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## 1 DB01388 Mibefradil investigational, withdrawn yes inhibitor  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)"

CCB = '(calcium channel blocker OR calcium channel inhibitor OR calcium channel antagonist)'  
RCT = '(randomized controlled trial OR RCT)'  
query = str\_c('(',drug\_string,' OR ',CCB,')',' AND ',RCT,' 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) OR (calcium channel blocker OR calcium channel inhibitor OR calcium channel antagonist)) AND (randomized controlled trial OR RCT) 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])) OR ((\"calcium channel blockers\"[Pharmacological Action] OR \"calcium channel blockers\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields] AND \"blockers\"[All Fields]) OR \"calcium channel blockers\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields] AND \"blocker\"[All Fields]) OR \"calcium channel blocker\"[All Fields]) OR ((\"calcium channels\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channels\"[All Fields]) OR \"calcium channels\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields]) OR \"calcium channel\"[All Fields]) AND inhibitor[All Fields]) OR ((\"calcium channels\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channels\"[All Fields]) OR \"calcium channels\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields]) OR \"calcium channel\"[All Fields]) AND antagonist[All Fields]))) AND ((\"randomized controlled trial\"[Publication Type] OR \"randomized controlled trials as topic\"[MeSH Terms] OR \"randomized controlled trial\"[All Fields] OR \"randomised controlled trial\"[All Fields]) OR RCT[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])) OR ((\"calcium channel blockers\"[Pharmacological Action] OR \"calcium channel blockers\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields] AND \"blockers\"[All Fields]) OR \"calcium channel blockers\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields] AND \"blocker\"[All Fields]) OR \"calcium channel blocker\"[All Fields]) OR ((\"calcium channels\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channels\"[All Fields]) OR \"calcium channels\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields]) OR \"calcium channel\"[All Fields]) AND inhibitor[All Fields]) OR ((\"calcium channels\"[MeSH Terms] OR (\"calcium\"[All Fields] AND \"channels\"[All Fields]) OR \"calcium channels\"[All Fields] OR (\"calcium\"[All Fields] AND \"channel\"[All Fields]) OR \"calcium channel\"[All Fields]) AND antagonist[All Fields]))) AND ((\"randomized controlled trial\"[Publication Type] OR \"randomized controlled trials as topic\"[MeSH Terms] OR \"randomized controlled trial\"[All Fields] OR \"randomised controlled trial\"[All Fields]) OR RCT[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])) OR (("calcium channel blockers"[Pharmacological Action] OR "calcium channel blockers"[MeSH Terms] OR ("calcium"[All Fields] AND "channel"[All Fields] AND "blockers"[All Fields]) OR "calcium channel blockers"[All Fields] OR ("calcium"[All Fields] AND "channel"[All Fields] AND "blocker"[All Fields]) OR "calcium channel blocker"[All Fields]) OR (("calcium channels"[MeSH Terms] OR ("calcium"[All Fields] AND "channels"[All Fields]) OR "calcium channels"[All Fields] OR ("calcium"[All Fields] AND "channel"[All Fields]) OR "calcium channel"[All Fields]) AND inhibitor[All Fields]) OR (("calcium channels"[MeSH Terms] OR ("calcium"[All Fields] AND "channels"[All Fields]) OR "calcium channels"[All Fields] OR ("calcium"[All Fields] AND "channel"[All Fields]) OR "calcium channel"[All Fields]) AND antagonist[All Fields]))) AND (("randomized controlled trial"[Publication Type] OR "randomized controlled trials as topic"[MeSH Terms] OR "randomized controlled trial"[All Fields] OR "randomised controlled trial"[All Fields]) OR RCT[All Fields]) AND ("schizophrenia"[MeSH Terms] OR "schizophrenia"[All Fields])   
##   
## Records: 33

### 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]))  
head(LastFirst)

## [1] "Essali Adib" "Baandrup Lone" "El-Sayeh Hany G"   
## [4] "Shcherbinin Sergey" "Reid Jennifer G" "Egan Michael F"

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

## year\_fetch  
## 1972 1987 1991 1996 1997 2000 2001 2003 2004 2006 2007 2008 2009 2011 2012   
## 1 2 1 1 1 1 2 1 2 3 3 1 4 1 3   
## 2013 2015 2018   
## 2 1 3

abs\_fetch = AbstractText(fetch)

PMID\_fetch = PMID(fetch)

journal\_fetch = Title(fetch)

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

## [1] "Calcium channel blockers for antipsychotic-induced tardive dyskinesia."

### 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')