

# 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: 640
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  
16\_KV880768v1\_fix : 1927115  
16\_KI270728v1\_random : 1872759  
17\_GL000258v2\_alt : 1821992  
5\_GL339449v2\_alt : 1612928  
14\_KI270847v1\_alt : 1511111  
17\_KI270908v1\_alt : 1423190  
14\_KI270846v1\_alt : 1351393  
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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19\_GL949751v2\_alt : 1002683  
19\_GL949746v1\_alt : 987716  
19\_GL949752v1\_alt : 987100  
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1\_KI270763v1\_alt : 911658  
6\_KI270801v1\_alt : 870480  
19\_GL949753v2\_alt : 796479  
19\_GL949747v2\_alt : 729520  
14\_KZ208920v1\_fix : 690932  
7\_KZ208913v1\_alt : 680662  
5\_KV575244v1\_fix : 673059  
8\_KI270822v1\_alt : 624492  
7\_KZ208912v1\_fix : 589656  
4\_GL000257v2\_alt : 586476  
12\_KI270904v1\_alt : 572349  
4\_KI270925v1\_alt : 555799  
1\_KV880763v1\_alt : 551020  
12\_KN538369v1\_fix : 541038  
2\_KQ983256v1\_alt : 535088  
21\_ML143377v1\_fix : 519485  
19\_ML143376v1\_fix : 493165  
2\_KQ031384v1\_fix : 481245  
16\_KZ559113v1\_fix : 480415  
15\_KI270852v1\_alt : 478999  
7\_KV880765v1\_fix : 468267  
1\_KQ031383v1\_fix : 467143  
22\_ML143378v1\_fix : 461303  
1\_KN538360v1\_fix : 460100  
10\_ML143354v1\_fix : 454963  
3\_KN196475v1\_fix : 451168  
15\_KI270727v1\_random : 448248  
9\_KI270823v1\_alt : 439082  
15\_KI270850v1\_alt : 430880  
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  
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19\_KN196484v1\_fix : 370917  
15\_ML143370v1\_fix : 369264  
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2\_KN538363v1\_fix : 365499  
5\_KV575243v1\_alt : 362221  
13\_KN538372v1\_fix : 356766  
1\_KI270762v1\_alt : 354444  
1\_KQ458383v1\_alt : 349938  
4\_ML143345v1\_fix : 341066  
9\_KN196479v1\_fix : 330164  
1\_KZ208906v1\_fix : 330031  
15\_KI270848v1\_alt : 327382  
17\_KI270909v1\_alt : 325800  
14\_KI270844v1\_alt : 322166  
6\_KQ031387v1\_fix : 320750  
8\_KI270900v1\_alt : 318687  
12\_KQ759760v1\_fix : 315610  
10\_GL383546v1\_alt : 309802  
13\_KI270838v1\_alt : 306913  
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1\_KN538361v1\_fix : 305542  
11\_KZ559108v1\_fix : 305244  
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11\_KZ559110v1\_alt : 301637  
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11\_KI270831v1\_alt : 296895  
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11\_KN538368v1\_alt : 203552  
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11\_KI270826v1\_alt : 186169  
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20\_KI270870v1\_alt : 183433  
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10\_KI270824v1\_alt : 181496  
11\_KZ559111v1\_alt : 181167  
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13\_KI270839v1\_alt : 180306  
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19\_KV575252v1\_alt : 178197  
19\_GL000209v2\_alt : 177381  
11\_KI270830v1\_alt : 177092  
9\_KI270719v1\_random : 176845  
4\_ML143347v1\_fix : 176674  
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3\_KZ208909v1\_alt : 175849  
6\_KI270800v1\_alt : 175808  
1\_KI270706v1\_random : 175055  
12\_KZ208918v1\_alt : 174808  
22\_KQ458388v1\_alt : 174749  
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18\_KI270912v1\_alt : 174061  
3\_KI270777v1\_alt : 173649  
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3\_JH636055v2\_alt : 173151  
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13\_KI270841v1\_alt : 169134  
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13\_KQ090024v1\_alt : 168146  
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1\_KN196473v1\_fix : 166200  
1\_KZ208904v1\_alt : 166136  
1\_KI270761v1\_alt : 165834  
3\_KQ031386v1\_fix : 165718  
3\_KI270937v1\_alt : 165607



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3\_KI270936v1\_alt : 164170  
3\_KZ559101v1\_alt : 164041  
19\_KV575246v1\_alt : 163926  
9\_KQ090018v1\_alt : 163882  
4\_KQ090014v1\_alt : 163749  
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3\_KI270895v1\_alt : 162896  
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3\_KI270782v1\_alt : 162429  
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2\_KI270767v1\_alt : 161578  
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4\_KI270788v1\_alt : 158965  
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7\_KI270804v1\_alt : 157952  
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19\_GL383574v1\_alt : 155864  
19\_KI270888v1\_alt : 155532  
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Un\_KI270750v1 : 148850  
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2\_ML143341v1\_fix : 145975  
19\_KV575260v1\_alt : 145691  
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7\_KI270807v1\_alt : 126434  
5\_KI270793v1\_alt : 126136  
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2\_GL383522v1\_alt : 123821  
13\_KQ090025v1\_alt : 123480  
19\_KI270918v1\_alt : 123111  
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12\_GL383549v1\_alt : 120804  
2\_KI270769v1\_alt : 120616  
4\_KI270785v1\_alt : 119912  
12\_KI270834v1\_alt : 119498  
7\_GL383534v2\_alt : 119183  
20\_KI270869v1\_alt : 118774  
17\_KZ559114v1\_alt : 116753  
21\_GL383581v2\_alt : 116689  
3\_KI270781v1\_alt : 113034  
17\_KI270730v1\_random : 112551  
Un\_KI270438v1 : 112505  
4\_KI270787v1\_alt : 111943  
18\_KI270864v1\_alt : 111737  
2\_KI270771v1\_alt : 110395  
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2\_KI270768v1\_alt : 110099  
1\_KI270760v1\_alt : 109528  
12\_KQ090023v1\_alt : 109323  
3\_KI270783v1\_alt : 109187  
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17\_KI270859v1\_alt : 108763  
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3\_KZ559104v1\_fix : 105527  
18\_GL383568v1\_alt : 104552  
22\_KI270737v1\_random : 103838  
13\_KI270843v1\_alt : 103832  
8\_KZ559107v1\_alt : 103072  
22\_KI270877v1\_alt : 101331  
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22\_KQ759762v1\_fix : 101037  
19\_KV575257v1\_alt : 100553  
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19\_KV575254v1\_alt : 99845  
22\_KI270738v1\_random : 99375  
15\_ML143369v1\_fix : 97763  
22\_GL383583v2\_alt : 96924  
2\_GL582966v2\_alt : 96131  
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18\_KZ208922v1\_fix : 93070  
Un\_KI270435v1 : 92983

5\_GL000208v1\_random : 92689  
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12\_KN538370v1\_fix : 86533  
10\_KN538366v1\_fix : 85284  
2\_ML143342v1\_fix : 84043  
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21\_KI270872v1\_alt : 82692  
6\_KQ090017v1\_alt : 82315  
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21\_GL383580v2\_alt : 74653  
22\_KB663609v1\_alt : 74013  
22\_KI270739v1\_random : 73985  
6\_ML143351v1\_fix : 73265  
9\_GL383540v1\_alt : 71551  
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2\_KI270773v1\_alt : 70887  
17\_JH159147v1\_alt : 70345  
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  
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  
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		16_KV880768v1_fix	
2659700		2365364		1927115	
16_KI270728v1_random		17_GL000258v2_alt		5_GL339449v2_alt	
1872759		1821992		1612928	
14_KI270847v1_alt		17_KI270908v1_alt		14_KI270846v1_alt	
1511111		1423190		1351393	
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		19_GL949751v2_alt		19_GL949746v1_alt	
1046838		1002683		987716	
19_GL949752v1_alt		8_KI270821v1_alt		1_KI270763v1_alt	
987100		985506		911658	
6_KI270801v1_alt		19_GL949753v2_alt		19_GL949747v2_alt	
870480		796479		729520	
14_KZ208920v1_fix		7_KZ208913v1_alt		5_KV575244v1_fix	
690932		680662		673059	
8_KI270822v1_alt		7_KZ208912v1_fix		4_GL000257v2_alt	
624492		589656		586476	
12_KI270904v1_alt		4_KI270925v1_alt		1_KV880763v1_alt	
572349		555799		551020	
12_KN538369v1_fix		2_KQ983256v1_alt		21_ML143377v1_fix	
541038		535088		519485	

19_ML143376v1_fix	2_KQ031384v1_fix	16_KZ559113v1_fix
493165	481245	480415
15_KI270852v1_alt	7_KV880765v1_fix	1_KQ031383v1_fix
478999	468267	467143
22_ML143378v1_fix	1_KN538360v1_fix	10_ML143354v1_fix
461303	460100	454963
3_KN196475v1_fix	15_KI270727v1_random	9_KI270823v1_alt
451168	448248	439082
15_KI270850v1_alt	1_KI270759v1_alt	4_KV766193v1_alt
430880	425601	420675
10_KN538367v1_fix	3_KN538364v1_fix	22_ML143380v1_fix
420164	415308	412368
3_KV766192v1_fix	13_ML143366v1_fix	12_GL877876v1_alt
411654	409912	408271
18_KQ090028v1_fix	19_KQ458386v1_fix	X_ML143381v1_fix
407387	405389	403128
14_ML143367v1_fix	15_ML143372v1_fix	Un_KI270442v1
399183	396515	392061
17_KI270862v1_alt	15_GL383555v2_alt	19_GL383573v1_alt
391357	388773	385657
4_KI270896v1_alt	4_GL383528v1_alt	17_GL383563v3_alt
378547	376187	375691
8_KI270810v1_alt	3_KQ031385v1_fix	19_KN196484v1_fix
374415	373699	370917
15_ML143370v1_fix	1_GL383520v2_alt	2_KN538363v1_fix
369264	366580	365499
5_KV575243v1_alt	13_KN538372v1_fix	1_KI270762v1_alt
362221	356766	354444
1_KQ458383v1_alt	4_ML143345v1_fix	9_KN196479v1_fix
349938	341066	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	13_KI270838v1_alt
315610	309802	306913
3_KN196476v1_fix	8_KI270816v1_alt	1_KN538361v1_fix
305979	305841	305542
11_KZ559108v1_fix	22_KI270879v1_alt	3_KZ559103v1_alt
305244	304135	302885
11_KZ559110v1_alt	8_KI270813v1_alt	12_ML143361v1_fix
301637	300230	297568
11_KI270831v1_alt	15_GL383554v1_alt	19_KV575249v1_alt
296895	296527	293522
10_ML143355v1_fix	8_KI270811v1_alt	18_GL383567v1_alt
292944	292436	289831

X_KI270880v1_alt	8_KI270812v1_alt	19_KI270921v1_alt
284869	282736	282224
17_KV766196v1_fix	17_KI270729v1_random	11_KZ559109v1_fix
281919	280839	279644
1_KQ983255v1_alt	17_JH159146v1_alt	10_KN196480v1_fix
278659	278131	277797
17_KV766198v1_alt	4_ML143349v1_fix	X_KI270913v1_alt
276292	276109	274009
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	22_KI270875v1_alt
263666	263054	259914
1_KI270766v1_alt	7_ML143352v1_fix	19_KI270882v1_alt
256271	254759	248807
3_KI270778v1_alt	17_KV766197v1_alt	6_KQ090016v1_fix
248252	246895	245716
15_KI270849v1_alt	4_KI270786v1_alt	6_KZ208911v1_fix
244917	244096	242796
19_KV575250v1_alt	12_KI270835v1_alt	4_KQ090015v1_alt
241058	238139	236512
17_KI270858v1_alt	4_ML143344v1_fix	19_KI270867v1_alt
235827	235734	233762
16_KI270855v1_alt	18_KZ559115v1_fix	4_KQ983257v1_fix
232857	230843	230434
8_KI270926v1_alt	5_GL949742v1_alt	3_KI270780v1_alt
229282	226852	224108
17_GL383565v1_alt	2_KI270774v1_alt	19_KV575256v1_alt
223995	223625	223118
4_KI270790v1_alt	11_KI270927v1_alt	11_ML143359v1_fix
220246	218612	217075
19_KI270932v1_alt	3_ML143343v1_alt	11_KI270903v1_alt
215732	215443	214625
2_KI270894v1_alt	1_KQ458384v1_alt	12_KN196482v1_fix
214158	212205	211377
14_GL000225v1_random	Un_KI270743v1	11_KI270832v1_alt
211173	210658	210133
7_KI270805v1_alt	Y_KZ208924v1_fix	4_GL000008v2_random
209988	209722	209709
7_KI270809v1_alt	19_KI270887v1_alt	2_KN538362v1_fix
209586	209512	208149
13_KN538371v1_fix	4_KI270789v1_alt	4_KQ983258v1_alt
206320	205944	205407

3_KI270779v1_alt	19_KI270914v1_alt	18_KQ458385v1_alt
205312	205194	205101
19_KI270886v1_alt	11_KI270829v1_alt	11_KN538368v1_alt
204239	204059	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	5_KI270791v1_alt	3_KZ559105v1_alt
196384	195710	195063
14_KI270722v1_random	12_ML143362v1_fix	16_GL383556v1_alt
194050	192531	192462
13_KI270840v1_alt	14_GL000194v1_random	11_JH159137v1_alt
191684	191469	191409
19_KI270917v1_alt	7_KI270899v1_alt	19_KI270923v1_alt
190932	190869	189352
10_KI270825v1_alt	19_GL383576v1_alt	X_KV766199v1_alt
188315	188024	188004
19_KI270922v1_alt	Un_KI270742v1	1_KN196472v1_fix
187935	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_KI270776v1_alt	18_KI270912v1_alt	3_KI270777v1_alt
174166	174061	173649
5_GL383531v1_alt	3_JH636055v2_alt	14_KI270725v1_random
173459	173151	172810
5_KI270796v1_alt	7_KZ559106v1_alt	14_KZ208919v1_alt
172708	172555	171798
9_GL383541v1_alt	19_KV575259v1_alt	19_KI270885v1_alt
171286	171263	171027
11_ML143360v1_fix	19_KI270919v1_alt	19_KI270889v1_alt
170928	170701	170698
19_KI270891v1_alt	19_KI270915v1_alt	19_KI270933v1_alt
170680	170665	170537
19_KI270883v1_alt	19_GL383575v2_alt	19_KV575247v1_alt
170399	170222	170206
19_KI270931v1_alt	12_GL383550v2_alt	16_KQ031390v1_alt
170148	169178	169136
13_KI270841v1_alt	Un_KI270744v1	13_KQ090024v1_alt
169134	168472	168146
19_KV575248v1_alt	18_KI270863v1_alt	18_GL383569v1_alt
168131	167999	167950
12_GL877875v1_alt	21_KI270874v1_alt	19_KV575253v1_alt
167313	166743	166713
3_KI270924v1_alt	1_KN196473v1_fix	1_KZ208904v1_alt
166540	166200	166136
1_KI270761v1_alt	3_KQ031386v1_fix	3_KI270937v1_alt
165834	165718	165607
11_ML143357v1_fix	8_KZ208914v1_fix	22_KI270734v1_random
165419	165120	165050
18_GL383570v1_alt	5_KI270794v1_alt	4_GL383527v1_alt
164789	164558	164536
Un_GL000213v1	3_KI270936v1_alt	3_KZ559101v1_alt
164239	164170	164041
19_KV575246v1_alt	9_KQ090018v1_alt	4_KQ090014v1_alt
163926	163882	163749
3_KI270934v1_alt	18_KZ559116v1_alt	9_GL383539v1_alt
163458	163186	162988
3_KI270895v1_alt	22_GL383582v2_alt	3_KI270782v1_alt
162896	162811	162429
1_KI270892v1_alt	Un_GL000220v1	2_KI270767v1_alt
162212	161802	161578

2_KI270715v1_random	2_KI270893v1_alt	Un_GL000218v1
161471	161218	161147
19_KV575255v1_alt	18_GL383572v1_alt	19_KV575251v1_alt
161095	159547	159285
8_KI270817v1_alt	4_KI270788v1_alt	13_ML143364v1_fix
158983	158965	158944
Un_KI270749v1	7_KI270806v1_alt	7_KI270804v1_alt
158759	158166	157952
18_KI270911v1_alt	Un_KI270741v1	17_KI270910v1_alt
157710	157432	157099
19_KI270884v1_alt	8_KV880766v1_fix	19_KV575258v1_alt
157053	156998	156965
22_KN196485v1_alt	22_KQ458387v1_alt	19_GL383574v1_alt
156562	155930	155864
19_KI270888v1_alt	3_GL000221v1_random	17_KV575245v1_fix
155532	155397	154723
11_GL383547v1_alt	12_KZ559112v1_alt	2_KI270716v1_random
154407	154139	153799
22_KN196486v1_alt	12_GL383553v2_alt	6_KI270799v1_alt
153027	152874	152148
22_KI270731v1_random	Un_KI270751v1	Un_KI270750v1
150754	150742	148850
13_KN538373v1_fix	2_ML143341v1_fix	19_KV575260v1_alt
148762	145975	145691
8_KI270818v1_alt	22_KQ759761v1_alt	X_KI270881v1_alt
145606	145162	144206
21_KI270873v1_alt	2_GL383521v1_alt	7_KV880764v1_fix
143900	143390	142129
8_KI270814v1_alt	1_KQ458382v1_alt	11_KV766195v1_fix
141812	141019	140877
2_KZ208908v1_alt	1_KZ208905v1_alt	6_KV766194v1_fix
140361	140355	139427
5_KN196477v1_alt	12_GL383552v1_alt	Un_KI270519v1
139087	138655	138126
2_KI270775v1_alt	17_ML143374v1_fix	17_KI270907v1_alt
138019	137908	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
1_KN196474v1_fix	12_GL383549v1_alt	2_KI270769v1_alt
122022	120804	120616
4_KI270785v1_alt	12_KI270834v1_alt	7_GL383534v2_alt
119912	119498	119183
20_KI270869v1_alt	17_KZ559114v1_alt	21_GL383581v2_alt
118774	116753	116689
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	11_KI270902v1_alt	3_KZ559104v1_fix
108763	106711	105527
18_GL383568v1_alt	22_KI270737v1_random	13_KI270843v1_alt
104552	103838	103832
8_KZ559107v1_alt	22_KI270877v1_alt	5_GL383530v1_alt
103072	101331	101241
Y_KN196487v1_fix	22_KQ759762v1_fix	19_KV575257v1_alt
101150	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
17_JH159148v1_alt	12_KN538370v1_fix	10_KN538366v1_fix
88070	86533	85284
2_ML143342v1_fix	5_GL383532v1_alt	21_KI270872v1_alt
84043	82728	82692
6_KQ090017v1_alt	Un_KI270756v1	16_KZ208921v1_alt
82315	79590	78609
6_KI270758v1_alt	12_KI270833v1_alt	6_KI270802v1_alt
76752	76061	75005
21_GL383580v2_alt	22_KB663609v1_alt	22_KI270739v1_random
74653	74013	73985

6_ML143351v1_fix	9_GL383540v1_alt	Un_KI270757v1
73265	71551	71251
2_KI270773v1_alt	17_JH159147v1_alt	X_ML143383v1_fix
70887	70345	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	9_KI270720v1_random	14_KI270723v1_random
39555	39050	38115
9_KI270718v1_random	Un_KI270317v1	13_KI270842v1_alt
38054	37690	37287
Y_KI270740v1_random	Un_KI270755v1	8_KI270820v1_alt
37240	36723	36640
13_KN196483v1_fix	1_KI270707v1_random	Un_KI270579v1
35455	32032	31033
X_ML143382v1_fix	Un_KI270752v1	9_ML143353v1_fix
28824	27745	25408
Un_KI270512v1	Un_KI270322v1	X_ML143385v1_fix
22689	21476	17435
M	Un_GL000226v1	X_ML143384v1_fix
16569	15008	14678
10_KN538365v1_fix	Un_KI270311v1	22_ML143379v1_fix
14347	12399	12295
Un_KI270366v1	Un_KI270511v1	Un_KI270448v1
8320	8127	7992
Un_KI270521v1	13_ML143363v1_fix	Un_KI270581v1
7642	7309	7046

Un_KI270582v1	Un_KI270515v1	Un_KI270588v1
6504	6361	6158
Un_KI270591v1	Un_KI270522v1	Un_KI270507v1
5796	5674	5353
Un_KI270590v1	Un_KI270584v1	Un_KI270320v1
4685	4513	4416
Un_KI270382v1	Un_KI270468v1	Un_KI270467v1
4215	4055	3920
Un_KI270362v1	Un_KI270517v1	Un_KI270593v1
3530	3253	3041
Un_KI270528v1	Un_KI270587v1	Un_KI270364v1
2983	2969	2855
Un_KI270371v1	Un_KI270333v1	Un_KI270374v1
2805	2699	2656
Un_KI270411v1	Un_KI270414v1	Un_KI270510v1
2646	2489	2415
Un_KI270390v1	Un_KI270375v1	Un_KI270420v1
2387	2378	2321
Un_KI270509v1	Un_KI270315v1	Un_KI270302v1
2318	2276	2274
Un_KI270518v1	Un_KI270530v1	Un_KI270304v1
2186	2168	2165
Un_KI270418v1	Un_KI270424v1	Un_KI270417v1
2145	2140	2043
Un_KI270508v1	Un_KI270303v1	Un_KI270381v1
1951	1942	1930
Un_KI270529v1	Un_KI270425v1	Un_KI270396v1
1899	1884	1880
Un_KI270363v1	Un_KI270386v1	Un_KI270465v1
1803	1788	1774
Un_KI270383v1	Un_KI270384v1	Un_KI270330v1
1750	1658	1652
Un_KI270372v1	Un_KI270548v1	Un_KI270580v1
1650	1599	1553
Un_KI270387v1	Un_KI270391v1	Un_KI270305v1
1537	1484	1472
Un_KI270373v1	Un_KI270422v1	Un_KI270316v1
1451	1445	1444
Un_KI270338v1	Un_KI270340v1	Un_KI270583v1
1428	1428	1400
Un_KI270334v1	Un_KI270429v1	Un_KI270393v1
1368	1361	1308
Un_KI270516v1	Un_KI270389v1	Un_KI270466v1
1300	1298	1233
Un_KI270388v1	Un_KI270544v1	Un_KI270310v1
1216	1202	1201

Un_KI270412v1	Un_KI270395v1	Un_KI270376v1
1179	1143	1136
Un_KI270337v1	Un_KI270335v1	Un_KI270378v1
1121	1048	1048
Un_KI270379v1	Un_KI270329v1	Un_KI270419v1
1045	1040	1029
Un_KI270336v1	Un_KI270312v1	Un_KI270539v1
1026	998	993
Un_KI270385v1	Un_KI270423v1	Un_KI270392v1
990	981	971
Un_KI270394v1		
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] 640
```

### 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.