

# HowTo: Build and use chromosomal information

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## 1 Overview

The `annotate` package provides a class that can be used to model chromosomal information about a species, using one of the metadata packages provided by Bioconductor. This class contains information about the organism and its chromosomes and provides a standardized interface to the information in the metadata packages for other software to quickly extract necessary chromosomal information. An example of using `chromLocation` objects in other software can be found with the `alongChrom` function of the `geneplotter` package in Bioconductor.

## 2 The `chromLocation` class

The `chromLocation` class is used to provide a structure for chromosomal data of a particular organism. In this section, we will discuss the various slots of the class and the methods for interacting with them. Before this though, we will create an object of class `chromLocation` for demonstration purposes later. The helper function `buildChromLocation` is used, and it takes as an argument the name of a Bioconductor metadata package, which is itself used to extract the data. For this vignette, we will be using the `hgu95av2.db` package.

```
> library("annotate")
> z <- buildChromLocation("hgu95av2")
> z
```

Instance of a `chromLocation` class with the following fields:

```
Organism: Homo sapiens
Data source: hgu95av2
Number of chromosomes for this organism: 711
Chromosomes of this organism and their lengths in base pairs:
  1 : 248956422
  2 : 242193529
  3 : 198295559
  4 : 190214555
  5 : 181538259
```

6 : 170805979  
7 : 159345973  
X : 156040895  
8 : 145138636  
9 : 138394717  
11 : 135086622  
10 : 133797422  
12 : 133275309  
13 : 114364328  
14 : 107043718  
15 : 101991189  
16 : 90338345  
17 : 83257441  
18 : 80373285  
20 : 64444167  
19 : 58617616  
Y : 57227415  
22 : 50818468  
21 : 46709983  
8\_KZ208915v1\_fix : 6367528  
15\_ML143371v1\_fix : 5500449  
15\_KI270905v1\_alt : 5161414  
15\_KN538374v1\_fix : 4998962  
6\_GL000256v2\_alt : 4929269  
6\_GL000254v2\_alt : 4827813  
6\_GL000251v2\_alt : 4795265  
6\_GL000253v2\_alt : 4677643  
6\_GL000250v2\_alt : 4672374  
6\_GL000255v2\_alt : 4606388  
6\_GL000252v2\_alt : 4604811  
17\_KI270857v1\_alt : 2877074  
16\_KI270853v1\_alt : 2659700  
15\_KQ031389v1\_alt : 2365364  
5\_MU273354v1\_fix : 2101585  
16\_KV880768v1\_fix : 1927115  
16\_KI270728v1\_random : 1872759  
17\_GL000258v2\_alt : 1821992  
5\_GL339449v2\_alt : 1612928  
1\_MU273333v1\_fix : 1572686  
14\_KI270847v1\_alt : 1511111  
17\_KI270908v1\_alt : 1423190  
14\_KI270846v1\_alt : 1351393  
15\_MU273374v1\_fix : 1154574  
5\_KI270897v1\_alt : 1144418  
7\_KI270803v1\_alt : 1111570  
19\_GL949749v2\_alt : 1091841

19\_KI270938v1\_alt : 1066800  
19\_GL949750v2\_alt : 1066390  
19\_GL949748v2\_alt : 1064304  
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21\_MU273391v1\_fix : 1020778  
19\_GL949751v2\_alt : 1002683  
19\_GL949746v1\_alt : 987716  
19\_GL949752v1\_alt : 987100  
8\_KI270821v1\_alt : 985506  
2\_MU273342v1\_fix : 955087  
1\_KI270763v1\_alt : 911658  
6\_KI270801v1\_alt : 870480  
Y\_MU273398v1\_fix : 865743  
1\_MU273331v1\_alt : 847441  
19\_GL949753v2\_alt : 796479  
19\_GL949747v2\_alt : 729520  
14\_MU273373v1\_fix : 722645  
14\_KZ208920v1\_fix : 690932  
7\_KZ208913v1\_alt : 680662  
5\_KV575244v1\_fix : 673059  
8\_KI270822v1\_alt : 624492  
X\_MU273395v1\_alt : 619716  
7\_KZ208912v1\_fix : 589656  
4\_GL000257v2\_alt : 586476  
12\_KI270904v1\_alt : 572349  
9\_MU273366v1\_fix : 569668  
4\_KI270925v1\_alt : 555799  
1\_KV880763v1\_alt : 551020  
12\_KN538369v1\_fix : 541038  
17\_MU273380v1\_fix : 538541  
2\_MU273338v1\_alt : 535251  
2\_KQ983256v1\_alt : 535088  
21\_ML143377v1\_fix : 519485  
1\_MU273330v1\_alt : 516764  
5\_MU273355v1\_fix : 508332  
2\_MU273339v1\_alt : 500581  
19\_ML143376v1\_fix : 493165  
2\_MU273343v1\_fix : 489404  
9\_MU273365v1\_fix : 482250  
2\_KQ031384v1\_fix : 481245  
16\_KZ559113v1\_fix : 480415  
15\_KI270852v1\_alt : 478999  
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1\_KN538360v1\_fix : 460100  
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3\_KN196475v1\_fix : 451168  
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9\_KI270823v1\_alt : 439082  
11\_MU273369v1\_fix : 434831  
2\_MU273337v1\_alt : 431782  
15\_KI270850v1\_alt : 430880  
8\_MU273362v1\_fix : 429744  
1\_KI270759v1\_alt : 425601  
4\_KV766193v1\_alt : 420675  
10\_KN538367v1\_fix : 420164  
3\_KN538364v1\_fix : 415308  
22\_ML143380v1\_fix : 412368  
3\_KV766192v1\_fix : 411654  
13\_ML143366v1\_fix : 409912  
12\_GL877876v1\_alt : 408271  
18\_KQ090028v1\_fix : 407387  
19\_KQ458386v1\_fix : 405389  
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14\_ML143367v1\_fix : 399183  
15\_ML143372v1\_fix : 396515  
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15\_GL383555v2\_alt : 388773  
19\_GL383573v1\_alt : 385657  
6\_MU273357v1\_alt : 383128  
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4\_GL383528v1\_alt : 376187  
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X\_KI270880v1\_alt : 284869  
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17\_MU273379v1\_fix : 234878  
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7\_KI270805v1\_alt : 209988  
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6\_KI270797v1\_alt : 197536  
3\_KI270935v1\_alt : 197351  
11\_KQ759759v1\_fix : 196940  
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10\_MU273367v1\_fix : 196262

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13\_KI270840v1\_alt : 191684  
14\_GL000194v1\_random : 191469  
11\_JH159137v1\_alt : 191409  
19\_KI270917v1\_alt : 190932  
7\_KI270899v1\_alt : 190869  
21\_MU273392v1\_fix : 189707  
19\_KI270923v1\_alt : 189352  
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X\_KV766199v1\_alt : 188004  
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1\_KN196472v1\_fix : 186494  
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19\_KI270916v1\_alt : 184516  
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20\_KI270870v1\_alt : 183433  
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13\_KI270839v1\_alt : 180306  
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3\_KZ208909v1\_alt : 175849  
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19\_GL383574v1\_alt : 155864  
19\_KI270888v1\_alt : 155532  
3\_GL000221v1\_random : 155397  
17\_KV575245v1\_fix : 154723  
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12\_KZ559112v1\_alt : 154139  
2\_KI270716v1\_random : 153799  
22\_KN196486v1\_alt : 153027  
12\_GL383553v2\_alt : 152874  
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22\_KI270731v1\_random : 150754  
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8\_MU273359v1\_fix : 150302  
Un\_KI270750v1 : 148850  
13\_KN538373v1\_fix : 148762  
2\_ML143341v1\_fix : 145975  
19\_KV575260v1\_alt : 145691  
8\_KI270818v1\_alt : 145606  
22\_KQ759761v1\_alt : 145162  
17\_MU273381v1\_fix : 144689  
X\_KI270881v1\_alt : 144206  
21\_KI270873v1\_alt : 143900  
2\_GL383521v1\_alt : 143390  
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8\_KI270814v1\_alt : 141812  
1\_KQ458382v1\_alt : 141019  
11\_KV766195v1\_fix : 140877  
X\_MU273394v1\_fix : 140567  
2\_KZ208908v1\_alt : 140361  
1\_KZ208905v1\_alt : 140355  
6\_KV766194v1\_fix : 139427  
5\_KN196477v1\_alt : 139087  
12\_GL383552v1\_alt : 138655  
Un\_KI270519v1 : 138126  
2\_KI270775v1\_alt : 138019  
17\_ML143374v1\_fix : 137908  
19\_MU273385v1\_fix : 137818  
17\_KI270907v1\_alt : 137721  
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2\_KI270770v1\_alt : 136240

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5\_KI270795v1\_alt : 131892  
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2\_KI270769v1\_alt : 120616  
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12\_KI270834v1\_alt : 119498  
7\_GL383534v2\_alt : 119183  
20\_KI270869v1\_alt : 118774  
17\_KZ559114v1\_alt : 116753  
21\_GL383581v2\_alt : 116689  
4\_MU273350v1\_fix : 113364  
3\_KI270781v1\_alt : 113034  
17\_KI270730v1\_random : 112551  
Un\_KI270438v1 : 112505  
4\_KI270787v1\_alt : 111943  
18\_KI270864v1\_alt : 111737  
2\_KI270771v1\_alt : 110395  
1\_GL383519v1\_alt : 110268  
2\_KI270768v1\_alt : 110099  
1\_KI270760v1\_alt : 109528  
12\_KQ090023v1\_alt : 109323  
3\_KI270783v1\_alt : 109187  
11\_KN196481v1\_fix : 108875  
17\_KI270859v1\_alt : 108763  
8\_MU273361v1\_fix : 106905  
11\_KI270902v1\_alt : 106711  
3\_KZ559104v1\_fix : 105527

18\_GL383568v1\_alt : 104552  
12\_MU273372v1\_fix : 104537  
22\_KI270737v1\_random : 103838  
13\_KI270843v1\_alt : 103832  
8\_KZ559107v1\_alt : 103072  
22\_KI270877v1\_alt : 101331  
5\_GL383530v1\_alt : 101241  
Y\_KN196487v1\_fix : 101150  
22\_KQ759762v2\_fix : 101040  
22\_KQ759762v1\_fix : 101037  
19\_KV575257v1\_alt : 100553  
11\_KI270721v1\_random : 100316  
19\_KV575254v1\_alt : 99845  
22\_KI270738v1\_random : 99375  
15\_ML143369v1\_fix : 97763  
22\_GL383583v2\_alt : 96924  
2\_GL582966v2\_alt : 96131  
Un\_KI270748v1 : 93321  
18\_KZ208922v1\_fix : 93070  
Un\_KI270435v1 : 92983  
5\_GL000208v1\_random : 92689  
Un\_KI270538v1 : 91309  
4\_KQ090013v1\_alt : 90922  
17\_GL383566v1\_alt : 90219  
5\_ML143350v1\_fix : 89956  
16\_GL383557v1\_alt : 89672  
19\_MU273387v1\_alt : 89211  
17\_JH159148v1\_alt : 88070  
16\_MU273376v1\_fix : 87715  
12\_KN538370v1\_fix : 86533  
10\_KN538366v1\_fix : 85284  
2\_ML143342v1\_fix : 84043  
5\_GL383532v1\_alt : 82728  
21\_KI270872v1\_alt : 82692  
6\_KQ090017v1\_alt : 82315  
Un\_KI270756v1 : 79590  
16\_KZ208921v1\_alt : 78609  
6\_KI270758v1\_alt : 76752  
12\_KI270833v1\_alt : 76061  
6\_KI270802v1\_alt : 75005  
21\_GL383580v2\_alt : 74653  
22\_KB663609v1\_alt : 74013  
22\_KI270739v1\_random : 73985  
6\_ML143351v1\_fix : 73265  
9\_GL383540v1\_alt : 71551  
Un\_KI270757v1 : 71251

2\_KI270773v1\_alt : 70887  
17\_JH159147v1\_alt : 70345  
X\_MU273393v1\_fix : 68810  
X\_ML143383v1\_fix : 68192  
11\_KI270827v1\_alt : 67707  
1\_KI270709v1\_random : 66860  
Un\_KI270746v1 : 66486  
13\_ML143365v1\_fix : 65394  
12\_KZ208917v1\_fix : 64689  
16\_KI270856v1\_alt : 63982  
21\_GL383578v2\_alt : 63917  
Un\_KI270753v1 : 62944  
19\_KI270868v1\_alt : 61734  
9\_GL383542v1\_alt : 60032  
16\_KQ090026v1\_alt : 59016  
20\_KI270871v1\_alt : 58661  
17\_ML143375v1\_fix : 56695  
12\_KI270836v1\_alt : 56134  
4\_ML143346v1\_fix : 53476  
19\_KI270865v1\_alt : 52969  
1\_KI270764v1\_alt : 50258  
Y\_KZ208923v1\_fix : 48370  
11\_ML143356v1\_fix : 45257  
1\_KZ559100v1\_fix : 44955  
Un\_KI270589v1 : 44474  
14\_KI270726v1\_random : 43739  
19\_KI270866v1\_alt : 43156  
22\_KI270735v1\_random : 42811  
1\_KI270711v1\_random : 42210  
Un\_KI270745v1 : 41891  
1\_KI270714v1\_random : 41717  
22\_KI270732v1\_random : 41543  
1\_KI270713v1\_random : 40745  
Un\_KI270754v1 : 40191  
1\_KI270710v1\_random : 40176  
12\_KI270837v1\_alt : 40090  
9\_KI270717v1\_random : 40062  
14\_KI270724v1\_random : 39555  
8\_MU273360v1\_fix : 39290  
9\_KI270720v1\_random : 39050  
14\_KI270723v1\_random : 38115  
9\_KI270718v1\_random : 38054  
Un\_KI270317v1 : 37690  
13\_KI270842v1\_alt : 37287  
Y\_KI270740v1\_random : 37240  
Un\_KI270755v1 : 36723

8\_KI270820v1\_alt : 36640  
13\_KN196483v1\_fix : 35455  
5\_MU273352v1\_fix : 34400  
1\_KI270707v1\_random : 32032  
Un\_KI270579v1 : 31033  
X\_ML143382v1\_fix : 28824  
Un\_KI270752v1 : 27745  
9\_ML143353v1\_fix : 25408  
Un\_KI270512v1 : 22689  
Un\_KI270322v1 : 21476  
X\_ML143385v1\_fix : 17435  
M : 16569  
Un\_GL000226v1 : 15008  
X\_ML143384v1\_fix : 14678  
10\_KN538365v1\_fix : 14347  
Un\_KI270311v1 : 12399  
22\_ML143379v1\_fix : 12295  
Un\_KI270366v1 : 8320  
Un\_KI270511v1 : 8127  
Un\_KI270448v1 : 7992  
Un\_KI270521v1 : 7642  
13\_ML143363v1\_fix : 7309  
Un\_KI270581v1 : 7046  
Un\_KI270582v1 : 6504  
Un\_KI270515v1 : 6361  
Un\_KI270588v1 : 6158  
Un\_KI270591v1 : 5796  
Un\_KI270522v1 : 5674  
Un\_KI270507v1 : 5353  
Un\_KI270590v1 : 4685  
Un\_KI270584v1 : 4513  
Un\_KI270320v1 : 4416  
Un\_KI270382v1 : 4215  
Un\_KI270468v1 : 4055  
Un\_KI270467v1 : 3920  
Un\_KI270362v1 : 3530  
Un\_KI270517v1 : 3253  
Un\_KI270593v1 : 3041  
Un\_KI270528v1 : 2983  
Un\_KI270587v1 : 2969  
Un\_KI270364v1 : 2855  
Un\_KI270371v1 : 2805  
Un\_KI270333v1 : 2699  
Un\_KI270374v1 : 2656  
Un\_KI270411v1 : 2646  
Un\_KI270414v1 : 2489

Un\_KI270510v1 : 2415  
Un\_KI270390v1 : 2387  
Un\_KI270375v1 : 2378  
Un\_KI270420v1 : 2321  
Un\_KI270509v1 : 2318  
Un\_KI270315v1 : 2276  
Un\_KI270302v1 : 2274  
Un\_KI270518v1 : 2186  
Un\_KI270530v1 : 2168  
Un\_KI270304v1 : 2165  
Un\_KI270418v1 : 2145  
Un\_KI270424v1 : 2140  
Un\_KI270417v1 : 2043  
Un\_KI270508v1 : 1951  
Un\_KI270303v1 : 1942  
Un\_KI270381v1 : 1930  
Un\_KI270529v1 : 1899  
Un\_KI270425v1 : 1884  
Un\_KI270396v1 : 1880  
Un\_KI270363v1 : 1803  
Un\_KI270386v1 : 1788  
Un\_KI270465v1 : 1774  
Un\_KI270383v1 : 1750  
Un\_KI270384v1 : 1658  
Un\_KI270330v1 : 1652  
Un\_KI270372v1 : 1650  
Un\_KI270548v1 : 1599  
Un\_KI270580v1 : 1553  
Un\_KI270387v1 : 1537  
Un\_KI270391v1 : 1484  
Un\_KI270305v1 : 1472  
Un\_KI270373v1 : 1451  
Un\_KI270422v1 : 1445  
Un\_KI270316v1 : 1444  
Un\_KI270338v1 : 1428  
Un\_KI270340v1 : 1428  
Un\_KI270583v1 : 1400  
Un\_KI270334v1 : 1368  
Un\_KI270429v1 : 1361  
Un\_KI270393v1 : 1308  
Un\_KI270516v1 : 1300  
Un\_KI270389v1 : 1298  
Un\_KI270466v1 : 1233  
Un\_KI270388v1 : 1216  
Un\_KI270544v1 : 1202  
Un\_KI270310v1 : 1201



```

Un_KI270412v1 : 1179
Un_KI270395v1 : 1143
Un_KI270376v1 : 1136
Un_KI270337v1 : 1121
Un_KI270335v1 : 1048
Un_KI270378v1 : 1048
Un_KI270379v1 : 1045
Un_KI270329v1 : 1040
Un_KI270419v1 : 1029
Un_KI270336v1 : 1026
Un_KI270312v1 : 998
Un_KI270539v1 : 993
Un_KI270385v1 : 990
Un_KI270423v1 : 981
Un_KI270392v1 : 971
Un_KI270394v1 : 970

```

Once we have an object of the *chromLocation* class, we can now access its various slots to get the information contained within it. There are six slots in this class:

```

organism:      This lists the organism that this object is describing.
dataSource:    Where this data was acquired from.
chromLocs:     A list with an element for every unique chromosome
               name, where each element contains a named vector where
               the names are probe IDs and the values describe the
               location of that probe on the chromosome. Negative
               values indicate that the location is on the antisense
               strand.
probesToChrom: A hash table which will translate a probe ID to the
               chromosome it belongs to.
chromInfo:     A numerical vector representing each chromosome, where
               the names are the names of the chromosomes and the
               values are the lengths of those chromosomes.
geneSymbols:   An environment that maps a probe ID to the appropriate
               gene symbol.

```

There is a basic 'get' type method for each of these slots, all with the same name as the respective slot. In the following example, we will demonstrate these basic methods. For the `probesToChrom` and `geneSymbols` methods, the return value is an environment which maps a probe ID to other values, we will be using the probe ID '32972\_at', which was selected at random for these examples. We are showing only part of the `chromLocs` method's output as it is quite long in its entirety.

```

> organism(z)

[1] "Homo sapiens"

> dataSource(z)

```

```
[1] "hgu95av2"
```

```
> ## The chromLocs list is extremely large. Let's only  
> ## look at one of the elements.  
> names(chromLocs(z))
```

```
[1] "1" "10" "11"  
[4] "12" "13" "14"  
[7] "15" "16" "17"  
[10] "18" "19" "2"  
[13] "20" "21" "22"  
[16] "22_KI270879v1_alt" "3" "4"  
[19] "5" "6" "7"  
[22] "8" "9" "X"  
[25] "Y" "14_KZ208920v1_fix" "17_KV766198v1_alt"  
[28] "7_KZ208912v1_fix" "17_KI270857v1_alt" "20_KI270869v1_alt"  
[31] "10_KQ090021v1_fix" "17_KV575245v1_fix" "19_KI270867v1_alt"  
[34] "2_KN538363v1_fix" "16_KI270853v1_alt" "15_KI270849v1_alt"  
[37] "1_KQ458383v1_alt" "8_KZ208914v1_fix" "11_KQ759759v1_fix"  
[40] "2_GL383522v1_alt" "13_KI270842v1_alt" "17_GL383564v2_alt"  
[43] "6_GL000251v2_alt" "8_KZ208915v1_fix" "19_KQ458386v1_fix"  
[46] "11_KN196481v1_fix" "11_KI270831v1_alt" "6_GL000254v2_alt"  
[49] "6_GL000256v2_alt" "20_KI270870v1_alt" "19_KI270866v1_alt"  
[52] "8_KI270822v1_alt" "8_KI270819v1_alt" "17_GL383563v3_alt"  
[55] "2_KZ208908v1_alt" "1_GL383519v1_alt" "19_KN196484v1_fix"  
[58] "4_GL000257v2_alt" "2_KI270776v1_alt" "14_KI270846v1_alt"  
[61] "22_KI270875v1_alt" "19_KI270868v1_alt" "8_KI270821v1_alt"  
[64] "16_KZ559113v1_fix" "11_KI270721v1_random" "9_KN196479v1_fix"  
[67] "7_KI270803v1_alt" "15_KI270850v1_alt" "17_JH159146v1_alt"  
[70] "12_KN538369v1_fix" "8_KI270816v1_alt" "14_KI270847v1_alt"  
[73] "16_KQ090026v1_alt" "16_KV880768v1_fix" "11_KI270832v1_alt"  
[76] "17_KI270861v1_alt" "12_KN538370v1_fix" "11_KZ559109v1_fix"  
[79] "3_KN196475v1_fix" "7_KZ208913v1_alt" "22_KQ759762v1_fix"  
[82] "11_KZ559110v1_alt" "1_KZ208904v1_alt" "5_KI270791v1_alt"  
[85] "8_KI270814v1_alt" "18_KQ090028v1_fix" "9_GL383540v1_alt"  
[88] "6_KQ090016v1_fix" "4_GL383527v1_alt" "7_KI270808v1_alt"  
[91] "7_KV880765v1_fix" "5_KV575244v1_fix" "3_KN538364v1_fix"  
[94] "17_KI270862v1_alt" "19_GL383574v1_alt" "22_KI270877v1_alt"  
[97] "12_KZ208916v1_fix" "17_KI270860v1_alt" "1_KI270762v1_alt"  
[100] "4_KQ090015v1_alt" "7_KI270809v1_alt" "10_KI270825v1_alt"  
[103] "1_GL383518v1_alt" "11_KI270830v1_alt" "11_KI270903v1_alt"  
[106] "17_KI270909v1_alt" "8_KI270813v1_alt" "21_KI270873v1_alt"  
[109] "5_KI270795v1_alt" "5_KI270898v1_alt" "7_KI270806v1_alt"  
[112] "6_GL000255v2_alt" "3_KZ559103v1_alt" "12_GL877876v1_alt"  
[115] "12_KI270904v1_alt" "20_KI270871v1_alt" "15_KN538374v1_fix"  
[118] "15_KI270905v1_alt" "17_KI270908v1_alt" "17_GL000258v2_alt"
```

[121]	"11_KI270927v1_alt"	"6_KI270801v1_alt"	"5_GL339449v2_alt"
[124]	"10_GL383546v1_alt"	"11_KZ559111v1_alt"	"13_KN538371v1_fix"
[127]	"19_GL949746v1_alt"	"19_GL949752v1_alt"	"19_KI270938v1_alt"
[130]	"19_GL949747v2_alt"	"19_GL949753v2_alt"	"2_KQ983256v1_alt"
[133]	"1_KI270763v1_alt"	"22_KI270734v1_random"	"12_GL877875v1_alt"
[136]	"15_KQ031389v1_alt"	"1_KV880763v1_alt"	"1_KQ458384v1_alt"
[139]	"2_GL582966v2_alt"	"12_KI270833v1_alt"	"6_GL000252v2_alt"
[142]	"1_KN196474v1_fix"	"19_KI270865v1_alt"	"16_KI270855v1_alt"
[145]	"16_KQ090027v1_alt"	"3_KI270782v1_alt"	"8_KI270817v1_alt"
[148]	"2_KI270768v1_alt"	"11_KI270902v1_alt"	"13_KI270838v1_alt"
[151]	"4_KI270896v1_alt"	"4_KQ983257v1_fix"	"4_KQ983258v1_alt"
[154]	"2_KI270769v1_alt"	"15_KI270851v1_alt"	"21_GL383581v2_alt"
[157]	"16_KI270854v1_alt"	"3_KV766192v1_fix"	"6_GL000250v2_alt"
[160]	"19_GL383575v2_alt"	"9_KI270823v1_alt"	"22_KN196485v1_alt"
[163]	"22_KI270928v1_alt"	"22_GL383582v2_alt"	"22_KB663609v1_alt"
[166]	"21_KI270872v1_alt"	"5_KI270897v1_alt"	"22_KI270876v1_alt"
[169]	"1_KN196473v1_fix"	"6_GL000253v2_alt"	"8_KI270900v1_alt"
[172]	"8_KI270926v1_alt"	"8_KI270818v1_alt"	"8_KI270812v1_alt"
[175]	"3_KQ031385v1_fix"	"2_KI270774v1_alt"	"18_KI270863v1_alt"
[178]	"19_GL383573v1_alt"	"7_GL383534v2_alt"	"6_KZ208911v1_fix"
[181]	"10_KN196480v1_fix"	"12_KI270837v1_alt"	"6_KI270758v1_alt"
[184]	"15_KI270848v1_alt"	"1_GL383520v2_alt"	"22_KQ458387v1_alt"
[187]	"22_KN196486v1_alt"	"22_KQ759761v1_alt"	"22_KQ458388v1_alt"
[190]	"19_GL949748v2_alt"	"19_GL949749v2_alt"	"19_GL949750v2_alt"
[193]	"19_GL949751v2_alt"	"7_KQ031388v1_fix"	"5_KV575243v1_alt"
[196]	"19_KV575250v1_alt"	"19_KI270922v1_alt"	"19_KV575258v1_alt"
[199]	"19_KI270920v1_alt"	"19_KI270917v1_alt"	"19_KI270923v1_alt"
[202]	"19_KI270929v1_alt"	"19_KI270921v1_alt"	"17_KI270910v1_alt"
[205]	"3_KI270934v1_alt"	"3_KI270895v1_alt"	"3_KI270779v1_alt"
[208]	"3_KI270936v1_alt"	"3_KI270935v1_alt"	"3_KI270924v1_alt"
[211]	"3_KI270937v1_alt"	"19_GL000209v2_alt"	"19_KI270882v1_alt"
[214]	"19_KI270883v1_alt"	"19_KI270884v1_alt"	"19_KI270885v1_alt"
[217]	"19_KI270886v1_alt"	"19_KI270887v1_alt"	"19_KI270888v1_alt"
[220]	"19_KI270889v1_alt"	"19_KI270890v1_alt"	"19_KI270891v1_alt"
[223]	"19_KI270914v1_alt"	"19_KI270915v1_alt"	"19_KI270916v1_alt"
[226]	"19_KI270918v1_alt"	"19_KI270919v1_alt"	"19_KI270930v1_alt"
[229]	"19_KI270931v1_alt"	"19_KI270932v1_alt"	"19_KI270933v1_alt"
[232]	"19_KV575246v1_alt"	"19_KV575247v1_alt"	"19_KV575248v1_alt"
[235]	"19_KV575249v1_alt"	"19_KV575251v1_alt"	"19_KV575252v1_alt"
[238]	"19_KV575253v1_alt"	"19_KV575254v1_alt"	"19_KV575255v1_alt"
[241]	"19_KV575256v1_alt"	"19_KV575257v1_alt"	"19_KV575259v1_alt"
[244]	"19_KV575260v1_alt"		

> chromLocs(z)[["Y"]]

31534_at	31911_at	32864_at	32991_f_at	35885_at	36321_at	40030_at
2935380	13703898	-2786854	-6865917	12701230	12662366	7273971

```

41214_at 34172_s_at 34215_at 34753_at 37583_at 37583_at 38182_at
2841601 1591603 1591603 57067864 -19703864 -19705414 19567357
38182_at 40097_at 40097_at 40435_at 40436_g_at 41108_at 938_at
19567357 20575710 20575775 -1386151 -1386151 -304749 57184215
31411_at 31411_at 31411_at 34477_at 34477_at 34477_at 1185_at
22984262 24618003 -25030900 -13248378 -13323033 -13297508 1336784
1185_at 35073_at 35073_at 36553_at 36553_at 36554_at 36554_at
1336615 624343 624343 -1403138 -1403138 -1403138 -1403138
39168_at 39168_at 41138_at 41138_at 38355_at 38355_at 38355_at
-2486434 -2486413 2691294 2691294 12905704 12904785 12904857
38355_at 38355_at 32930_f_at 32930_f_at 32930_f_at 32930_f_at 32930_f_at
12903998 12904867 14524528 14622020 14522615 14523745 14524573
32930_f_at 35447_s_at 35447_s_at 35447_s_at 33665_s_at 33665_s_at 33665_s_at
14523504 1595454 1615132 1615058 1268813 1268813 1268813
33665_s_at
1268813

```

```
> get("32972_at", probesToChrom(z))
```

```
[1] "X"
```

```
> chromInfo(z)
```

```

1 2 3
248956422 242193529 198295559
4 5 6
190214555 181538259 170805979
7 X 8
159345973 156040895 145138636
9 11 10
138394717 135086622 133797422
12 13 14
133275309 114364328 107043718
15 16 17
101991189 90338345 83257441
18 20 19
80373285 64444167 58617616
Y 22 21
57227415 50818468 46709983
8_KZ208915v1_fix 15_ML143371v1_fix 15_KI270905v1_alt
6367528 5500449 5161414
15_KN538374v1_fix 6_GL000256v2_alt 6_GL000254v2_alt
4998962 4929269 4827813
6_GL000251v2_alt 6_GL000253v2_alt 6_GL000250v2_alt
4795265 4677643 4672374
6_GL000255v2_alt 6_GL000252v2_alt 17_KI270857v1_alt
4606388 4604811 2877074

```

16_KI270853v1_alt	15_KQ031389v1_alt	5_MU273354v1_fix
2659700	2365364	2101585
16_KV880768v1_fix	16_KI270728v1_random	17_GL000258v2_alt
1927115	1872759	1821992
5_GL339449v2_alt	1_MU273333v1_fix	14_KI270847v1_alt
1612928	1572686	1511111
17_KI270908v1_alt	14_KI270846v1_alt	15_MU273374v1_fix
1423190	1351393	1154574
5_KI270897v1_alt	7_KI270803v1_alt	19_GL949749v2_alt
1144418	1111570	1091841
19_KI270938v1_alt	19_GL949750v2_alt	19_GL949748v2_alt
1066800	1066390	1064304
12_KZ208916v1_fix	21_MU273391v1_fix	19_GL949751v2_alt
1046838	1020778	1002683
19_GL949746v1_alt	19_GL949752v1_alt	8_KI270821v1_alt
987716	987100	985506
2_MU273342v1_fix	1_KI270763v1_alt	6_KI270801v1_alt
955087	911658	870480
Y_MU273398v1_fix	1_MU273331v1_alt	19_GL949753v2_alt
865743	847441	796479
19_GL949747v2_alt	14_MU273373v1_fix	14_KZ208920v1_fix
729520	722645	690932
7_KZ208913v1_alt	5_KV575244v1_fix	8_KI270822v1_alt
680662	673059	624492
X_MU273395v1_alt	7_KZ208912v1_fix	4_GL000257v2_alt
619716	589656	586476
12_KI270904v1_alt	9_MU273366v1_fix	4_KI270925v1_alt
572349	569668	555799
1_KV880763v1_alt	12_KN538369v1_fix	17_MU273380v1_fix
551020	541038	538541
2_MU273338v1_alt	2_KQ983256v1_alt	21_ML143377v1_fix
535251	535088	519485
1_MU273330v1_alt	5_MU273355v1_fix	2_MU273339v1_alt
516764	508332	500581
19_ML143376v1_fix	2_MU273343v1_fix	9_MU273365v1_fix
493165	489404	482250
2_KQ031384v1_fix	16_KZ559113v1_fix	15_KI270852v1_alt
481245	480415	478999
3_MU273348v1_fix	3_MU273346v1_fix	7_KV880765v1_fix
475876	469342	468267
1_KQ031383v1_fix	7_MU273358v1_alt	22_ML143378v1_fix
467143	464417	461303
1_KN538360v1_fix	10_ML143354v1_fix	3_KN196475v1_fix
460100	454963	451168
15_KI270727v1_random	9_KI270823v1_alt	11_MU273369v1_fix
448248	439082	434831

2_MU273337v1_alt	15_KI270850v1_alt	8_MU273362v1_fix
431782	430880	429744
1_KI270759v1_alt	4_KV766193v1_alt	10_KN538367v1_fix
425601	420675	420164
3_KN538364v1_fix	22_ML143380v1_fix	3_KV766192v1_fix
415308	412368	411654
13_ML143366v1_fix	12_GL877876v1_alt	18_KQ090028v1_fix
409912	408271	407387
19_KQ458386v1_fix	X_ML143381v1_fix	14_ML143367v1_fix
405389	403128	399183
15_ML143372v1_fix	Un_KI270442v1	17_KI270862v1_alt
396515	392061	391357
15_GL383555v2_alt	19_GL383573v1_alt	6_MU273357v1_alt
388773	385657	383128
4_KI270896v1_alt	4_GL383528v1_alt	17_GL383563v3_alt
378547	376187	375691
8_KI270810v1_alt	3_KQ031385v1_fix	17_MU273378v1_alt
374415	373699	372839
19_KN196484v1_fix	15_ML143370v1_fix	1_GL383520v2_alt
370917	369264	366580
2_KN538363v1_fix	5_KV575243v1_alt	13_KN538372v1_fix
365499	362221	356766
20_MU273389v1_fix	1_KI270762v1_alt	1_KQ458383v1_alt
355731	354444	349938
11_MU273370v1_fix	4_ML143345v1_fix	9_MU273364v1_fix
344606	341066	340717
21_MU273390v1_fix	1_MU273332v1_alt	16_MU273377v1_fix
336752	335159	334997
19_MU273384v1_fix	X_MU273397v1_alt	9_KN196479v1_fix
333754	330493	330164
1_KZ208906v1_fix	15_KI270848v1_alt	17_KI270909v1_alt
330031	327382	325800
14_KI270844v1_alt	6_KQ031387v1_fix	8_KI270900v1_alt
322166	320750	318687
12_KQ759760v1_fix	10_GL383546v1_alt	4_MU273349v1_alt
315610	309802	308682
13_KI270838v1_alt	3_KN196476v1_fix	8_KI270816v1_alt
306913	305979	305841
1_KN538361v1_fix	11_KZ559108v1_fix	22_KI270879v1_alt
305542	305244	304135
3_KZ559103v1_alt	5_MU273356v1_alt	11_KZ559110v1_alt
302885	302485	301637
3_MU273347v1_fix	8_KI270813v1_alt	12_ML143361v1_fix
301310	300230	297568
11_KI270831v1_alt	15_GL383554v1_alt	X_MU273396v1_alt
296895	296527	294119

19_KV575249v1_alt	10_ML143355v1_fix	8_KI270811v1_alt
293522	292944	292436
18_GL383567v1_alt	2_MU273340v1_alt	X_KI270880v1_alt
289831	284971	284869
8_KI270812v1_alt	19_KI270921v1_alt	17_KV766196v1_fix
282736	282224	281919
17_KI270729v1_random	11_KZ559109v1_fix	1_KQ983255v1_alt
280839	279644	278659
17_JH159146v1_alt	10_KN196480v1_fix	17_KV766198v1_alt
278131	277797	276292
4_ML143349v1_fix	X_KI270913v1_alt	20_MU273388v1_fix
276109	274009	273725
6_KI270798v1_alt	7_KI270808v1_alt	16_ML143373v1_fix
271782	271455	270967
11_ML143358v1_fix	6_KN196478v1_fix	16_KQ090027v1_alt
270122	268330	267463
8_KV880767v1_fix	10_KQ090021v1_fix	14_ML143368v1_alt
265876	264545	264228
22_KI270876v1_alt	15_KI270851v1_alt	11_MU273368v1_alt
263666	263054	261194
22_KI270875v1_alt	1_KI270766v1_alt	7_ML143352v1_fix
259914	256271	254759
1_MU273336v1_fix	19_KI270882v1_alt	3_KI270778v1_alt
250447	248807	248252
17_KV766197v1_alt	6_KQ090016v1_fix	15_KI270849v1_alt
246895	245716	244917
2_MU273344v1_fix	4_KI270786v1_alt	6_KZ208911v1_fix
244725	244096	242796
19_KV575250v1_alt	12_KI270835v1_alt	4_KQ090015v1_alt
241058	238139	236512
17_KI270858v1_alt	4_ML143344v1_fix	17_MU273379v1_fix
235827	235734	234878
19_KI270867v1_alt	16_KI270855v1_alt	18_KZ559115v1_fix
233762	232857	230843
4_KQ983257v1_fix	8_KI270926v1_alt	5_GL949742v1_alt
230434	229282	226852
19_MU273386v1_fix	3_KI270780v1_alt	17_GL383565v1_alt
226166	224108	223995
2_KI270774v1_alt	19_KV575256v1_alt	4_KI270790v1_alt
223625	223118	220246
11_KI270927v1_alt	11_ML143359v1_fix	19_KI270932v1_alt
218612	217075	215732
3_ML143343v1_alt	11_KI270903v1_alt	2_KI270894v1_alt
215443	214625	214158
1_KQ458384v1_alt	1_MU273335v1_fix	12_KN196482v1_fix
212205	211934	211377

14_GL000225v1_random	Un_KI270743v1	1_MU273334v1_fix
211173	210658	210426
11_KI270832v1_alt	7_KI270805v1_alt	Y_KZ208924v1_fix
210133	209988	209722
4_GL000008v2_random	7_KI270809v1_alt	19_KI270887v1_alt
209709	209586	209512
5_MU273353v1_fix	2_KN538362v1_fix	8_MU273363v1_fix
208405	208149	207371
13_KN538371v1_fix	4_KI270789v1_alt	4_MU273351v1_fix
206320	205944	205691
4_KQ983258v1_alt	3_KI270779v1_alt	19_KI270914v1_alt
205407	205312	205194
18_KQ458385v1_alt	11_KQ759759v2_fix	19_KI270886v1_alt
205101	204999	204239
11_KI270829v1_alt	15_MU273375v1_alt	11_KN538368v1_alt
204059	204007	203552
14_GL000009v2_random	21_GL383579v2_alt	11_JH159136v1_alt
201709	201197	200998
19_KI270930v1_alt	Un_KI270747v1	18_GL383571v1_alt
200773	198735	198278
19_KI270920v1_alt	3_KZ559102v1_alt	6_KI270797v1_alt
198005	197752	197536
3_KI270935v1_alt	11_KQ759759v1_fix	17_KI270861v1_alt
197351	196940	196688
15_KI270906v1_alt	10_MU273367v1_fix	5_KI270791v1_alt
196384	196262	195710
3_KZ559105v1_alt	14_KI270722v1_random	12_ML143362v1_fix
195063	194050	192531
16_GL383556v1_alt	13_KI270840v1_alt	14_GL000194v1_random
192462	191684	191469
11_JH159137v1_alt	19_KI270917v1_alt	7_KI270899v1_alt
191409	190932	190869
21_MU273392v1_fix	19_KI270923v1_alt	10_KI270825v1_alt
189707	189352	188315
19_GL383576v1_alt	X_KV766199v1_alt	19_KI270922v1_alt
188024	188004	187935
17_MU273382v1_fix	Un_KI270742v1	1_KN196472v1_fix
187626	186739	186494
22_KI270878v1_alt	19_KI270929v1_alt	11_KI270826v1_alt
186262	186203	186169
6_KB021644v2_alt	17_GL000205v2_random	10_KQ090020v1_alt
185823	185591	185507
1_KI270765v1_alt	19_KI270916v1_alt	19_KI270890v1_alt
185285	184516	184499
3_KI270784v1_alt	12_GL383551v1_alt	20_KI270870v1_alt
184404	184319	183433



Un_GL000195v1	1_GL383518v1_alt	11_KQ090022v1_fix
182896	182439	181958
22_KI270736v1_random	2_KZ208907v1_alt	10_KI270824v1_alt
181920	181658	181496
11_KZ559111v1_alt	14_KI270845v1_alt	3_GL383526v1_alt
181167	180703	180671
13_KI270839v1_alt	7_KQ031388v1_fix	22_KI270733v1_random
180306	179932	179772
Un_GL000224v1	10_GL383545v1_alt	Un_GL000219v1
179693	179254	179198
5_KI270792v1_alt	17_KI270860v1_alt	19_KV575252v1_alt
179043	178921	178197
19_GL000209v2_alt	11_KI270830v1_alt	9_KI270719v1_random
177381	177092	176845
4_ML143347v1_fix	Un_GL000216v2	22_KI270928v1_alt
176674	176608	176103
1_KI270712v1_random	3_KZ208909v1_alt	6_KI270800v1_alt
176043	175849	175808
1_KI270706v1_random	12_KZ208918v1_alt	22_KQ458388v1_alt
175055	174808	174749
2_MU273345v1_fix	2_KI270776v1_alt	18_KI270912v1_alt
174385	174166	174061
3_KI270777v1_alt	5_GL383531v1_alt	3_JH636055v2_alt
173649	173459	173151
14_KI270725v1_random	5_KI270796v1_alt	17_MU273383v1_fix
172810	172708	172609
7_KZ559106v1_alt	14_KZ208919v1_alt	9_GL383541v1_alt
172555	171798	171286
19_KV575259v1_alt	19_KI270885v1_alt	11_ML143360v1_fix
171263	171027	170928
19_KI270919v1_alt	19_KI270889v1_alt	19_KI270891v1_alt
170701	170698	170680
19_KI270915v1_alt	19_KI270933v1_alt	19_KI270883v1_alt
170665	170537	170399
19_GL383575v2_alt	19_KV575247v1_alt	19_KI270931v1_alt
170222	170206	170148
12_GL383550v2_alt	16_KQ031390v1_alt	13_KI270841v1_alt
169178	169136	169134
Un_KI270744v1	13_KQ090024v1_alt	19_KV575248v1_alt
168472	168146	168131
18_KI270863v1_alt	18_GL383569v1_alt	12_GL877875v1_alt
167999	167950	167313
21_KI270874v1_alt	19_KV575253v1_alt	3_KI270924v1_alt
166743	166713	166540
1_KN196473v1_fix	1_KZ208904v1_alt	1_KI270761v1_alt
166200	166136	165834

3_KQ031386v1_fix	3_KI270937v1_alt	11_ML143357v1_fix
165718	165607	165419
8_KZ208914v1_fix	22_KI270734v1_random	18_GL383570v1_alt
165120	165050	164789
5_KI270794v1_alt	4_GL383527v1_alt	Un_GL000213v1
164558	164536	164239
3_KI270936v1_alt	3_KZ559101v1_alt	19_KV575246v1_alt
164170	164041	163926
9_KQ090018v1_alt	4_KQ090014v1_alt	3_KI270934v1_alt
163882	163749	163458
18_KZ559116v1_alt	9_GL383539v1_alt	3_KI270895v1_alt
163186	162988	162896
22_GL383582v2_alt	3_KI270782v1_alt	1_KI270892v1_alt
162811	162429	162212
Un_GL000220v1	2_KI270767v1_alt	2_KI270715v1_random
161802	161578	161471
2_KI270893v1_alt	Un_GL000218v1	19_KV575255v1_alt
161218	161147	161095
18_GL383572v1_alt	19_KV575251v1_alt	8_KI270817v1_alt
159547	159285	158983
4_KI270788v1_alt	13_ML143364v1_fix	Un_KI270749v1
158965	158944	158759
7_KI270806v1_alt	7_KI270804v1_alt	18_KI270911v1_alt
158166	157952	157710
Un_KI270741v1	17_KI270910v1_alt	19_KI270884v1_alt
157432	157099	157053
8_KV880766v1_fix	19_KV575258v1_alt	22_KN196485v1_alt
156998	156965	156562
22_KQ458387v1_alt	19_GL383574v1_alt	19_KI270888v1_alt
155930	155864	155532
3_GL000221v1_random	17_KV575245v1_fix	11_GL383547v1_alt
155397	154723	154407
12_KZ559112v1_alt	2_KI270716v1_random	22_KN196486v1_alt
154139	153799	153027
12_GL383553v2_alt	6_KI270799v1_alt	22_KI270731v1_random
152874	152148	150754
Un_KI270751v1	8_MU273359v1_fix	Un_KI270750v1
150742	150302	148850
13_KN538373v1_fix	2_ML143341v1_fix	19_KV575260v1_alt
148762	145975	145691
8_KI270818v1_alt	22_KQ759761v1_alt	17_MU273381v1_fix
145606	145162	144689
X_KI270881v1_alt	21_KI270873v1_alt	2_GL383521v1_alt
144206	143900	143390
7_KV880764v1_fix	8_KI270814v1_alt	1_KQ458382v1_alt
142129	141812	141019

11_KV766195v1_fix	X_MU273394v1_fix	2_KZ208908v1_alt
140877	140567	140361
1_KZ208905v1_alt	6_KV766194v1_fix	5_KN196477v1_alt
140355	139427	139087
12_GL383552v1_alt	Un_KI270519v1	2_KI270775v1_alt
138655	138126	138019
17_ML143374v1_fix	19_MU273385v1_fix	17_KI270907v1_alt
137908	137818	137721
Un_GL000214v1	8_KI270901v1_alt	2_KI270770v1_alt
137718	136959	136240
5_KZ208910v1_alt	16_KI270854v1_alt	9_KQ090019v1_alt
135987	134193	134099
8_KI270819v1_alt	17_GL383564v2_alt	2_KI270772v1_alt
133535	133151	133041
8_KI270815v1_alt	5_KI270795v1_alt	5_KI270898v1_alt
132244	131892	130957
20_GL383577v2_alt	1_KI270708v1_random	7_KI270807v1_alt
128386	127682	126434
5_KI270793v1_alt	4_ML143348v1_fix	6_GL383533v1_alt
126136	125549	124736
2_GL383522v1_alt	13_KQ090025v1_alt	19_KI270918v1_alt
123821	123480	123111
11_MU273371v1_fix	1_KN196474v1_fix	12_GL383549v1_alt
122722	122022	120804
2_KI270769v1_alt	2_MU273341v1_fix	4_KI270785v1_alt
120616	120381	119912
12_KI270834v1_alt	7_GL383534v2_alt	20_KI270869v1_alt
119498	119183	118774
17_KZ559114v1_alt	21_GL383581v2_alt	4_MU273350v1_fix
116753	116689	113364
3_KI270781v1_alt	17_KI270730v1_random	Un_KI270438v1
113034	112551	112505
4_KI270787v1_alt	18_KI270864v1_alt	2_KI270771v1_alt
111943	111737	110395
1_GL383519v1_alt	2_KI270768v1_alt	1_KI270760v1_alt
110268	110099	109528
12_KQ090023v1_alt	3_KI270783v1_alt	11_KN196481v1_fix
109323	109187	108875
17_KI270859v1_alt	8_MU273361v1_fix	11_KI270902v1_alt
108763	106905	106711
3_KZ559104v1_fix	18_GL383568v1_alt	12_MU273372v1_fix
105527	104552	104537
22_KI270737v1_random	13_KI270843v1_alt	8_KZ559107v1_alt
103838	103832	103072
22_KI270877v1_alt	5_GL383530v1_alt	Y_KN196487v1_fix
101331	101241	101150

22_KQ759762v2_fix	22_KQ759762v1_fix	19_KV575257v1_alt
101040	101037	100553
11_KI270721v1_random	19_KV575254v1_alt	22_KI270738v1_random
100316	99845	99375
15_ML143369v1_fix	22_GL383583v2_alt	2_GL582966v2_alt
97763	96924	96131
Un_KI270748v1	18_KZ208922v1_fix	Un_KI270435v1
93321	93070	92983
5_GL000208v1_random	Un_KI270538v1	4_KQ090013v1_alt
92689	91309	90922
17_GL383566v1_alt	5_ML143350v1_fix	16_GL383557v1_alt
90219	89956	89672
19_MU273387v1_alt	17_JH159148v1_alt	16_MU273376v1_fix
89211	88070	87715
12_KN538370v1_fix	10_KN538366v1_fix	2_ML143342v1_fix
86533	85284	84043
5_GL383532v1_alt	21_KI270872v1_alt	6_KQ090017v1_alt
82728	82692	82315
Un_KI270756v1	16_KZ208921v1_alt	6_KI270758v1_alt
79590	78609	76752
12_KI270833v1_alt	6_KI270802v1_alt	21_GL383580v2_alt
76061	75005	74653
22_KB663609v1_alt	22_KI270739v1_random	6_ML143351v1_fix
74013	73985	73265
9_GL383540v1_alt	Un_KI270757v1	2_KI270773v1_alt
71551	71251	70887
17_JH159147v1_alt	X_MU273393v1_fix	X_ML143383v1_fix
70345	68810	68192
11_KI270827v1_alt	1_KI270709v1_random	Un_KI270746v1
67707	66860	66486
13_ML143365v1_fix	12_KZ208917v1_fix	16_KI270856v1_alt
65394	64689	63982
21_GL383578v2_alt	Un_KI270753v1	19_KI270868v1_alt
63917	62944	61734
9_GL383542v1_alt	16_KQ090026v1_alt	20_KI270871v1_alt
60032	59016	58661
17_ML143375v1_fix	12_KI270836v1_alt	4_ML143346v1_fix
56695	56134	53476
19_KI270865v1_alt	1_KI270764v1_alt	Y_KZ208923v1_fix
52969	50258	48370
11_ML143356v1_fix	1_KZ559100v1_fix	Un_KI270589v1
45257	44955	44474
14_KI270726v1_random	19_KI270866v1_alt	22_KI270735v1_random
43739	43156	42811
1_KI270711v1_random	Un_KI270745v1	1_KI270714v1_random
42210	41891	41717

22_KI270732v1_random	1_KI270713v1_random	Un_KI270754v1
41543	40745	40191
1_KI270710v1_random	12_KI270837v1_alt	9_KI270717v1_random
40176	40090	40062
14_KI270724v1_random	8_MU273360v1_fix	9_KI270720v1_random
39555	39290	39050
14_KI270723v1_random	9_KI270718v1_random	Un_KI270317v1
38115	38054	37690
13_KI270842v1_alt	Y_KI270740v1_random	Un_KI270755v1
37287	37240	36723
8_KI270820v1_alt	13_KN196483v1_fix	5_MU273352v1_fix
36640	35455	34400
1_KI270707v1_random	Un_KI270579v1	X_ML143382v1_fix
32032	31033	28824
Un_KI270752v1	9_ML143353v1_fix	Un_KI270512v1
27745	25408	22689
Un_KI270322v1	X_ML143385v1_fix	M
21476	17435	16569
Un_GL000226v1	X_ML143384v1_fix	10_KN538365v1_fix
15008	14678	14347
Un_KI270311v1	22_ML143379v1_fix	Un_KI270366v1
12399	12295	8320
Un_KI270511v1	Un_KI270448v1	Un_KI270521v1
8127	7992	7642
13_ML143363v1_fix	Un_KI270581v1	Un_KI270582v1
7309	7046	6504
Un_KI270515v1	Un_KI270588v1	Un_KI270591v1
6361	6158	5796
Un_KI270522v1	Un_KI270507v1	Un_KI270590v1
5674	5353	4685
Un_KI270584v1	Un_KI270320v1	Un_KI270382v1
4513	4416	4215
Un_KI270468v1	Un_KI270467v1	Un_KI270362v1
4055	3920	3530
Un_KI270517v1	Un_KI270593v1	Un_KI270528v1
3253	3041	2983
Un_KI270587v1	Un_KI270364v1	Un_KI270371v1
2969	2855	2805
Un_KI270333v1	Un_KI270374v1	Un_KI270411v1
2699	2656	2646
Un_KI270414v1	Un_KI270510v1	Un_KI270390v1
2489	2415	2387
Un_KI270375v1	Un_KI270420v1	Un_KI270509v1
2378	2321	2318
Un_KI270315v1	Un_KI270302v1	Un_KI270518v1
2276	2274	2186

Un_KI270530v1	Un_KI270304v1	Un_KI270418v1
2168	2165	2145
Un_KI270424v1	Un_KI270417v1	Un_KI270508v1
2140	2043	1951
Un_KI270303v1	Un_KI270381v1	Un_KI270529v1
1942	1930	1899
Un_KI270425v1	Un_KI270396v1	Un_KI270363v1
1884	1880	1803
Un_KI270386v1	Un_KI270465v1	Un_KI270383v1
1788	1774	1750
Un_KI270384v1	Un_KI270330v1	Un_KI270372v1
1658	1652	1650
Un_KI270548v1	Un_KI270580v1	Un_KI270387v1
1599	1553	1537
Un_KI270391v1	Un_KI270305v1	Un_KI270373v1
1484	1472	1451
Un_KI270422v1	Un_KI270316v1	Un_KI270338v1
1445	1444	1428
Un_KI270340v1	Un_KI270583v1	Un_KI270334v1
1428	1400	1368
Un_KI270429v1	Un_KI270393v1	Un_KI270516v1
1361	1308	1300
Un_KI270389v1	Un_KI270466v1	Un_KI270388v1
1298	1233	1216
Un_KI270544v1	Un_KI270310v1	Un_KI270412v1
1202	1201	1179
Un_KI270395v1	Un_KI270376v1	Un_KI270337v1
1143	1136	1121
Un_KI270335v1	Un_KI270378v1	Un_KI270379v1
1048	1048	1045
Un_KI270329v1	Un_KI270419v1	Un_KI270336v1
1040	1029	1026
Un_KI270312v1	Un_KI270539v1	Un_KI270385v1
998	993	990
Un_KI270423v1	Un_KI270392v1	Un_KI270394v1
981	971	970

```
> get("32972_at", geneSymbols(z))
```

```
[1] "NOX1"
```

```
>
```

Another method which can be used to access information about the particular *chromLocation* object is the *nChrom* method, which will list how many chromosomes this organism has:

```
> nChrom(z)
```

[1] 711

### **3 Summary**

The *chromLocation* class has a simple design, but can be powerful if one wants to store the chromosomal data contained in a Bioconductor package into a single object. These objects can be created once and then passed around to multiple functions, which can cut down on computation time to access the desired information from the package. These objects allow access to basic but also important information, and provide a standard interface for writers of other software to access this information.