webQueries: Retrieve genes or protein annotations by querying NCBI.

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1 Introduction

webQueries provides R functions for retrieving up-to-date gene and protein annotations from NCBI databases, given HUGO symbols or ids, e.g. entrezgene or Uniprot ids.

The main function, runQuery(), is a wrapper for the NCBI E-utilities functions [1], and is designed to query *genes*, *protein*, and *snp* databases. runQueries requires a functional web connexion.

In case a HUGO symbol is called, runQuery first interogate NCBI in order to get identifiers, using E-utilities Esearch, then use the returned values to get the corresponding annotations, using E-utilities Esummary.

2 Examples

Here are some examples showing how a single, or multiple, annotation(s) can be retrieved using either official symbols or identifiers.

```
require(webQueries)

Loading required package:  webQueries

runQuery("erbb2", "gene")
     query  Name                             Description Orgname Status
//Id erbb2 ERBB2 erb-b2 receptor tyrosine kinase 2               0
     CurrentID Chromosome GeneticSource MapLocation
//Id         0         17       genomic       17q12
                                                 OtherAliases
//Id CD340, HER-2, HER-2/neu, HER2, MLN 19, NEU, NGL, TKR1

//Id c-erb B2/neu protein|herstatin|human epidermal growth factor receptor 2|metastatic lymph nod
     NomenclatureSymbol                     NomenclatureName
//Id              ERBB2 erb-b2 receptor tyrosine kinase 2
     NomenclatureStatus TaxID    Mim    int
//Id           Official       164870 164870
                       GenomicInfo               GenomicInfoType
//Id 17NC_000017.11396880833972866132 17NC_000017.11396880833972866132
     ChrLoc    ChrAccVer ChrStart  ChrStop ExonCount GeneWeight
```

```
//Id      17 NC_000017.11 39688083 39728661         32      292128

//Id This gene encodes a member of the epidermal growth factor (EGF) receptor family of receptor
     ChrSort ChrStart                Organism ScientificName CommonName   GI
//Id      17 39688083 Homo sapienshuman9606   Homo sapiens      human 2064
runQuery(2064, "gene", bySymbol = FALSE)
  query  Name                       Description Orgname Status CurrentID
1  2064 ERBB2 erb-b2 receptor tyrosine kinase 2              0         0
  Chromosome GeneticSource MapLocation
1         17       genomic       17q12
                                    OtherAliases
1 CD340, HER-2, HER-2/neu, HER2, MLN 19, NEU, NGL, TKR1

1 c-erb B2/neu protein|herstatin|human epidermal growth factor receptor 2|metastatic lymph node g
  NomenclatureSymbol                 NomenclatureName NomenclatureStatus
1             ERBB2 erb-b2 receptor tyrosine kinase 2           Official
  TaxID    Mim    int                    GenomicInfo
1      164870 164870 17NC_000017.11396880833972866132
                 GenomicInfoType ChrLoc    ChrAccVer ChrStart  ChrStop
1 17NC_000017.11396880833972866132     17 NC_000017.11 39688083 39728661
  ExonCount GeneWeight
1        32    292128

1 This gene encodes a member of the epidermal growth factor (EGF) receptor family of receptor tyr
  ChrSort ChrStart                Organism ScientificName CommonName   GI
1      17 39688083 Homo sapienshuman9606   Homo sapiens      human 2064
# Querying the Protein database
runQuery("erbb2", "protein")
   query       Caption
1  erbb2       P04626
2  erbb2 NP_001276867
3  erbb2 NP_001276866
4  erbb2 NP_001276865
5  erbb2 NP_001005862
6  erbb2    NP_004439
7  erbb2     AAI67147
8  erbb2     EAW60597
9  erbb2     EAW60596
10 erbb2     EAW60595
11 erbb2     AHW56604
12 erbb2     AHW56472
13 erbb2     AHW56471
14 erbb2     ETE72869
15 erbb2     CCQ43016
16 erbb2     AFD33643
17 erbb2     ADN43069
18 erbb2     AAF30295
19 erbb2     AAO18082
20 erbb2     BAE15960

1  RecName: Full=Receptor tyrosine-protein kinase erbB-2; AltName: Full=Metastatic lymph node gen
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                                                            Extra
1                      gi|119533|sp|P04626.1|ERBB2_HUMAN[119533]
2                  gi|584277109|ref|NP_001276867.1|[584277109]
3                  gi|584277106|ref|NP_001276866.1|[584277106]
4                  gi|584277103|ref|NP_001276865.1|[584277103]
5                   gi|54792098|ref|NP_001005862.1|[54792098]
6                     gi|54792096|ref|NP_004439.2|[54792096]
7                     gi|187469647|gb|AAI67147.1|[187469647]
8     gi|119581001|gb|EAW60597.1||gnl|WGS:AADB|hCP44700[119581001]
9   gi|119581000|gb|EAW60596.1||gnl|WGS:AADB|hCP1811970[119581000]
10  gi|119580999|gb|EAW60595.1||gnl|WGS:AADB|hCP1811971[119580999]
11                    gi|608785535|gb|AHW56604.1|[608785535]
12                    gi|608785271|gb|AHW56472.1|[608785271]
13                    gi|608785269|gb|AHW56471.1|[608785269]
14  gi|565322140|gb|ETE72869.1||gnl|WGS:AZIM|L345_01293[565322140]
15                    gi|444737899|emb|CCQ43016.1|[444737899]
16                    gi|380709118|gb|AFD33643.1|[380709118]
17                    gi|307334911|gb|ADN43069.1|[307334911]
18                       gi|6857751|gb|AAF30295.1|[6857751]
19                      gi|27658000|gb|AAO18082.1|[27658000]
20                      gi|71017497|dbj|BAE15960.1|[71017497]
          Gi CreateDate UpdateDate Flags TaxId Length Status ReplacedBy
1     119533 1987/08/13 2015/03/04     0  9606   1255   live
2  584277109 2014/02/11 2014/12/26   512  9606    603   live
3  584277106 2014/02/11 2014/12/26   512  9606   1055   live
4  584277103 2014/02/11 2014/12/26   512  9606   1240   live
5   54792098 2004/10/28 2014/12/26   512  9606   1225   live
6   54792096 1999/05/07 2014/12/26   512  9606   1255   live
7  187469647 2008/05/05 2008/05/05     0  9606   1255   live
8  119581001 2006/12/18 2014/05/14     0  9606   1255   live
9  119581000 2006/12/18 2014/05/14     0  9606   1225   live
10 119580999 2006/12/18 2014/05/14     0  9606    419   live
11 608785535 2014/04/14 2014/04/14     0  9606    867   live
12 608785271 2014/04/14 2014/04/14     0  9606    147   live
13 608785269 2014/04/14 2014/04/14     0  9606   1255   live
14 565322140 2013/12/11 2013/12/11     0  8665    784   live
```

```
15 444737899 2013/01/31 2013/09/25    0  9606    87   live
16 380709118 2012/03/19 2012/03/19    0  9643  1260   live
17 307334911 2010/09/25 2010/09/25    0  9606    80   live
18   6857751 2000/02/03 2000/02/03    0  9606    36   live
19  27658000 2003/01/12 2003/01/12    0  9606  1255   live
20  71017497 2005/07/16 2008/03/18    0  9606    65   live
    Comment        GI
1             119533
2          584277109
3          584277106
4          584277103
5           54792098
6           54792096
7          187469647
8          119581001
9          119581000
10         119580999
11         608785535
12         608785271
13         608785269
14         565322140
15         444737899
16         380709118
17         307334911
18           6857751
19          27658000
20          71017497
runQuery("P04626", "protein", bySymbol = FALSE)
   query      Caption
1 P04626        P04626
2 P04626 NP_001276866
3 P04626    NP_004439
4 P04626     CAA27060

1 RecName: Full=Receptor tyrosine-protein kinase erbB-2; AltName: Full=Metastatic lymph node gene
2
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                                  Extra        Gi CreateDate
1   gi|119533|sp|P04626.1|ERBB2_HUMAN[119533]     119533 1987/08/13
2 gi|584277106|ref|NP_001276866.1|[584277106] 584277106 2014/02/11
3     gi|54792096|ref|NP_004439.2|[54792096]  54792096 1999/05/07
4          gi|31198|emb|CAA27060.1|[31198]      31198 1986/11/18
  UpdateDate Flags TaxId Length Status ReplacedBy Comment        GI
1 2015/03/04     0  9606   1255   live                       119533
2 2014/12/26   512  9606   1055   live                    584277106
3 2014/12/26   512  9606   1255   live                     54792096
4 1995/03/30     0  9606   1255   live                        31198
# Querying the SNP database
runQuery("erbb2", "snp")
Document is empty
Start tag expected, '<' not found
Connexion error during gsummary - I'm trying again... 1
```

```
   query     SNP_ID Organism ALLELE_ORIGIN  GLOBAL_MAF GLOBAL_POPULATION
1  erbb2 587776805
2  erbb2 578192771                          T=0.0002/1
3  erbb2 578155528                          G=0.0002/1
4  erbb2 578138670
5  erbb2 578108865                          T=0.0002/1
6  erbb2 578046124                          T=0.0002/1
7  erbb2 577933020                          C=0.0068/34
8  erbb2 577787590                          G=0.0004/2
9  erbb2 577767674                          C=0.0166/83
10 erbb2 577608686                          T=0.0002/1
11 erbb2 577560557
12 erbb2 577523466                          A=0.0002/1
13 erbb2 577467099                          G=0.0002/1
14 erbb2 577449121                          T=0.0004/2
15 erbb2 577329788                          G=0.0002/1
16 erbb2 577272317                          T=0.0008/4
17 erbb2 577260523                          T=0.0002/1
18 erbb2 577200967                          T=0.0002/1
19 erbb2 577121666
20 erbb2 577083829                          G=0.0002/1
   GLOBAL_SAMPLESIZE SUSPECTED CLINICAL_SIGNIFICANCE GENE LOCUS_ID
1                  0
2                  0
3                  0
4                  0
5                  0
6                  0
7                  0
8                  0
9                  0
10                 0
11                 0
12                 0
13                 0
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16                 0
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18                 0
19                 0
20                 0

1                                                              NM_001005862.1,N
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15                                                                                          NM_0
16
17 NM_001005862.1,NM_001005862.2,NM_001289936.1,NM_001289937.1,NM_001289938.1,NM_004448.2,NM_0044
18
19
20
   CHR WEIGHT             HANDLE
1   17      1 OMIM-CURATED-RECORDS
2   17      1          1000GENOMES
3   17      1          1000GENOMES
4   17      1            JMKIDD_LAB
5   17      1          1000GENOMES
6   17      1          1000GENOMES
7   17      1          1000GENOMES
8   17      1 1000GENOMES,EVA-GONL
9   17      1          1000GENOMES
10  17      1          1000GENOMES
11  17      1             EVA-GONL
12  17      1          1000GENOMES
13  17      1          1000GENOMES
14  17      1          1000GENOMES
15  17      1          1000GENOMES
16  17      1          1000GENOMES
17  17      1          1000GENOMES
18  17      1          1000GENOMES
19  17      1             EVA-GONL
20  17      1          1000GENOMES
                                            FXN_CLASS
1  cds-indel,nc-transcript-variant,upstream-variant-2KB
2                                        intron-variant
3                                        intron-variant
4                                        intron-variant
5                 intron-variant,upstream-variant-2KB
6                                        intron-variant
7                 intron-variant,upstream-variant-2KB
8                 intron-variant,upstream-variant-2KB
9                 intron-variant,upstream-variant-2KB
10                                       intron-variant
11                                       intron-variant
12                                       intron-variant
13                                       intron-variant
14                                       intron-variant
15    nc-transcript-variant,reference,synonymous-codon
16                                       intron-variant
17    nc-transcript-variant,reference,synonymous-codon
18                 intron-variant,upstream-variant-2KB
19                                       intron-variant
20                                       intron-variant
                      VALIDATED GTYPE NONREF
```

```
1                              no-info        false
2                             by-1000G        false
3                             by-1000G        false
4                              no-info        false
5                             by-1000G        false
6                             by-1000G        false
7             by-1000G,by-frequency        false
8   by-1000G,by-cluster,by-frequency         false
9             by-1000G,by-frequency        false
10                            by-1000G        false
11                             no-info        false
12                            by-1000G        false
13                            by-1000G        false
14            by-1000G,by-frequency        false
15                            by-1000G        false
16            by-1000G,by-frequency        false
17                            by-1000G        false
18                            by-1000G        false
19                             no-info        false
20                            by-1000G        false

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17 HGVS=NC_000017.10:g.37866134C>T,NC_000017.11:g.39709881C>T,NG_007503.1:g.26742C>T,NM_001005862
18
19
20
   HET SRATE TAX_ID
1    0     0   9606
2    0     0   9606
3    0     0   9606
4    0     0   9606
5    0     0   9606
6    0     0   9606
7    1     0   9606
8    0     0   9606
9    3     0   9606
10   0     0   9606
11   0     0   9606
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12    0      0    9606
13    0      0    9606
14    0      0    9606
15    0      0    9606
16    0      0    9606
17    0      0    9606
18    0      0    9606
19    0      0    9606
20    0      0    9606


1                                    587776805|2|0|1|1|1|17|NT_010783.16|12788773|39724754|MIR4728,
2          578192771|2|0|1|1|1|17|NT_010783.16|12764467|39700448|ERBB2|0.000399282|0.0141238| |32
3          578155528|2|0|1|1|1|17|NT_010783.16|12771726|39707707|ERBB2|0.000399282|0.0141238| |32
4                              578138670|2|0|1|1|1|17|NT_010783.16|12773079|39709060|
5          578108865|2|0|1|1|1|17|NT_010783.16|12763842|39699823|ERBB2|0.000399282|0.0141238| |32
6          578046124|2|0|1|1|1|17|NT_010783.16|12785790|39721771|ERBB2|0.000399282|0.0141238| |32
7           577933020|2|0|1|1|1|17|NT_010783.16|12755976|39691957|ERBB2|0.0134861|0.0810011| |34
8          577787590|2|0|1|1|1|17|NT_010783.16|12755550|39691531|ERBB2|0.000798403|0.0199641| |35
9        577767674|2|0|1|1|1|17|NT_010783.16|12750567|39686548|ERBB2,PGAP3|0.0325976|0.123435| |34
10         577608686|2|0|1|1|1|17|NT_010783.16|12765751|39701732|ERBB2|0.000399282|0.0141238| |32
11                             577560557|2|0|1|1|1|17|NT_010783.16|12785093|39721074|
12         577523466|2|0|1|1|1|17|NT_010783.16|12780756|39716737|ERBB2|0.000399282|0.0141238| |32
13         577467099|2|0|1|1|1|17|NT_010783.16|12788146|39724127|ERBB2|0.000399282|0.0141238| |32
14         577449121|2|0|1|1|1|17|NT_010783.16|12779743|39715724|ERBB2|0.000798403|0.0199641| |34
15         577329788|2|0|1|1|1|17|NT_010783.16|12787359|39723340|ERBB2|0.000399282|0.0141238| |32
16          577272317|2|0|1|1|1|17|NT_010783.16|12767947|39703928|ERBB2|0.00159617|0.0282053| |34
17         577260523|2|0|1|1|1|17|NT_010783.16|12773900|39709881|ERBB2|0.000399282|0.0141238| |32
18 577200967|2|0|1|1|1|17|NT_010783.16|12788692|39724673|MIR4728,ERBB2|0.000399282|0.0141238| |32
19                              577121666|2|0|1|1|1|17|NT_010783.16|12775246|39711227|
20         577083829|2|0|1|1|1|17|NT_010783.16|12760926|39696907|ERBB2|0.000399282|0.0141238| |32
   ORIG_BUILD UPD_BUILD      CREATEDATE       UPDATEDATE POP_CLASS
1         142        142 2014-10-14 15:44 2014-10-14 16:02
2         142        142 2014-08-21 18:13 2014-10-23 15:20
3         142        142 2014-08-21 18:13 2014-10-23 15:20
4         142        142 2014-08-21 18:13 2014-08-21 18:13
5         142        142 2014-08-21 18:13 2014-10-23 15:20
6         142        142 2014-08-21 18:13 2014-10-23 15:20
7         142        142 2014-08-21 18:13 2014-10-23 15:20
8         142        142 2014-08-21 18:13 2014-10-23 15:20
9         142        142 2014-08-21 18:13 2014-10-23 15:20
10        142        142 2014-08-21 18:13 2014-10-23 15:20
11        142        142 2014-08-21 18:13 2014-08-21 18:13
12        142        142 2014-08-21 18:13 2014-10-23 15:20
13        142        142 2014-08-21 18:13 2014-10-23 15:20
14        142        142 2014-08-21 18:13 2014-10-23 15:20
15        142        142 2014-08-21 18:13 2014-10-23 15:20
16        142        142 2014-08-21 18:13 2014-10-23 15:20
17        142        142 2014-08-21 18:13 2014-10-23 15:20
18        142        142 2014-08-21 18:13 2014-10-23 15:20
19        142        142 2014-08-21 18:13 2014-08-21 18:13
20        142        142 2014-08-21 18:13 2014-10-23 15:20
   METHOD_CLASS SNP3D        GI
1      sequence        587776805
```

```
2       sequence        578192771
3       sequence        578155528
4       sequence        578138670
5       sequence        578108865
6       sequence        578046124
7       sequence        577933020
8       sequence        577787590
9       sequence        577767674
10      sequence        577608686
11      sequence        577560557
12      sequence        577523466
13      sequence        577467099
14      sequence        577449121
15      sequence        577329788
16      sequence        577272317
17      sequence        577260523
18      sequence        577200967
19      sequence        577121666
20      sequence        577083829
runQuery(2064, "snp", bySymbol = FALSE)
   query     SNP_ID Organism ALLELE_ORIGIN  GLOBAL_MAF GLOBAL_POPULATION
1   2064 587776805
2   2064 578192771                          T=0.0002/1
3   2064 578155528                          G=0.0002/1
4   2064 578138670
5   2064 578108865                          T=0.0002/1
6   2064 578046124                          T=0.0002/1
7   2064 577933020                          C=0.0068/34
8   2064 577787590                          G=0.0004/2
9   2064 577767674                          C=0.0166/83
10  2064 577608686                          T=0.0002/1
11  2064 577560557
12  2064 577523466                          A=0.0002/1
13  2064 577467099                          G=0.0002/1
14  2064 577449121                          T=0.0004/2
15  2064 577329788                          G=0.0002/1
16  2064 577272317                          T=0.0008/4
17  2064 577260523                          T=0.0002/1
18  2064 577200967                          T=0.0002/1
19  2064 577121666
20  2064 577083829                          G=0.0002/1
   GLOBAL_SAMPLESIZE SUSPECTED CLINICAL_SIGNIFICANCE GENE LOCUS_ID
1                  0
2                  0
3                  0
4                  0
5                  0
6                  0
7                  0
8                  0
9                  0
10                 0
11                 0
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12                 0
13                 0
14                 0
15                 0
16                 0
17                 0
18                 0
19                 0
20                 0

1                                                                                       NM_001005862.1,N
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15                                                                                                  NM_0
16
17 NM_001005862.1,NM_001005862.2,NM_001289936.1,NM_001289937.1,NM_001289938.1,NM_004448.2,NM_0044
18
19
20
   CHR WEIGHT               HANDLE
1   17      1 OMIM-CURATED-RECORDS
2   17      1          1000GENOMES
3   17      1          1000GENOMES
4   17      1            JMKIDD_LAB
5   17      1          1000GENOMES
6   17      1          1000GENOMES
7   17      1          1000GENOMES
8   17      1 1000GENOMES,EVA-GONL
9   17      1          1000GENOMES
10  17      1          1000GENOMES
11  17      1             EVA-GONL
12  17      1          1000GENOMES
13  17      1          1000GENOMES
14  17      1          1000GENOMES
15  17      1          1000GENOMES
16  17      1          1000GENOMES
17  17      1          1000GENOMES
18  17      1          1000GENOMES
19  17      1             EVA-GONL
20  17      1          1000GENOMES
                                         FXN_CLASS
1  cds-indel,nc-transcript-variant,upstream-variant-2KB
```

```
2                                        intron-variant
3                                        intron-variant
4                                        intron-variant
5                   intron-variant,upstream-variant-2KB
6                                        intron-variant
7                   intron-variant,upstream-variant-2KB
8                   intron-variant,upstream-variant-2KB
9                   intron-variant,upstream-variant-2KB
10                                       intron-variant
11                                       intron-variant
12                                       intron-variant
13                                       intron-variant
14                                       intron-variant
15    nc-transcript-variant,reference,synonymous-codon
16                                       intron-variant
17    nc-transcript-variant,reference,synonymous-codon
18                  intron-variant,upstream-variant-2KB
19                                       intron-variant
20                                       intron-variant
                      VALIDATED GTYPE NONREF
1                        no-info        false
2                        by-1000G       false
3                        by-1000G       false
4                        no-info        false
5                        by-1000G       false
6                        by-1000G       false
7             by-1000G,by-frequency     false
8   by-1000G,by-cluster,by-frequency    false
9             by-1000G,by-frequency     false
10                       by-1000G       false
11                       no-info        false
12                       by-1000G       false
13                       by-1000G       false
14            by-1000G,by-frequency     false
15                       by-1000G       false
16            by-1000G,by-frequency     false
17                       by-1000G       false
18                       by-1000G       false
19                       no-info        false
20                       by-1000G       false

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13
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16
17 HGVS=NC_000017.10:g.37866134C>T,NC_000017.11:g.39709881C>T,NG_007503.1:g.26742C>T,NM_001005862
18
19
20
   HET SRATE TAX_ID
1    0     0   9606
2    0     0   9606
3    0     0   9606
4    0     0   9606
5    0     0   9606
6    0     0   9606
7    1     0   9606
8    0     0   9606
9    3     0   9606
10   0     0   9606
11   0     0   9606
12   0     0   9606
13   0     0   9606
14   0     0   9606
15   0     0   9606
16   0     0   9606
17   0     0   9606
18   0     0   9606
19   0     0   9606
20   0     0   9606

1                               587776805|2|0|1|1|1|17|NT_010783.16|12788773|39724754|MIR4728,
2          578192771|2|0|1|1|1|17|NT_010783.16|12764467|39700448|ERBB2|0.000399282|0.0141238| |32
3          578155528|2|0|1|1|1|17|NT_010783.16|12771726|39707707|ERBB2|0.000399282|0.0141238| |32
4                               578138670|2|0|1|1|1|17|NT_010783.16|12773079|39709060|
5          578108865|2|0|1|1|1|17|NT_010783.16|12763842|39699823|ERBB2|0.000399282|0.0141238| |32
6          578046124|2|0|1|1|1|17|NT_010783.16|12785790|39721771|ERBB2|0.000399282|0.0141238| |32
7           577933020|2|0|1|1|1|17|NT_010783.16|12755976|39691957|ERBB2|0.0134861|0.0810011| |34
8          577787590|2|0|1|1|1|17|NT_010783.16|12755550|39691531|ERBB2|0.000798403|0.0199641| |35
9       577767674|2|0|1|1|1|17|NT_010783.16|12750567|39686548|ERBB2,PGAP3|0.0325976|0.123435| |34
10         577608686|2|0|1|1|1|17|NT_010783.16|12765751|39701732|ERBB2|0.000399282|0.0141238| |32
11                              577560557|2|0|1|1|1|17|NT_010783.16|12785093|39721074|
12         577523466|2|0|1|1|1|17|NT_010783.16|12780756|39716737|ERBB2|0.000399282|0.0141238| |32
13         577467099|2|0|1|1|1|17|NT_010783.16|12788146|39724127|ERBB2|0.000399282|0.0141238| |32
14         577449121|2|0|1|1|1|17|NT_010783.16|12779743|39715724|ERBB2|0.000798403|0.0199641| |34
15         577329788|2|0|1|1|1|17|NT_010783.16|12787359|39723340|ERBB2|0.000399282|0.0141238| |32
16          577272317|2|0|1|1|1|17|NT_010783.16|12767947|39703928|ERBB2|0.00159617|0.0282053| |34
17         577260523|2|0|1|1|1|17|NT_010783.16|12773900|39709881|ERBB2|0.000399282|0.0141238| |32
18 577200967|2|0|1|1|1|17|NT_010783.16|12788692|39724673|MIR4728,ERBB2|0.000399282|0.0141238| |32
19                              577121666|2|0|1|1|1|17|NT_010783.16|12775246|39711227|
20         577083829|2|0|1|1|1|17|NT_010783.16|12760926|39696907|ERBB2|0.000399282|0.0141238| |32
   ORIG_BUILD UPD_BUILD      CREATEDATE        UPDATEDATE POP_CLASS
1         142        142 2014-10-14 15:44 2014-10-14 16:02
2         142        142 2014-08-21 18:13 2014-10-23 15:20
```

```
3        142        142 2014-08-21 18:13 2014-10-23 15:20
4        142        142 2014-08-21 18:13 2014-08-21 18:13
5        142        142 2014-08-21 18:13 2014-10-23 15:20
6        142        142 2014-08-21 18:13 2014-10-23 15:20
7        142        142 2014-08-21 18:13 2014-10-23 15:20
8        142        142 2014-08-21 18:13 2014-10-23 15:20
9        142        142 2014-08-21 18:13 2014-10-23 15:20
10       142        142 2014-08-21 18:13 2014-10-23 15:20
11       142        142 2014-08-21 18:13 2014-08-21 18:13
12       142        142 2014-08-21 18:13 2014-10-23 15:20
13       142        142 2014-08-21 18:13 2014-10-23 15:20
14       142        142 2014-08-21 18:13 2014-10-23 15:20
15       142        142 2014-08-21 18:13 2014-10-23 15:20
16       142        142 2014-08-21 18:13 2014-10-23 15:20
17       142        142 2014-08-21 18:13 2014-10-23 15:20
18       142        142 2014-08-21 18:13 2014-10-23 15:20
19       142        142 2014-08-21 18:13 2014-08-21 18:13
20       142        142 2014-08-21 18:13 2014-10-23 15:20
   METHOD_CLASS SNP3D        GI
1      sequence       587776805
2      sequence       578192771
3      sequence       578155528
4      sequence       578138670
5      sequence       578108865
6      sequence       578046124
7      sequence       577933020
8      sequence       577787590
9      sequence       577767674
10     sequence       577608686
11     sequence       577560557
12     sequence       577523466
13     sequence       577467099
14     sequence       577449121
15     sequence       577329788
16     sequence       577272317
17     sequence       577260523
18     sequence       577200967
19     sequence       577121666
20     sequence       577083829
```

A siple way to run multiple queries is to call `runQuery` within a loop, e.g. `lapply`:

```
# Multiple queries
ids <- c("egfr", "erbb2", "fgfr1")
annots <- lapply(ids, function(id) runQuery(id, "gene") )
annots <- do.call(rbind, annots)
annots
     query  Name                        Description Orgname Status
//Id   egfr   EGFR   epidermal growth factor receptor              0
//Id1 erbb2 ERBB2    erb-b2 receptor tyrosine kinase 2             0
//Id2 fgfr1 FGFR1 fibroblast growth factor receptor 1             0
     CurrentID Chromosome GeneticSource    MapLocation
//Id          0          7       genomic          7p12
```

```
//Id1       0        17      genomic             17q12
//Id2       0         8      genomic 8p11.23-p11.22
                                                                         Other
//Id                                               ERBB, ERBB1, HER1, NISBD2, PIG6
//Id1                                       CD340, HER-2, HER-2/neu, HER2, MLN 19, NEU, NG
//Id2 BFGFR, CD331, CEK, FGFBR, FGFR-1, FLG, FLT-2, FLT2, HBGFR, HH2, HRTFDS, KAL2, N-SAM, OGD, b

//Id
//Id1 c-erb B2/neu protein|herstatin|human epidermal growth factor receptor 2|metastatic lymph no
//Id2
     NomenclatureSymbol                    NomenclatureName
//Id               EGFR    epidermal growth factor receptor
//Id1             ERBB2   erb-b2 receptor tyrosine kinase 2
//Id2             FGFR1 fibroblast growth factor receptor 1
     NomenclatureStatus TaxID    Mim     int
//Id           Official        131550 131550
//Id1          Official        164870 164870
//Id2          Official        136350 136350
                          GenomicInfo               GenomicInfoType
//Id   7NC_000007.14550190315520733730  7NC_000007.14550190315520733730
//Id1 17NC_000017.11396880833972866132 17NC_000017.11396880833972866132
//Id2  8NC_000008.11384688333841113724  8NC_000008.11384688333841113724
     ChrLoc    ChrAccVer ChrStart  ChrStop ExonCount GeneWeight
//Id       7 NC_000007.14 55019031 55207337       30     540739
//Id1     17 NC_000017.11 39688083 39728661       32     292128
//Id2      8 NC_000008.11 38468833 38411137       24      48969

//Id
//Id1
//Id2 The protein encoded by this gene is a member of the fibroblast growth factor receptor (FGFR
     ChrSort ChrStart              Organism ScientificName CommonName
//Id      07 55019031 Homo sapienshuman9606   Homo sapiens      human
//Id1     17 39688083 Homo sapienshuman9606   Homo sapiens      human
//Id2     08 38411137 Homo sapienshuman9606   Homo sapiens      human
      GI
//Id  1956
//Id1 2064
//Id2 2260
```

3   Accessing R code

R source code for `webQueries` is available on github: `https://github.com/fredcommo/webQueries`

References

[1]   URL: http://www.ncbi.nlm.nih.gov/books/NBK25500/.