Sciatica PubMed

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This script takes ten articles from the abstracts on earache articles from NCBI's PubMed

This creates a directory to stem the abstracts and preprocess from the csv file into a corpus of 20 files in a folder called Earache.

```
Auto <- read.csv('sciatic_PubMed_Abstracts.csv', sep=',',
                 header=TRUE, na.strings=c('',' '))

auto <- Auto[complete.cases(Auto$abstract),]


dir.create('./Sciatica')

ea <- as.character(auto$abstract)
setwd('./Sciatica')

for (j in 1:length(ea)){
  write(ea[j], paste(paste('EA',j, sep='.'), '.txt', sep=''))
}
setwd('../')
```

This code preprocesses and stems the corpus

```
library(tm)
library(SnowballC)
library(wordcloud)
library(ggplot2)

Sciatica <- Corpus(DirSource("Sciatica"))


Sciatica
```

```
## <<SimpleCorpus>>
## Metadata:  corpus specific: 1, document level (indexed): 0
## Content:  documents: 20
```

```
#Sciatica <- tm_map(Sciatica, removePunctuation)
#Sciatica <- tm_map(Sciatica, removeNumbers)
Sciatica <- tm_map(Sciatica, tolower)
Sciatica <- tm_map(Sciatica, removeWords, stopwords("english"))
Sciatica <- tm_map(Sciatica, stripWhitespace)
Sciatica <- tm_map(Sciatica, stemDocument)

dtmSciatica <- DocumentTermMatrix(Sciatica)
```

```
freq <- colSums(as.matrix(dtmSciatica))
```

This code orders words stemmed by frequency and finds input correlations

```
FREQ <- data.frame(freq)
ord <- order(freq, decreasing=TRUE)

freq[head(ord, 25)]
```

```
##      nerv   sciatic   patient      pain     studi     muscl   control
##        68        59        56        41        29        22        20
##    postop piriformi    clinic  signific    associ     block    measur
##        18        17        16        16        16        16        14
##  sciatica     group      show    produc    effect    assess    am1710
##        13        13        13        12        12        12        12
##      imag    outcom    receiv    result
##        11        11        11        10
```

```
findAssocs(dtmSciatica, "effect", corlimit=0.7)
```

```
## $effect
##                manag                 hour                 (cg).
##                 0.85                 0.78                 0.76
##          (f?=?16.26;            (partial                (pisp)
##                 0.76                 0.76                 0.76
##               (stens)              (tens)                 (tg)
##                 0.76                 0.76                 0.76
##              10?week                 10th                  19%
##                 0.76                 0.76                 0.76
##                2018.                 29th                 2nd,
##                 0.76                 0.76                 0.76
##                 4th,                 6th,                  8th
##                 0.76                 0.76                 0.76
##              account            administr               africa
##                 0.76                 0.76                 0.76
##                allot              analysi                anova
##                 0.76                 0.76                 0.76
##                appli              azikiw                blind
##                 0.76                 0.76                 0.76
##                carri                 come           comparison
##                 0.76                 0.76                 0.76
##              consent              conveni          counterpart
##                 0.76                 0.76                 0.76
##              current             determin               electr
##                 0.76                 0.76                 0.76
##                enrol                  eta            hospital,
##                 0.76                 0.76                 0.76
##                howev               inform             intervent
##                 0.76                 0.76                 0.76
##       interventions.        intramuscular             landmark
##                 0.76                 0.76                 0.76
```

```
##              lasted.                 mani                 may,
##                 0.76                 0.76                 0.76
##           mean?ñ?sd,        medicals/surg               nnamdi
##                 0.76                 0.76                 0.76
##               nnewi               nnewi.           non-random
##                 0.76                 0.76                 0.76
##               none,               obtain            p?<?0.05.
##                 0.76                 0.76                 0.76
##           p?=?0.01); pactr201805003408271                 pair
##                 0.76                 0.76                 0.76
##                  pan        physiotherapi       physiotherapy,
##                 0.76                 0.76                 0.76
##                 pisp                pisp.          post-inject
##                 0.76                 0.76                 0.76
##               prove            recommend              recruit
##                 0.76                 0.76                 0.76
##             registri              reliev               repeat
##                 0.76                 0.76                 0.76
##        respectively,              result:            services,
##                 0.76                 0.76                 0.76
##              session                  set                 sham
##                 0.76                 0.76                 0.76
##     squared)?=?0.19.                 sten               stimul
##                 0.76                 0.76                 0.76
##              t-test.                tens;      test/experiment
##                 0.76                 0.76                 0.76
##           transcutan           undertaken              varianc
##                 0.76                 0.76                 0.76
##            variance.                week,               weeks)
##                 0.76                 0.76                 0.76
##                 well                 wise              written
##                 0.76                 0.76                 0.76
##                wrong                  ten             particip
##                 0.76                 0.74                 0.73
##                 test
##                 0.72
```

```
findAssocs(dtmSciatica, "assess", corlimit=0.5)
```

```
## $assess
##            intern              less             (32.9              (g.
##              0.84              0.82              0.76              0.76
##           (ifis),             (odi)          (sf-36),              /s.
##              0.76              0.76              0.76              0.76
##             0.01)             0.05).               159              16th
##              0.76              0.76              0.76              0.76
##              34th          36-item               4.7          agility;
##              0.76              0.76              0.76              0.76
##            bodili          bodily, cardiorespiratori            compon
##              0.76              0.76              0.76              0.76
##           course.            disabl            employ               fit
##              0.76              0.76              0.76              0.76
##          fitness.          fitness;      flexibility;           flexibl
##              0.76              0.76              0.76              0.76
```

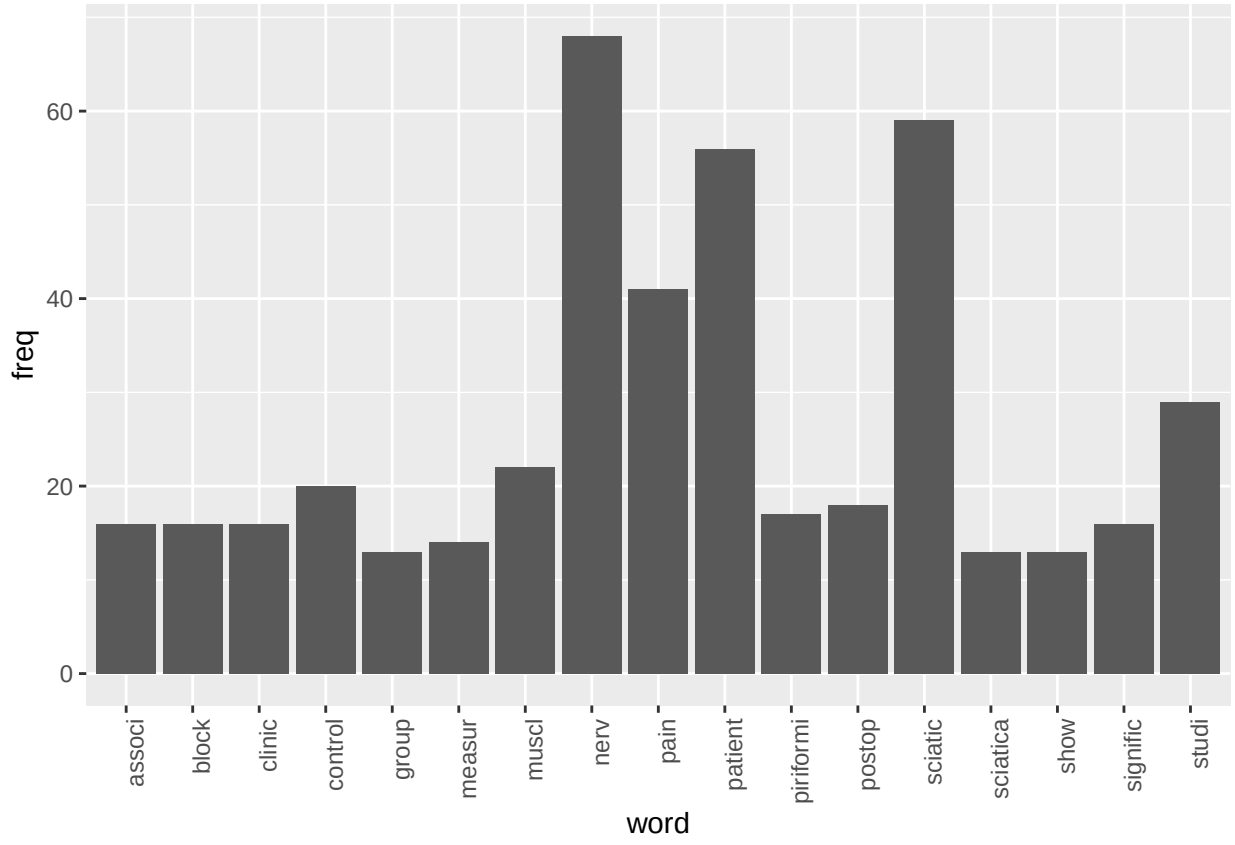
```
##            gestat        gestation;           greater             index
##              0.76              0.76              0.76              0.76
##              john         low-moder            medium          muscular
##              0.76              0.76              0.76              0.76
##             old).          oswestri            overal          pregnanc
##              0.76              0.76              0.76              0.76
##        pregnancy.          pregnant      questionnair             relev
##              0.76              0.76              0.76              0.76
##            scale;       self-report               son        speed-agil
##              0.76              0.76              0.76              0.76
##            stage.          strength         strength;             w.).
##              0.76              0.76              0.76              0.76
##               w.,             women              year           analogu
##              0.76              0.76              0.76              0.73
##            explor            physic            associ             pain,
##              0.73              0.72              0.71              0.69
##              pain             wiley             scale           compris
##              0.67              0.64              0.63              0.62
##              week            health            survey             score
##              0.62              0.62              0.62              0.59
##              ltd.              need            higher            lumbar
##              0.58              0.58              0.55              0.53
```

```
findAssocs(dtmSciatica, "piriformi", corlimit=0.5)
```

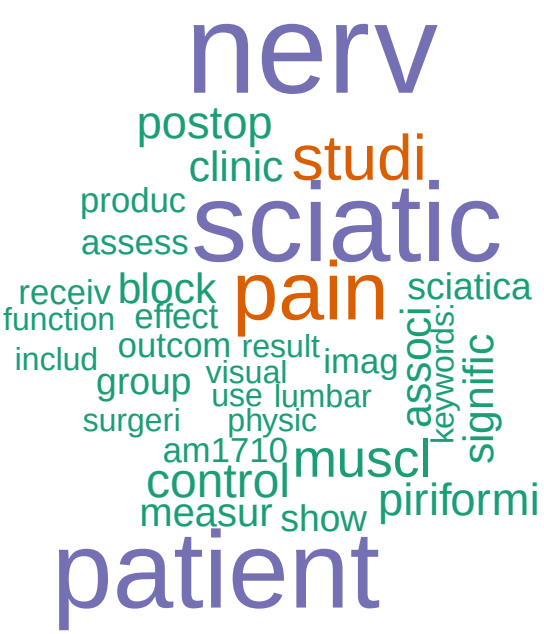
```
## $piriformi
##       muscle.        twenti         "nerv         (5%),        (70%),
##          0.95          0.88          0.87          0.87          0.87
##        (85%),   32:282-286,           80%    abandoned.         anat.
##          0.87          0.87          0.87          0.87          0.87
##       anatomi      anatomy;      anterior      approach arthroplasty,
##          0.87          0.87          0.87          0.87          0.87
##         cadav      cadaver;       clarifi         clin.    disorders,
##          0.87          0.87          0.87          0.87          0.87
##       dissect         exist  fresh-frozen   identified,   identified.
##          0.87          0.87          0.87          0.87          0.87
##        implic          inc.      inferior        innerv        joint;
##          0.87          0.87          0.87          0.87          0.87
##       nerves.       origin.  periodicals,   piriformis"       plexus,
##          0.87          0.87          0.87          0.87          0.87
##       plexus;     posterior          rami         ramus           s2.
##          0.87          0.87          0.87          0.87          0.87
##    sacroiliac          said        sides,        sides.         singl
##          0.87          0.87          0.87          0.87          0.87
##         sourc      specimen        study,        suppli      surround
##          0.87          0.87          0.87          0.87          0.87
##          term        vague.       ventral          side          2018
##          0.87          0.87          0.87          0.85          0.80
##     syndrome;        sacral      superior           one        branch
##          0.80          0.75          0.75          0.73          0.67
##       gluteal        common      iatrogen      studied.        origin
##          0.65          0.64          0.64          0.64          0.62
##          thus        nerve,      descript specifically,         trace
##          0.57          0.57          0.57          0.57          0.57
```

```
##         proxim respectively.     therefore,      literatur
##           0.57           0.57           0.57           0.56
```

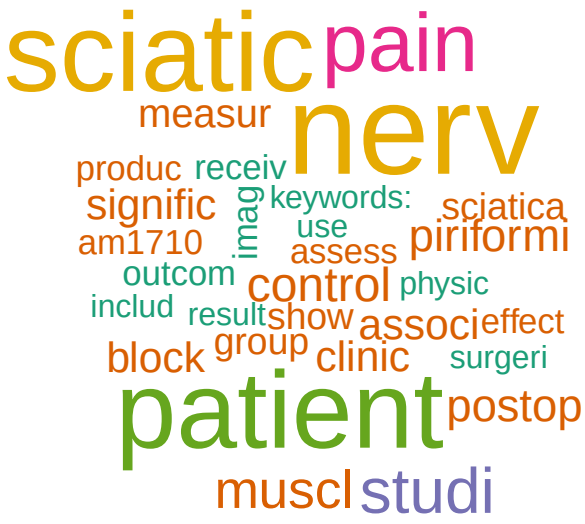
```
wf <- data.frame(word=names(freq), freq=freq)
p <- ggplot(subset(wf, freq>12), aes(word, freq))
p <- p + geom_bar(stat= 'identity')
p <- p + theme(axis.text.x=element_text(angle=90, hjust=1))
p
```




```
wordcloud(names(freq), freq, min.freq=10,colors=brewer.pal(3,'Dark2'))
```




```
wordcloud(names(freq), freq, max.words=30,colors=brewer.pal(6,'Dark2'))
```



The above stemmed the corpus, this will lemmatize the original csv file

and add the field to the table and write out to csv, followed by plot the word count frequencies that were lemmatized and the word clouds

```
library(textstem)

lemma <- lemmatize_strings(auto$abstract, dictionary=lexicon::hash_lemmas)

Lemma <- as.data.frame(lemma)
Lemma <- cbind(Lemma, auto)

colnames(Lemma) <- c('lemmatizedAbstract','abstract', 'source')

write.csv(Lemma, 'LemmatizedSciatica.csv', row.names=FALSE)
```

```
dir.create('./Sciatica-Lemma')

ea <- as.character(Lemma$lemmatizedAbstract)
setwd('./Sciatica-Lemma')

for (j in 1:length(ea)){
  write(ea[j], paste(paste('EAL',j, sep='.'), '.txt', sep=''))
}
setwd('../')
```

```r
library(tm)
library(SnowballC)
library(wordcloud)
library(ggplot2)
```

```r
Sciatica <- Corpus(DirSource("Sciatica-Lemma"))

Sciatica
```

```
## <<SimpleCorpus>>
## Metadata:  corpus specific: 1, document level (indexed): 0
## Content:  documents: 20
```

```r
#Sciatica <- tm_map(Sciatica, removePunctuation)
#Sciatica <- tm_map(Sciatica, removeNumbers)
Sciatica <- tm_map(Sciatica, tolower)
Sciatica <- tm_map(Sciatica, removeWords, stopwords("english"))
Sciatica <- tm_map(Sciatica, stripWhitespace)

dtmSciatica <- DocumentTermMatrix(Sciatica)
dtmSciatica
```

```
## <<DocumentTermMatrix (documents: 20, terms: 1425)>>
## Non-/sparse entries: 2238/26262
## Sparsity           : 92%
## Maximal term length: 21
## Weighting          : term frequency (tf)
```

```r
freq <- colSums(as.matrix(dtmSciatica))

FREQ <- data.frame(freq)
ord <- order(freq, decreasing=TRUE)

freq[head(ord, 25)]
```

```
##         nerve       sciatic       patient          pain         study
##            69            60            55            41            29
##        muscle       control    piriformis postoperative           ca8
##            22            21            18            17            17
##         group           low         block      clinical      sciatica
##            16            16            16            14            14
##          show           can          much       produce    ultrasound
##            13            12            12            12            12
##           tka     associate        am1710   conclusion:       include
##            12            12            12            11            11
```

```r
piriformis <- as.data.frame(findAssocs(dtmSciatica, "piriformis", corlimit=0.70))

ultrasound <- as.data.frame(findAssocs(dtmSciatica, "ultrasound", corlimit=0.5))
```

```r
am1710 <- as.data.frame(findAssocs(dtmSciatica, "am1710", corlimit=0.55))

ca8 <- as.data.frame(findAssocs(dtmSciatica, "ca8", corlimit=0.85))

piriformis
```

```
##               piriformis
## 2019.?              0.89
## 282                 0.89
## 286,                0.89
## 32:                 0.89
## abandon.            0.89
## anat.               0.89
## anatomy             0.89
## anatomy;            0.89
## anterior            0.89
## approach            0.89
## arthroplasty,       0.89
## cadaver             0.89
## cadaver;            0.89
## clarify             0.89
## clin.               0.89
## description         0.89
## disorder,           0.89
## dissection          0.89
## exist               0.89
## freeze              0.89
## fresh               0.89
## identify,           0.89
## identify.           0.89
## implicate           0.89
## inc.                0.89
## inferior            0.89
## innervate           0.89
## innervation         0.89
## joint;              0.89
## majority            0.89
## origin.             0.89
## periodical,         0.89
## plexus,             0.89
## plexus;             0.89
## posterior           0.89
## proximally          0.89
## rami                0.89
## ramus               0.89
## s2.                 0.89
## sacroiliac          0.89
## say                 0.89
## side,               0.89
## side.               0.89
## source              0.89
## specimen            0.89
## study,              0.89
```

```
## supply              0.89
## surround            0.89
## term                0.89
## vague.              0.89
## ventral             0.89
## twenty              0.87
## side                0.85
## 2018                0.80
## origin              0.80
## sacral              0.77
## superior            0.77
## muscle.             0.71
```

```
ultrasound
```

```
##                 ultrasound
## femoris,              0.72
## medial                0.72
## soleus                0.72
## ultrasonography       0.72
## july                  0.72
## contraction           0.70
## area                  0.68
## bicep                 0.68
## change                0.68
## low                   0.68
## ratio                 0.65
## 2017.                 0.65
## cross                 0.64
## sectional             0.64
## evaluate              0.63
## intensity             0.58
## muscle                0.57
## femoris               0.57
## injection,            0.57
## background:           0.55
## copyright?            0.53
## elsevier              0.53
## pain;                 0.53
## structure             0.53
## guide                 0.53
## image                 0.52
## measure               0.50
## maximum               0.50
```

```
am1710
```

```
##                     am1710
## activation            1.00
## adjuvant              1.00
## agent                 1.00
## agonist,              1.00
## allodynia             1.00
```

```
## antagonist             1.00
## antiallodynic          1.00
## antinociceptive        1.00
## appropriate            1.00
## attenuate              1.00
## behave                 1.00
## benzo                  1.00
## broad                  1.00
## camp                   1.00
## cannabilactone         1.00
## cannabinoid            1.00
## cb1                    1.00
## cb2                    1.00
## cfa                    1.00
## characterize.          1.00
## chromen                1.00
## contrast,              1.00
## day,                   1.00
## day?                   1.00
## delay                  1.00
## dependence.            1.00
## development            1.00
## dimethyl               1.00
## dose                   1.00
## efficacy               1.00
## embryonic              1.00
## endure                 1.00
## extracellular          1.00
## forskolin              1.00
## freund's               1.00
## gabapentin             1.00
## hcb2.                  1.00
## hek                    1.00
## heptyl                 1.00
## hydroxy                1.00
## incompletely           1.00
## indication             1.00
## inhibition             1.00
## kg,                    1.00
## kidney                 1.00
## kinase                 1.00
## ligation               1.00
## mcb2                   1.00
## mcb2.                  1.00
## mechanical             1.00
## mediate                1.00
## methoxy                1.00
## model.                 1.00
## modest                 1.00
## mouse                  1.00
## mouse,                 1.00
## mouse.                 1.00
## paclitaxel             1.00
## pathway                1.00
```

```
## phosphorylation         1.00
## precipitate             1.00
## production              1.00
## profile                 1.00
## prophylactic            1.00
## psnl                    1.00
## receptor;               1.00
## render                  1.00
## rodent                  1.00
## similarly,              1.00
## species                 1.00
## spectrum                1.00
## stably                  1.00
## stimulate               1.00
## suppress                1.00
## sustain                 1.00
## tetrahydrocannabinol,   1.00
## tolerance               1.00
## tolerant                1.00
## translation.            1.00
## underlie                1.00
## vitro,                  1.00
## vivo,                   1.00
## vivo.                   1.00
## withdrawal              1.00
## signal                  0.94
## morphine                0.89
## receptor                0.89
## identify                0.81
## induce                  0.79
## suggest                 0.70
## unwanted                0.69
## know                    0.69
## chemotherapy            0.69
## neuropathic             0.69
## partial                 0.69
## establish               0.69
## express                 0.69
## human                   0.69
## inhibit                 0.69
## observe                 0.69
## therapeutic             0.69
## whether                 0.69
```

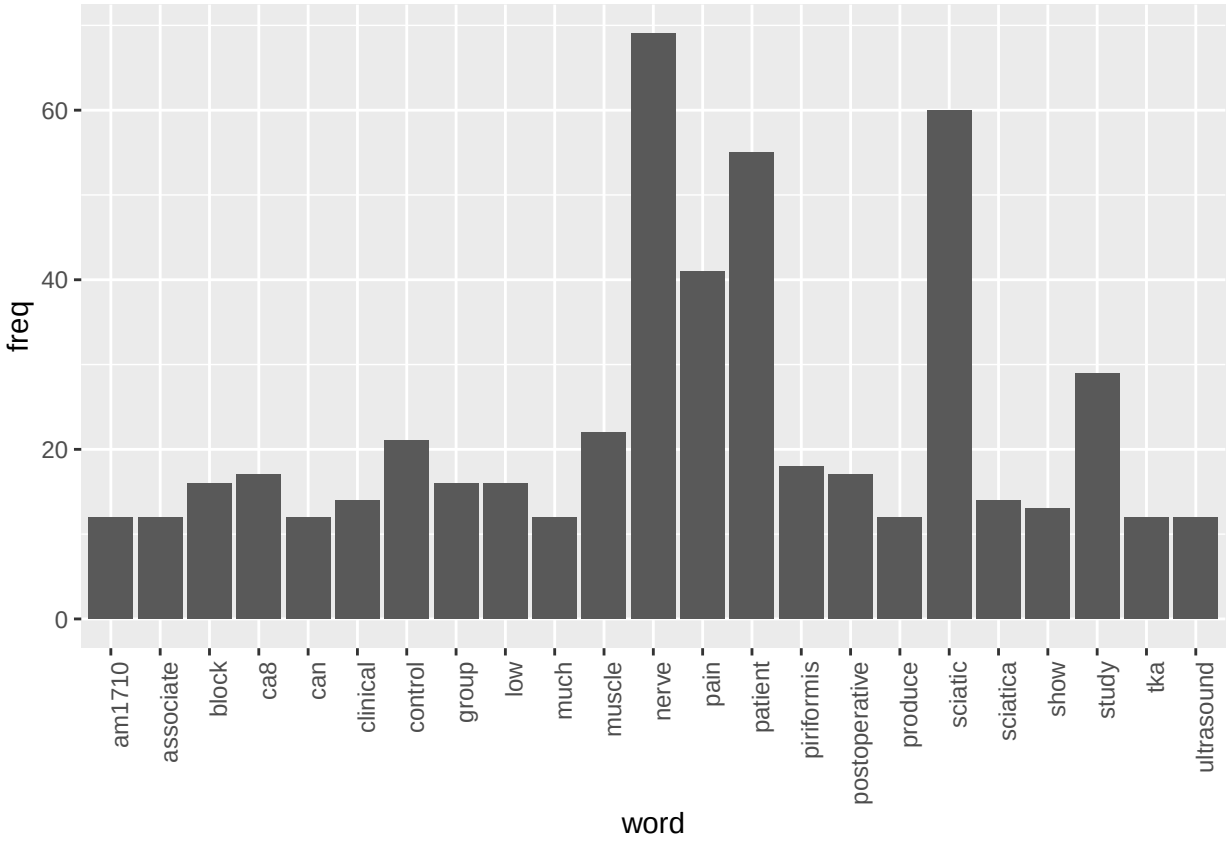
```
ca8
```

```
##                       ca8
## 1,697bp              1.00
## 201                  1.00
## 204                  1.00
## 204.                 1.00
## 204c                 1.00
## 204g                 1.00
## 3'utr                1.00
```

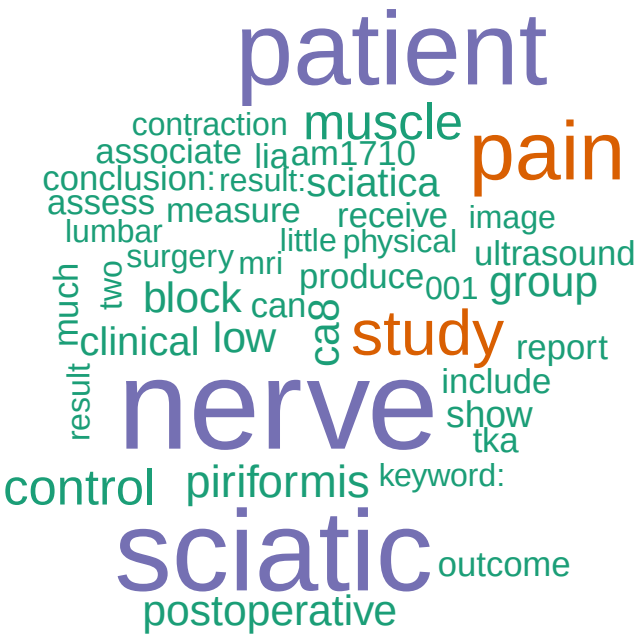
```
## aav8                 1.00
## able                 1.00
## advance              1.00
## advillin             1.00
## allele               1.00
## allosteric           1.00
## also                 1.00
## anhydrase            1.00
## ataxia,              1.00
## barely               1.00
## ca++                 1.00
## calcium              1.00
## carbonic             1.00
## cell,                1.00
## cell.                1.00
## cerebellar           1.00
## cis                  1.00
## construct            1.00
## critical             1.00
## cryptic              1.00
## deliver              1.00
## derive               1.00
## develop              1.00
## dorsal               1.00
## drg                  1.00
## eqtl                 1.00
## eqtl.                1.00
## evade                1.00
## excitability         1.00
## excitability.        1.00
## exclusively          1.00
## exon                 1.00
## explain              1.00
## expression           1.00
## extent               1.00
## flag                 1.00
## g.,                  1.00
## ganglion             1.00
## gene                 1.00
## genomic              1.00
## glial                1.00
## greatly              1.00
## hek293               1.00
## homozygote           1.00
## homozygous           1.00
## hyperalgesic         1.00
## ihc                  1.00
## immunohistochemistry 1.00
## impact               1.00
## imply                1.00
## inhibitor            1.00
## inositol             1.00
## intracellular        1.00
## itpr1                1.00
```

```
## lesser              1.00
## murine              1.00
## mutation            1.00
## naturally           1.00
## nbl                 1.00
## neural              1.00
## neuronal            1.00
## nociception         1.00
## null                1.00
## occur               1.00
## pathway,            1.00
## peptide             1.00
## phenotype.          1.00
## pitpr1              1.00
## population,         1.00
## predominantly       1.00
## previously          1.00
## question,           1.00
## release,            1.00
## report,             1.00
## restrict            1.00
## reversion           1.00
## rs6471859           1.00
## rs6471859,          1.00
## splice              1.00
## splice,             1.00
## stable              1.00
## synaptic            1.00
## tissue              1.00
## transcript          1.00
## transduce           1.00
## transfer            1.00
## trisphosphate       1.00
## truncate            1.00
## viral               1.00
## vitro.              1.00
## vivo                1.00
## function            0.96
## regulate            0.95
## response            0.89
## cell                0.87
## produce             0.86
```

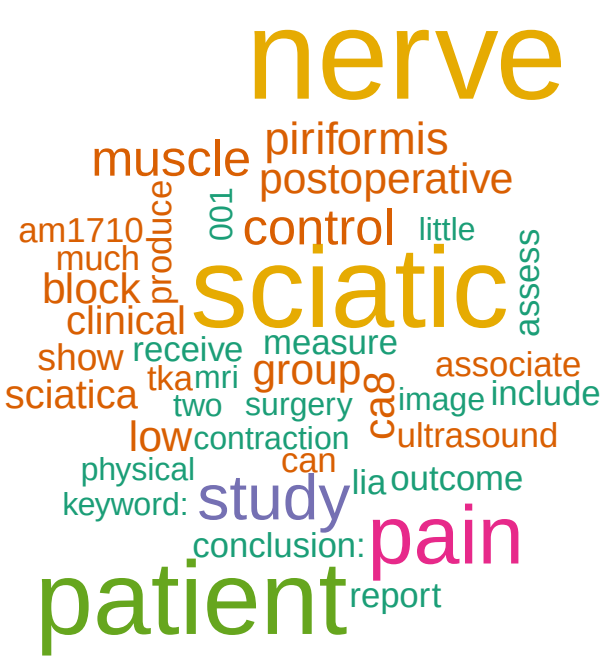
```
wf <- data.frame(word=names(freq), freq=freq)
p <- ggplot(subset(wf, freq>11), aes(word, freq))
p <- p + geom_bar(stat= 'identity')
p <- p + theme(axis.text.x=element_text(angle=90, hjust=1))
p
```




```
wordcloud(names(freq), freq, min.freq=10,colors=brewer.pal(3,'Dark2'))
```




```
wordcloud(names(freq), freq, max.words=40,colors=brewer.pal(6,'Dark2'))
```


nerve
muscle
piriformis
postoperative
produce
001
control
am1710
little
much
sciatic
assess
block
clinical
measure
show
receive
group
associate
tka
mri
sciatica
ca8
image
include
two
surgery
low
contraction
ultrasound
physical
can
lia
outcome
keyword:
study
pain
conclusion:
patient
report