"nisoldipine\"[All Fields]) OR (\"nitrendipine\"[MeSH Terms] OR \"nitrendipine\"[All Fields]) OR (\"cinnarizine\"[MeSH Terms] OR \"cinnarizine\"[All Fields]) OR (\"nilvadipine\"[Supplementary Concept] OR \"nilvadipine\"[All Fields]) OR (\"mepirodipine\"[Supplementary Concept] OR \"mepirodipine\"[All Fields] OR \"barnidipine\"[All Fields]) OR (\"aranidipine\"[Supplementary Concept] OR \"aranidipine\"[All Fields]) OR (\"propiverine\"[Supplementary Concept] OR \"propiverine\"[All Fields]) OR (\"nicardipine\"[MeSH Terms] OR \"nicardipine\"[All Fields])) AND (\"schizophrenia\"[MeSH Terms] OR \"schizophrenia\"[All Fields])"

### Extracting the data

fetch = EUtilsGet(fit)  
fetch

## PubMed query: (("mibefradil"[MeSH Terms] OR "mibefradil"[All Fields]) OR ("isradipine"[MeSH Terms] OR "isradipine"[All Fields]) OR ("verapamil"[MeSH Terms] OR "verapamil"[All Fields]) OR ("amlodipine"[MeSH Terms] OR "amlodipine"[All Fields]) OR ("felodipine"[MeSH Terms] OR "felodipine"[All Fields]) OR ("nifedipine"[MeSH Terms] OR "nifedipine"[All Fields]) OR ("nimodipine"[MeSH Terms] OR "nimodipine"[All Fields]) OR ("nisoldipine"[MeSH Terms] OR "nisoldipine"[All Fields]) OR ("nitrendipine"[MeSH Terms] OR "nitrendipine"[All Fields]) OR ("cinnarizine"[MeSH Terms] OR "cinnarizine"[All Fields]) OR ("nilvadipine"[Supplementary Concept] OR "nilvadipine"[All Fields]) OR ("mepirodipine"[Supplementary Concept] OR "mepirodipine"[All Fields] OR "barnidipine"[All Fields]) OR ("aranidipine"[Supplementary Concept] OR "aranidipine"[All Fields]) OR ("propiverine"[Supplementary Concept] OR "propiverine"[All Fields]) OR ("nicardipine"[MeSH Terms] OR "nicardipine"[All Fields])) AND ("schizophrenia"[MeSH Terms] OR "schizophrenia"[All Fields])   
##   
## Records: 72

### Before accessing the medline object

getSlots('Medline')

## Query PMID YearReceived   
## "character" "character" "numeric"   
## MonthReceived DayReceived HourReceived   
## "numeric" "numeric" "numeric"   
## MinuteReceived YearAccepted MonthAccepted   
## "numeric" "numeric" "numeric"   
## DayAccepted HourAccepted MinuteAccepted   
## "numeric" "numeric" "numeric"   
## YearEpublish MonthEpublish DayEpublish   
## "numeric" "numeric" "numeric"   
## HourEpublish MinuteEpublish YearPpublish   
## "numeric" "numeric" "numeric"   
## MonthPpublish DayPpublish HourPpublish   
## "numeric" "numeric" "numeric"   
## MinutePpublish YearPmc MonthPmc   
## "numeric" "numeric" "numeric"   
## DayPmc HourPmc MinutePmc   
## "numeric" "numeric" "numeric"   
## YearPubmed MonthPubmed DayPubmed   
## "numeric" "numeric" "numeric"   
## HourPubmed MinutePubmed Author   
## "numeric" "numeric" "list"   
## ISSN Title ArticleTitle   
## "character" "character" "character"   
## ELocationID AbstractText Affiliation   
## "character" "character" "list"   
## Language PublicationType MedlineTA   
## "character" "list" "character"   
## NlmUniqueID ISSNLinking PublicationStatus   
## "character" "character" "character"   
## ArticleId Volume Issue   
## "character" "character" "character"   
## ISOAbbreviation MedlinePgn CopyrightInformation   
## "character" "character" "character"   
## Country GrantID Acronym   
## "character" "character" "character"   
## Agency RegistryNumber RefSource   
## "character" "character" "character"   
## CollectiveName Mesh   
## "character" "list"

### Accessing the medline object

Author(), YearPubmed(), PMID(), AbstractText()

auth\_fetch = Author(fetch)  
LastFirst = sapply(auth\_fetch, function(x) paste(x$LastName[1],x$ForeName[1]))  
LastFirst

## [1] "Dickens David" "Kim S J" "Yuen Jessica W Y"   
## [4] "Essali Adib" "Terrillion C E" "Settem Jagadeesh V V"  
## [7] "Akamine Y" "Bartsch Julia C" "Timpe Jennifer M"   
## [10] "Doorduin Janine" "Emmert Dana" "Das Piyush"   
## [13] "Diamond Bruce J" "Solís-Chagoyán H" "Corradini Irene"   
## [16] "Gee Steven" "Essali Adib" "Korkmaz Sevda"   
## [19] "Hwang Pei-Lin" "de Klerk Onno L" "Dzhuga N P"   
## [22] "Popov M Iu" "Zhou Yan-Gang" "Igartua Itziar"   
## [25] "Conley Robert" "Zhang Lei" "Maines Lynn W"   
## [28] "Feuerbach Dominik" "Eaton Molly E" "Mastropaolo John"   
## [31] "Soares-Weiser K" "Chodorowski Zygmunt" "Henning U"   
## [34] "Krupitsky E M" "Soares K V" "Kourie J I"   
## [37] "Soares K V" "Post R M" "Hollister L E"   
## [40] "Shiwach R S" "Schwartz B L" "Martin-Iverson M T"   
## [43] "Balon R" "Yamada K" "Liao W B"   
## [46] "Overstreet D H" "Yamada K" "Wikinski S I"   
## [49] "DiLullo S L" "Suddath R L" "Stedman T J"   
## [52] "Bartko G" "Duncan E" "Wells B G"   
## [55] "Reiter S" "Narang P K" "Uhr S B"   
## [58] "Price W A" "Kramer M S" "Schepelern S"   
## [61] "Pickar D" "Bloom D M" "Tourjman S V"   
## [64] "Price W A" "Price W A" "Uhr S B"   
## [67] "Price W A" "Grebb J A" "Doran A R"   
## [70] "Gould R J" "Reis J" "Toledo J B"

year\_fetch = YearPubmed(fetch)  
table(year\_fetch)

## year\_fetch  
## 1972 1983 1985 1986 1987 1988 1989 1990 1991 1992 1995 1996 1997 1998 1999   
## 1 2 1 4 7 2 1 2 3 1 3 3 2 1 2   
## 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014   
## 2 2 1 1 3 3 1 1 2 1 2 2 2 3 4   
## 2015 2017 2018   
## 2 1 4

abs\_fetch = AbstractText(fetch)

PMID\_fetch = PMID(fetch)

journal\_fetch = Title(fetch)

Art\_ti\_fetch = ArticleTitle(fetch)  
Art\_ti\_fetch[1]

## [1] "Cellular Uptake of the Atypical Antipsychotic Clozapine Is a Carrier-Mediated Process."

### Summarizing in a table

sum\_fetch\_brief = data.frame(Title = Art\_ti\_fetch,   
 Journal = journal\_fetch,   
 Year = year\_fetch,   
 PMID = PMID\_fetch)  
sum\_fetch\_brief\_l = list(sum\_fetch\_brief)  
write.table(sum\_fetch\_brief\_l, 'sum\_fetch\_brief.txt', sep="\t")  
write\_csv(sum\_fetch\_brief, 'sum\_fetch\_brief.csv')

sum\_fetch = data.frame(Title = Art\_ti\_fetch,   
 Journal = journal\_fetch,   
 Year = year\_fetch,   
 PMID = PMID\_fetch,   
 Abstract = abs\_fetch)  
write\_csv(sum\_fetch, 'sum\_fetch.csv')  
sum\_fetch\_l = list(sum\_fetch)  
write.table(sum\_fetch\_l, 'sum\_fetch.txt', sep = '\t')