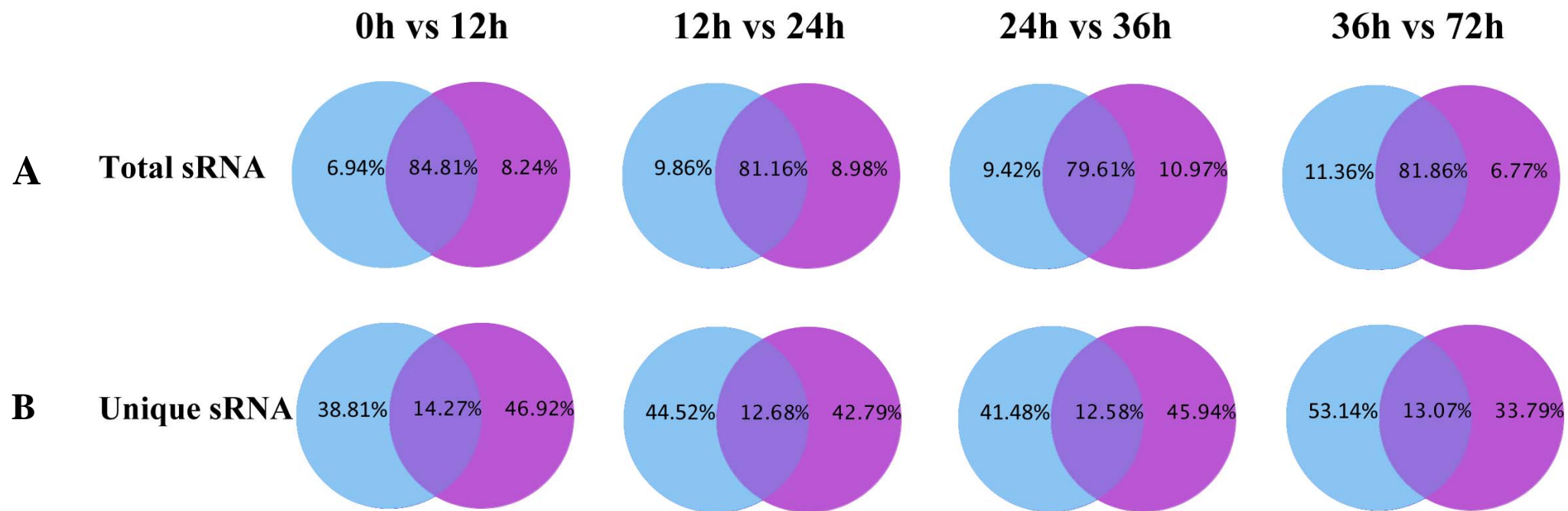


Additional file 1: Figure S1 Size distribution of small RNAs in all five libraries from germinating seed at 0h, 12h, 24h, 36h and 72h.



Additional file 1: Figure S2 Venn chart for total sRNA (A) and unique sRNAs (B) among adjoining stages.

Additional file 1: Figure S3 The secondary structures of sacred lotus novel miRNA precursors. The mature miRNAs are in red and miRNA* in blue. ("." represent baase mismatches, "(" represent base matches).

novel_mir_1

```
TCGATGATGGTCTTACGGGTGTCTTCACCTCCGGAGTTGAAGAACATTATCGGAGATTCGTCGTATTTCCATCGGAGGTGAAGGCCACCCGCTAGATCTTCATCGAT
(((((((.((((.(.((((((((((((((((((((((.(.((...))).....((((((.....)))))).)))))))).))))).))))).))))).))))).
*****TCTTACGGGTGTCTTCACCTC*****
```

novel_mir_10

```
ATCGGGAGGCTGCGGAATGGACGGGTCGGAAACAAAATTCTCGTCTGTGGGATTGTTTTTTGTTTGCTTCCAACCCCGCCATTCCATAGTTTTTCCGA
.(((((((.((((.(.((((((((((((((((((((((.(.((...))).....((((((.....)))))).)))))))).))))).))))).))))).))))).
*****GGAATGGACGGGTCGGAAACA*****
*****CTTCCAACCCCGCCATTCCAT*****
```

novel_mir_102

```
ATAAAGGTAATGATCGGGGATGCACTTTCCTGATGGAAACCAAACCTACCGGCATTTGATCTCAATCATTGGAATTTTTTTTTGTAAAATCTATATATATGATAT
ATACTTACATATGGTTTCAAACATTTGCAAATGGGCTAAGAGGTTAAGTGTAAGGCCATTTAGTCAGGCAGTGCTTGATCATTATCCTAAA
.....(((((((.((((.(.((((((((((((((((((((((.(.((...))).....((((((.....)))))).)))))))).))))).))))).))))).))))).
*****TGATCGGGGATGCACTTTCCTG*****
*****
```

novel_mir_103

```
CATTCCTCGAGGCAAGCCCGATCAAAGTCTATGTTAGGGTCTGAAATTTCTTATTTCTCACATAAAAAATAATAATTTTTTATCAAAAAATAAAAAATAATGA
TTTTATACTTTCATTGCCTTTAAGAAGATATTTTATTGCAATGAATGAATGAACAACATTAGCAAATAAGGGGTTCTCACATAAAAGGCAATGAAAGTTATAA
AATCATTATTTTTTATGTGAGACATAAGAATTTAGACCCTAACATAGACTTGTGGGTTTGCCTCGAGGAGAGT
.((((.(((((((((((((((((((((((((((((((.(.((...))).....((((((.....)))))).)))))))).))))).))))).))))).))))).
*****
```


novel_mir_66

GTGGTCCCTTTATACCTGACTCCCGTCGTTGATAATTTCTGAGGTGTAATTTGTTGGCGTTAAATGAAATCTAGTCTTTTGGCTTCCAAATAAAAGAAATTACAAA
AAAAAAAACACTCATGAAGGATGTATCATTAATTAGTAGTTAAGTATCATTAAACTCATAATTTTAGCATCTGGTGGACGTGCCGGAGTGGTTATCGGGCATG
...(((((((((.....)))))))).)).....)))))...
.....)))))(((((.....)))))).....)))))...)))))...

*****GTGGACGTGCCGGAGTGGTT*****

novel_mir_68

AGTGGTTGAGGTGTCGTCCAGCTTGAGCTTGATTCAAATTAGAGACGCGAGGTGTTGAGCTAAGGCCTCCCTTAGTTGACAAGGTGCTGAGTTGAGGTCTCCCTCAGTTG
TCGAGGTGCTGAGCCGAGACCTCCCTTAGTGACCGAGGTGTCAAGCCGATGTCTCCCTCAGTGGTTGAAGTGTCTGCTAGCTCAAGCTCGATTCTGAATTAA
.....(((((((.....)))))))).(((((.....)))))).....
.....))))).....

*****TGTCGTCTAGCTCAAGCTCGA*****

novel_mir_69

CCATTCGAAGAAAATTTAGTTTCAGATCAGAGATTGGCAATGGAAAGTTTCTTCAATGTGGTTATGTTAAGCTTCTCTTTTGTGTTAGATGTTCTTATTGTTTTC
CTCTGTGGTGATGAAATATGAAAATTCCTTCGCATG
.(((((((.....)))))))).
)))).)))))

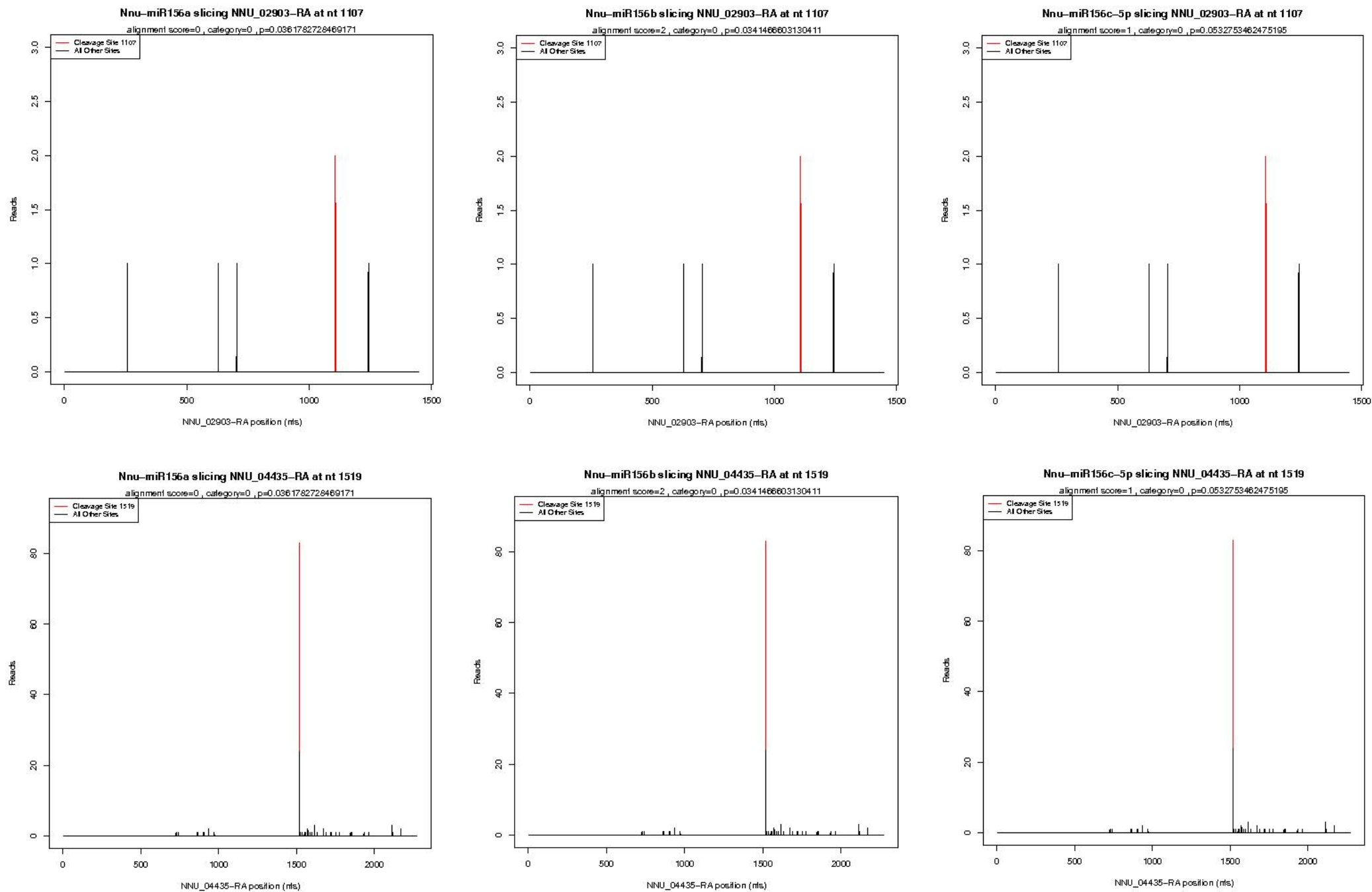
TGTGGTGATGAAATATGAAAAT**

novel_mir_7

AGAACGTCCCCCTTCGAGTTCGCCAGTCAACGCAGATATCCTCCGGCGGCGTCTGACTGGAACGATCGTCGGCGTCTGACTGGCGGAACTCGAAGGGGGCAAGCTC
.....(((((((.....)))))))).
*****TCGACTGGCGGAACTCGAAGG*****

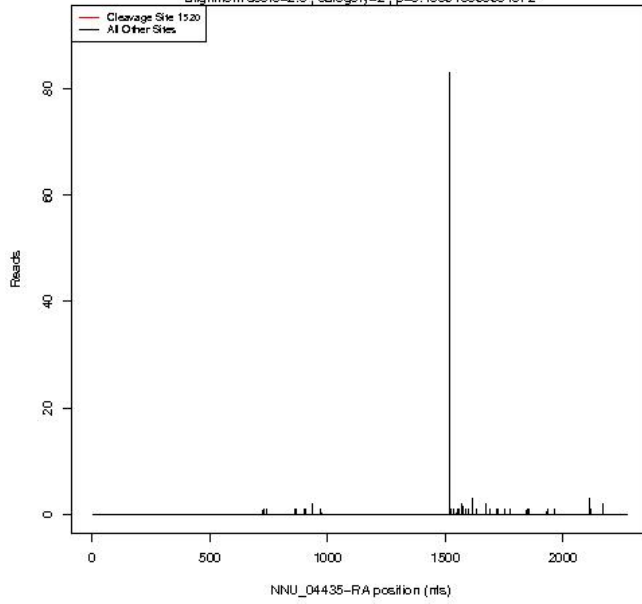
novel_mir_70

Additional file 1: Figure S4 Target plats (T-plots) of identified known and novel miRNA targets using degradome sequencing. The red lines indicate signatures consistent with miRNA-directed cleavage.



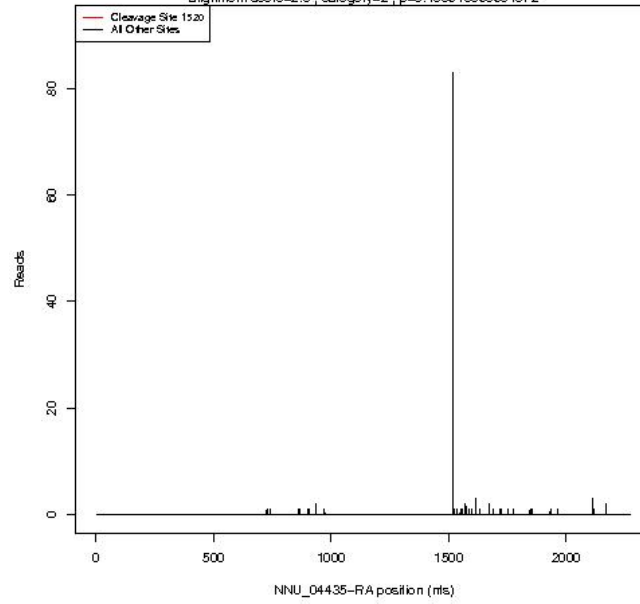
Nnu-miR156d slicing NNU_04435-RA at nt 1520

alignment score=2.5 , category=2 , p=0.483613560604572



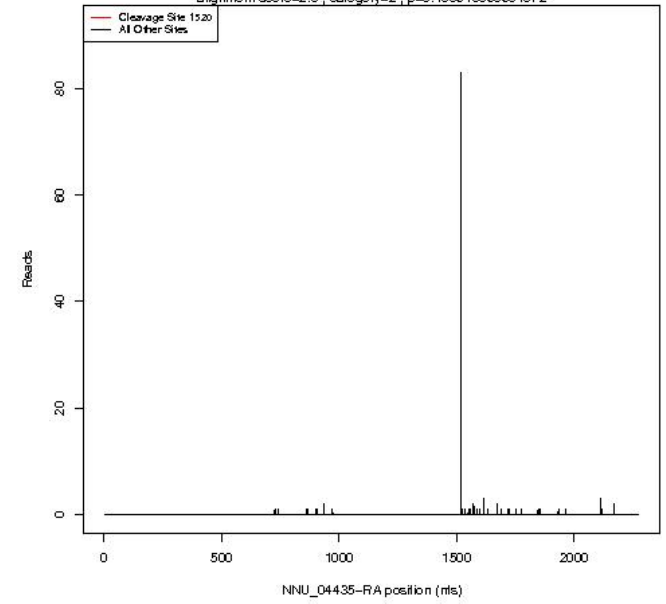
Nnu-miR157a slicing NNU_04435-RA at nt 1520

alignment score=2.5 , category=2 , p=0.483613560604572



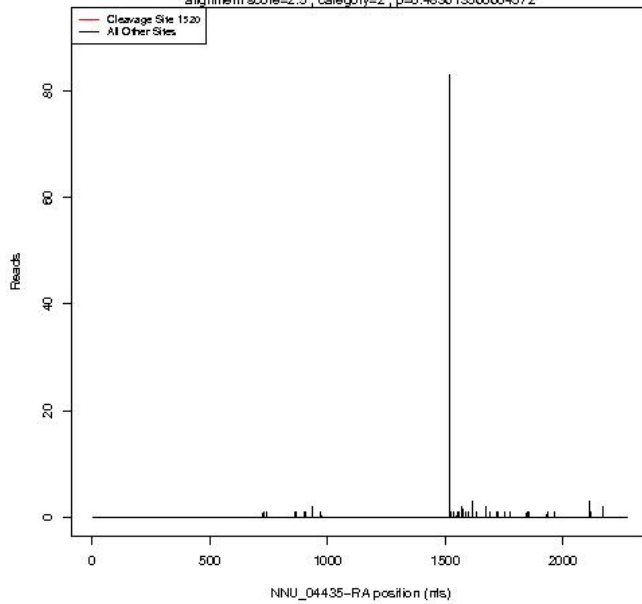
Nnu-miR157b-5p slicing NNU_04435-RA at nt 1520

alignment score=2.5 , category=2 , p=0.483613560604572



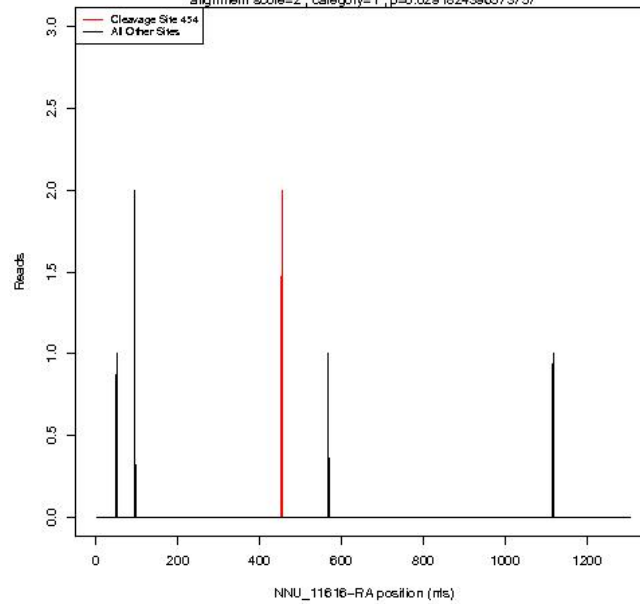
Nnu-miR157c slicing NNU_04435-RA at nt 1520

alignment score=2.5 , category=2 , p=0.483613560604572



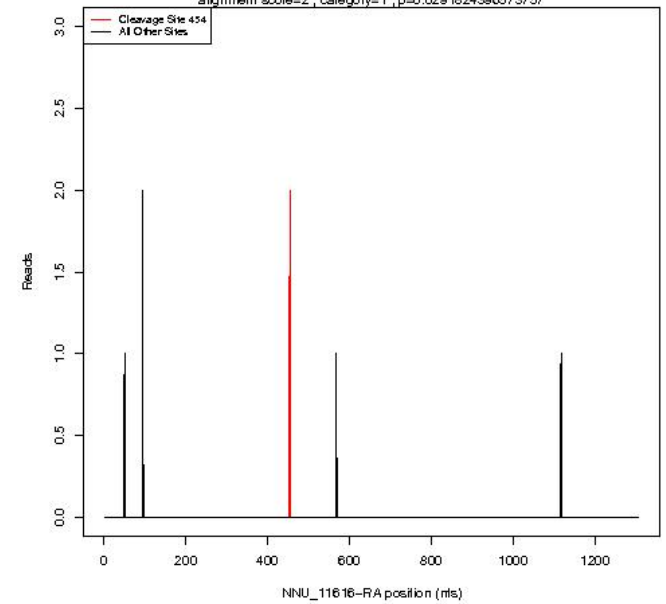
Nnu-miR156d slicing NNU_11616-RA at nt 454

alignment score=2 , category=1 , p=0.0291824396573757



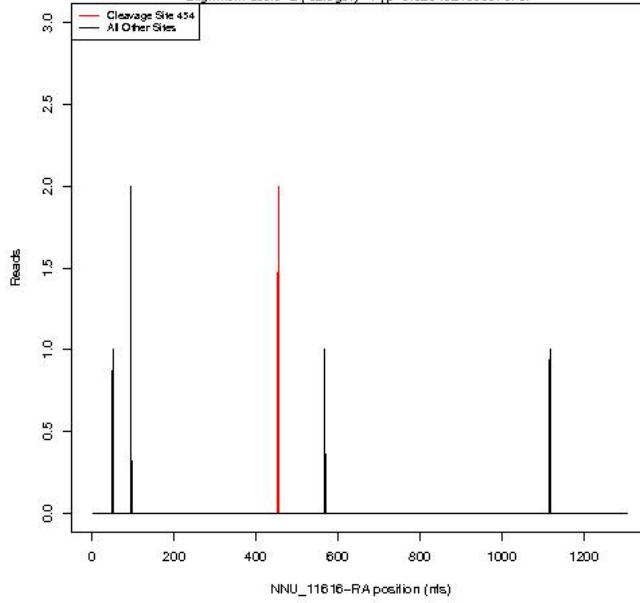
Nnu-miR157a slicing NNU_11616-RA at nt 454

alignment score=2 , category=1 , p=0.0291824396573757



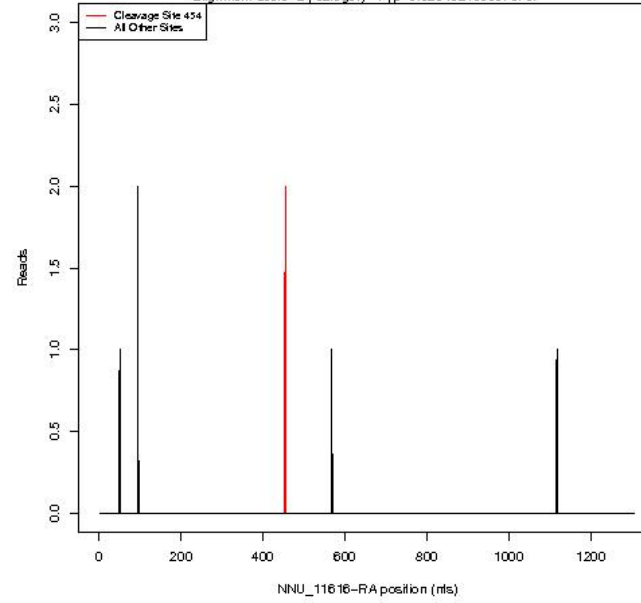
Nnu-miR157b-5p slicing NNU_11616-RA at nt 454

alignment score=2, category=1, p=0.0291824396573757



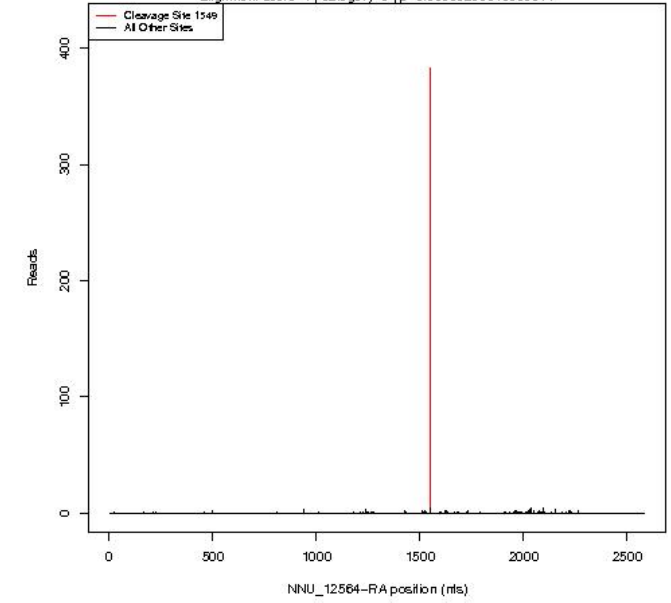
Nnu-miR157c slicing NNU_11616-RA at nt 454

alignment score=2, category=1, p=0.0291824396573757



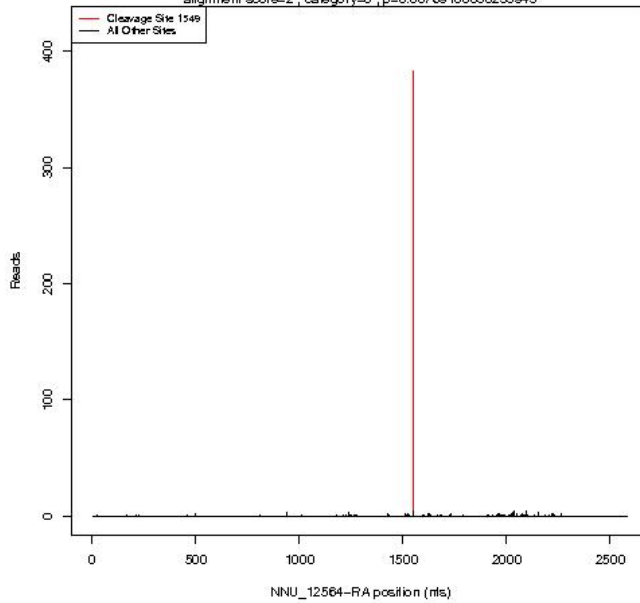
Nnu-miR160a slicing NNU_12564-RA at nt 1549

alignment score=1, category=0, p=0.00908299549868641



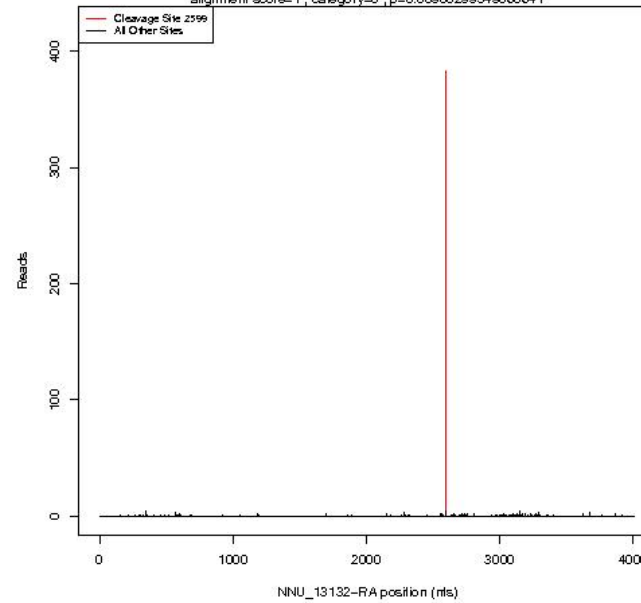
Nnu-miR160b slicing NNU_12564-RA at nt 1549

alignment score=2, category=0, p=0.00769100030255943



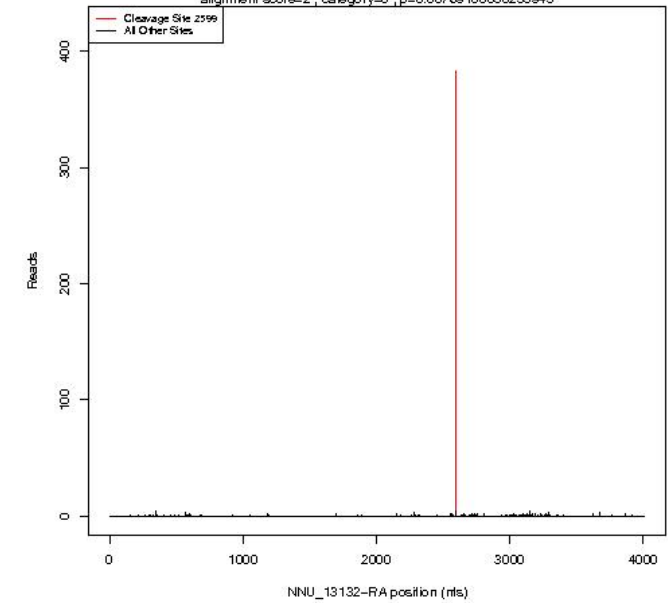
Nnu-miR160a slicing NNU_13132-RA at nt 2599

alignment score=1, category=0, p=0.00908299549868641



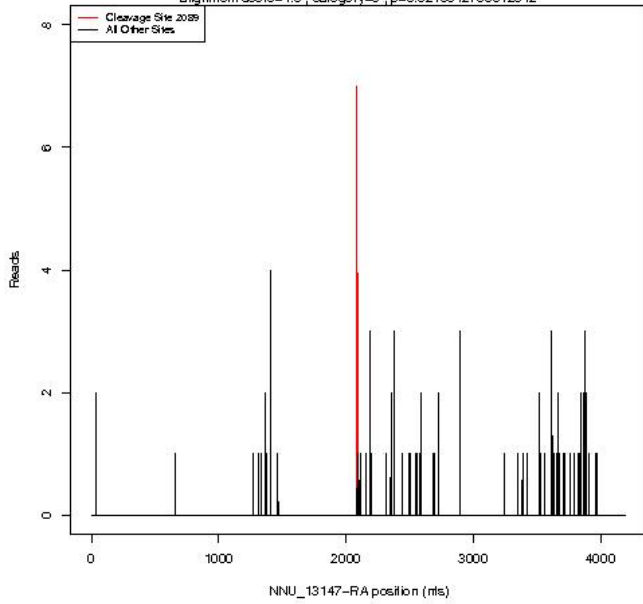
Nnu-miR160b slicing NNU_13132-RA at nt 2599

alignment score=2, category=0, p=0.00769100030255943



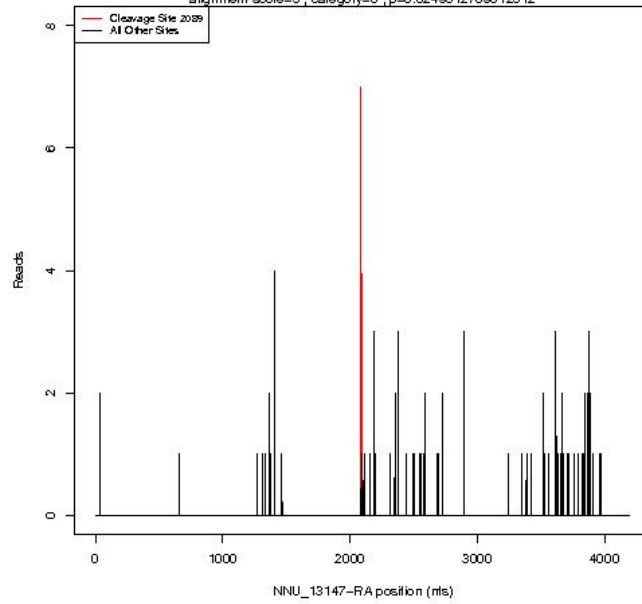
Nnu-miR165a-5p slicing NNU_13147-RA at nt 2089

alignment score=1.5 , category=0 , p=0.0249512789812312



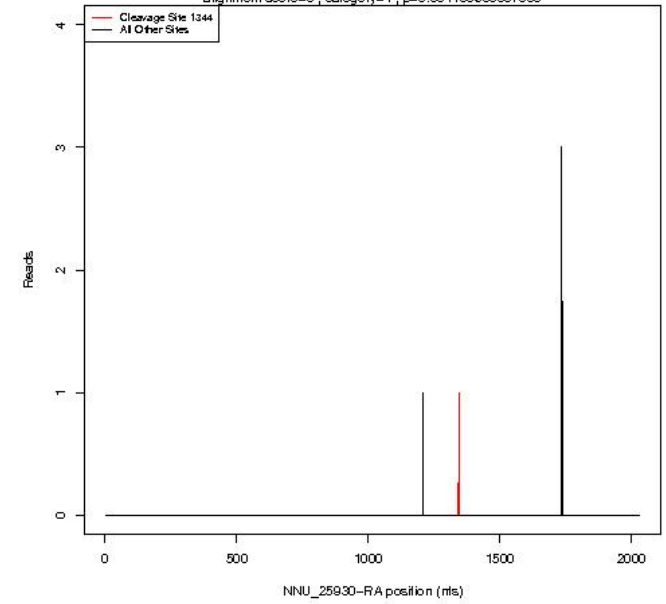
Nnu-miR166c slicing NNU_13147-RA at nt 2089

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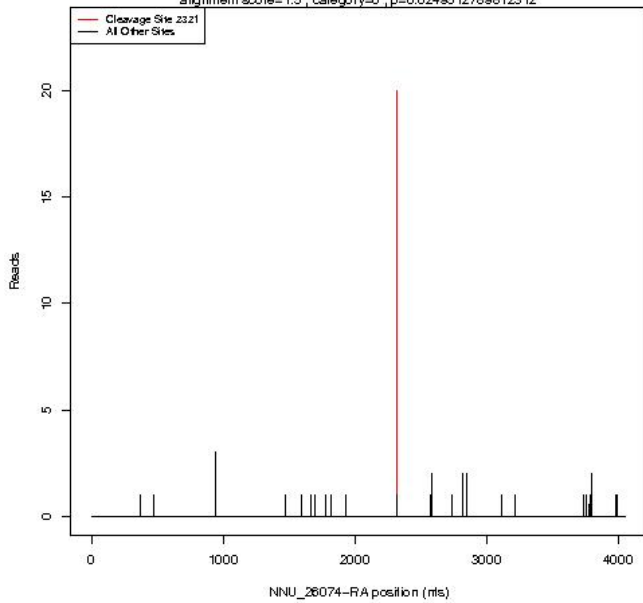
Nnu-miR164a-5p slicing NNU_25930-RA at nt 1344

alignment score=3 , category=4 , p=0.331183603537808



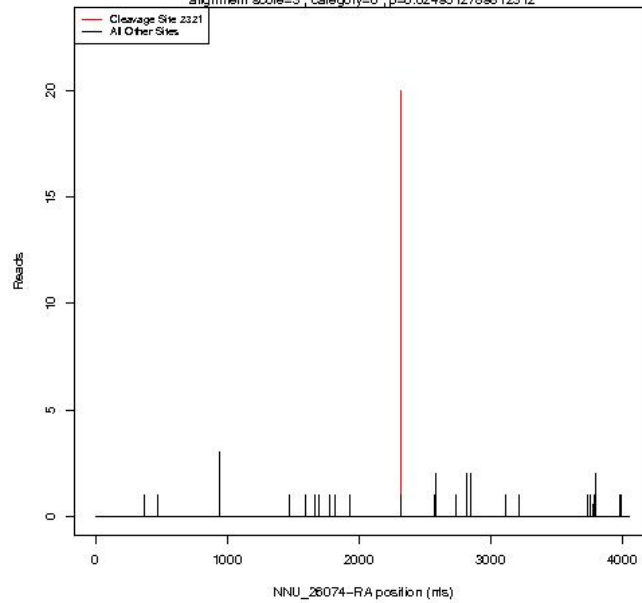
Nnu-miR165a-5p slicing NNU_26074-RA at nt 2321

alignment score=1.5 , category=0 , p=0.0249512789812312



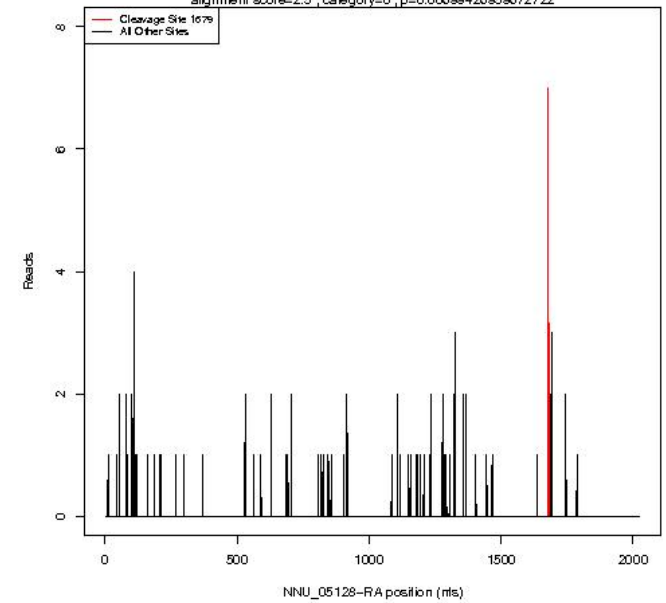
Nnu-miR166c slicing NNU_26074-RA at nt 2321

alignment score=3 , category=0 , p=0.0249512789812312



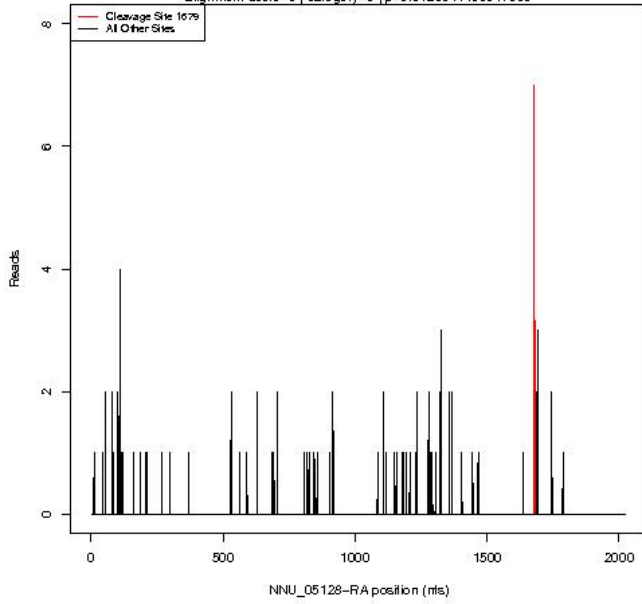
Nnu-miR169a slicing NNU_05128-RA at nt 1679

alignment score=2.5 , category=0 , p=0.00699426959672722



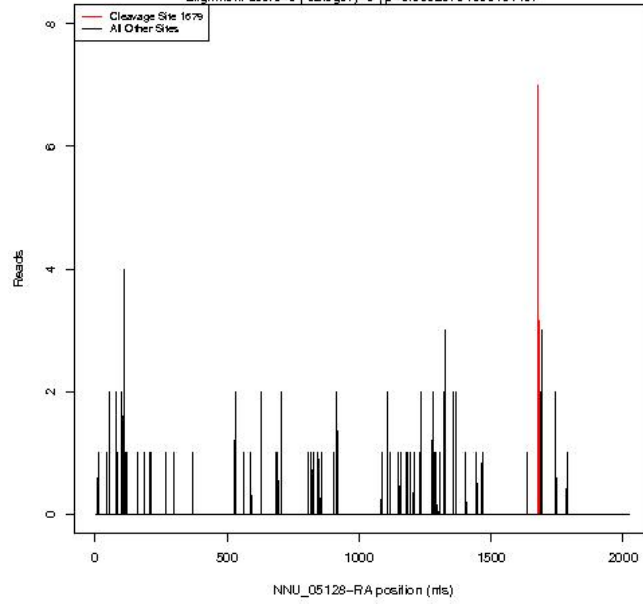
Nnu-miR169b slicing NNU_05128-RA at nt 1679

alignment score=3 , category=0 , p=0.0125544465547638



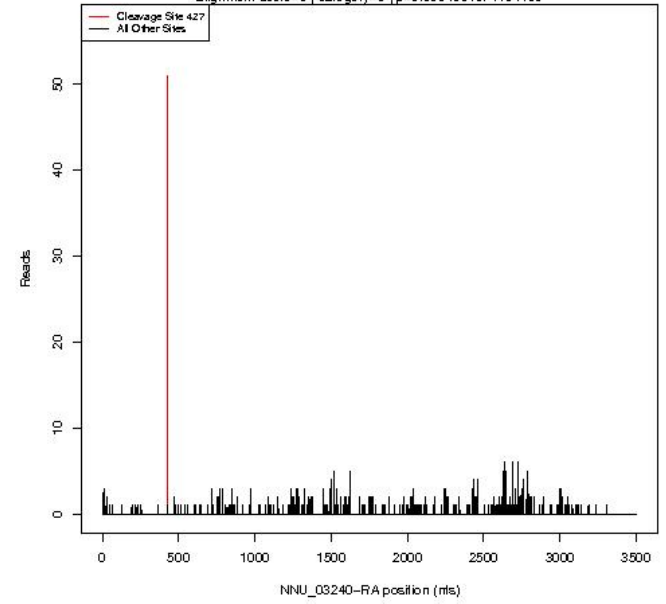
Nnu-miR169c-5p slicing NNU_05128-RA at nt 1679

alignment score=3 , category=0 , p=0.00629704969481137



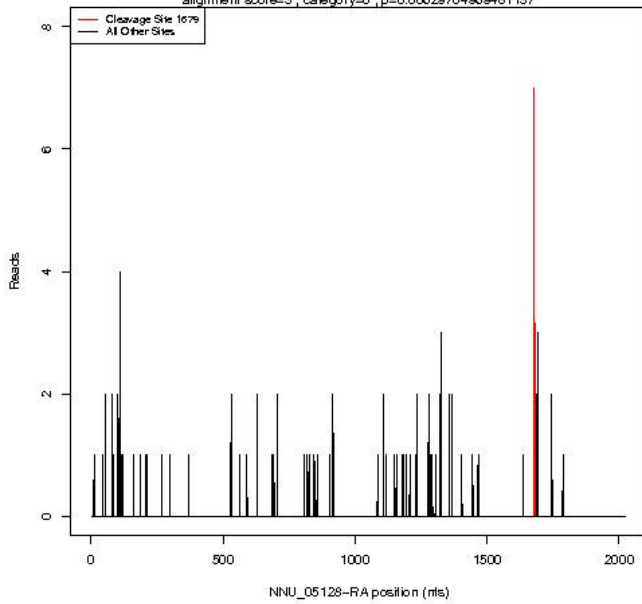
Nnu-miR168a-5p slicing NNU_03240-RA at nt 427

alignment score=3 , category=0 , p=0.0031534971194469



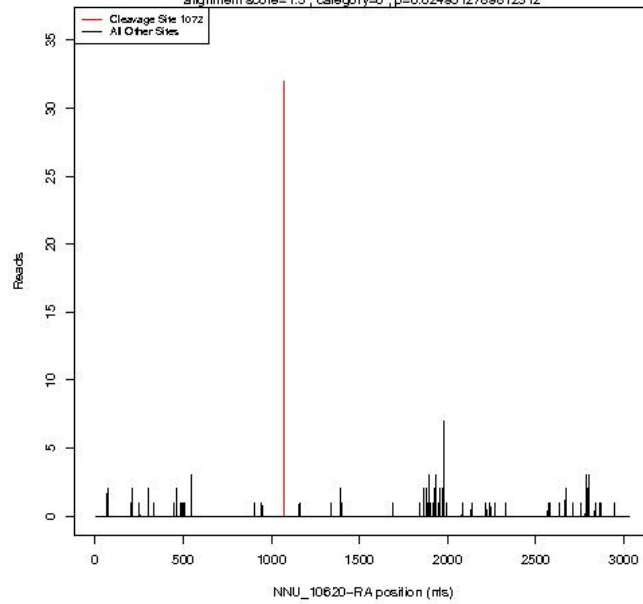
Nnu-miR169d slicing NNU_05128-RA at nt 1679

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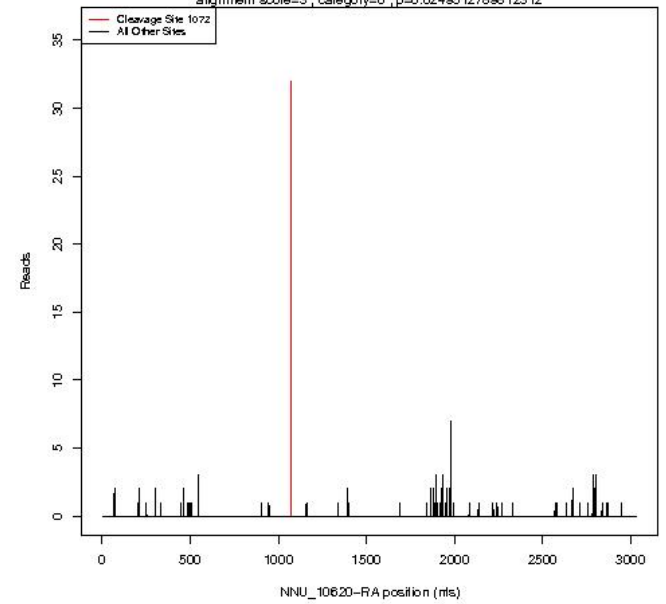
Nnu-miR165a-5p slicing NNU_10620-RA at nt 1072

alignment score=1.5 , category=0 , p=0.0249512789812312



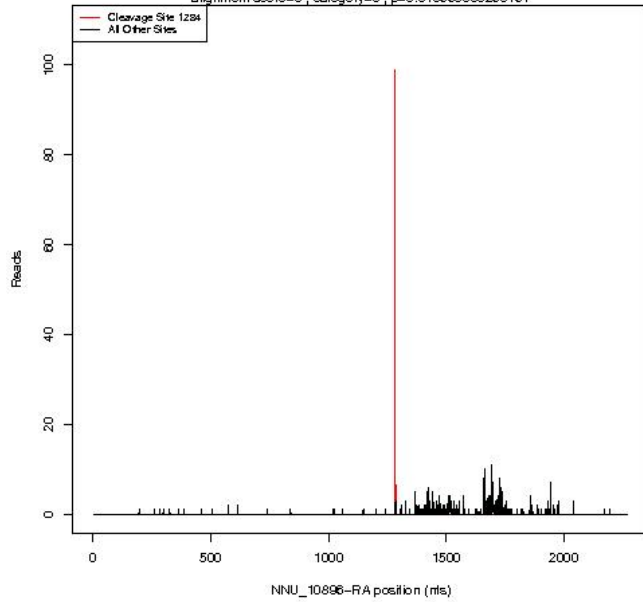
Nnu-miR166c slicing NNU_10620-RA at nt 1072

alignment score=3 , category=0 , p=0.0249512789812312



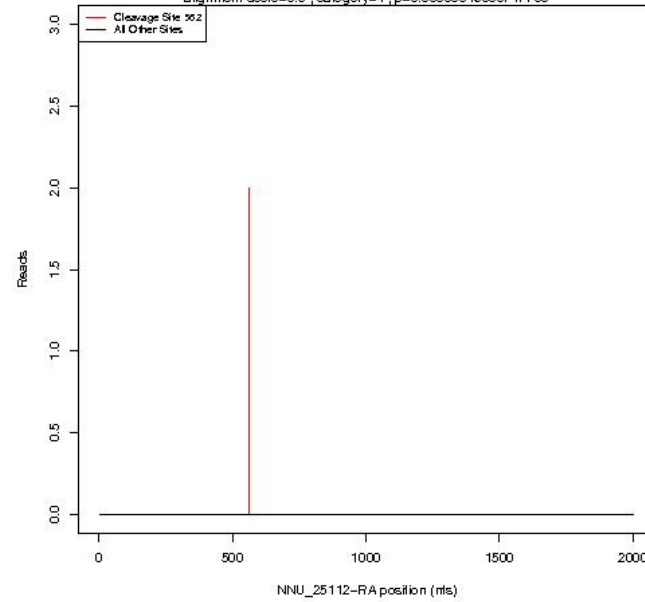
Nnu-miR159b slicing NNU_10896-RA at nt 1284

alignment score=0, category=0, p=0.015668353263164



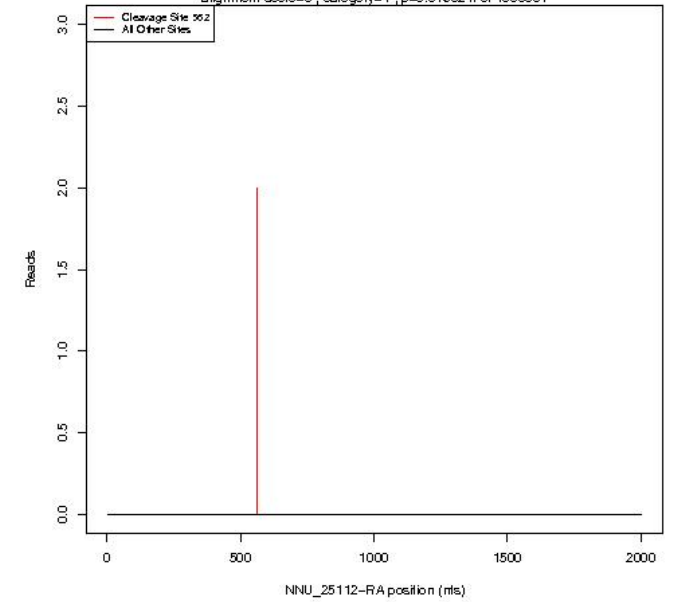
Nnu-miR169a slicing NNU_25112-RA at nt 562

alignment score=3.5, category=1, p=0.00358346905717755



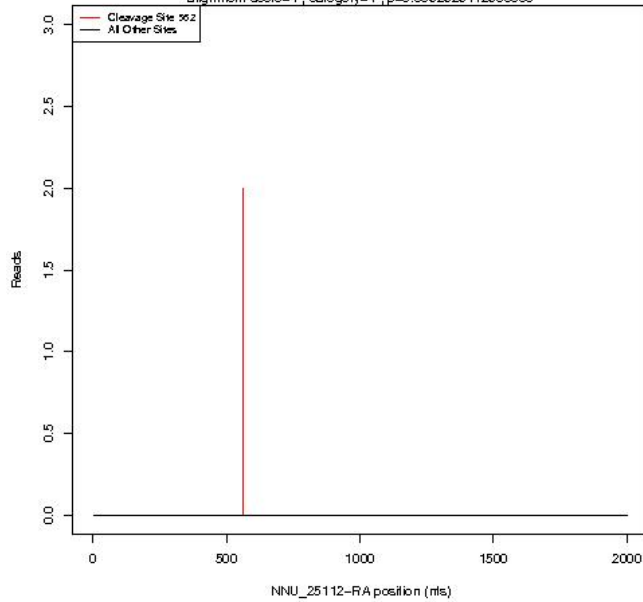
Nnu-miR169b slicing NNU_25112-RA at nt 562

alignment score=3, category=1, p=0.0160247874855504



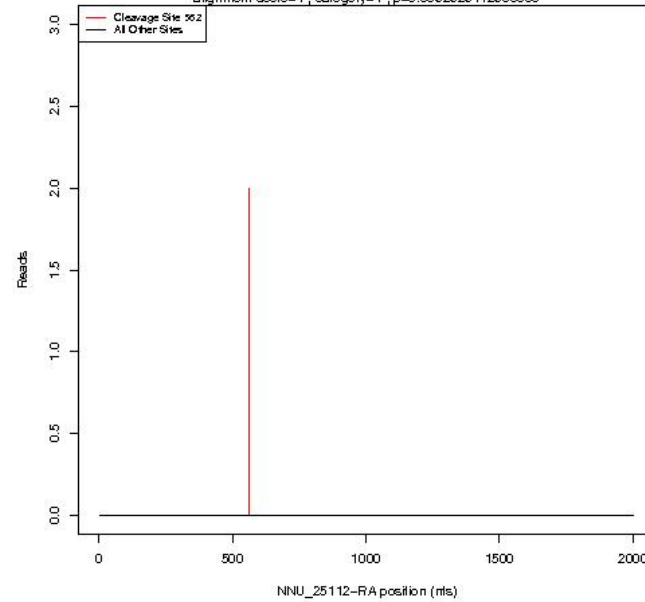
Nnu-miR169c-5p slicing NNU_25112-RA at nt 562

alignment score=4, category=1, p=0.0062626412600959



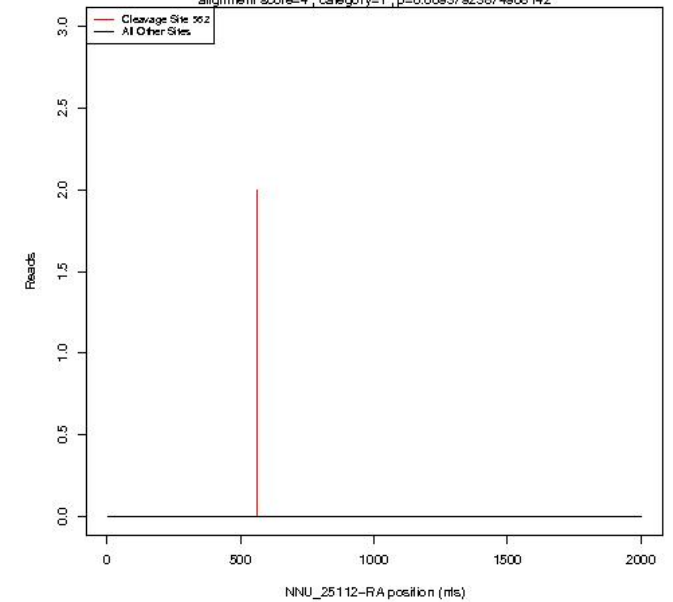
Nnu-miR169d slicing NNU_25112-RA at nt 562

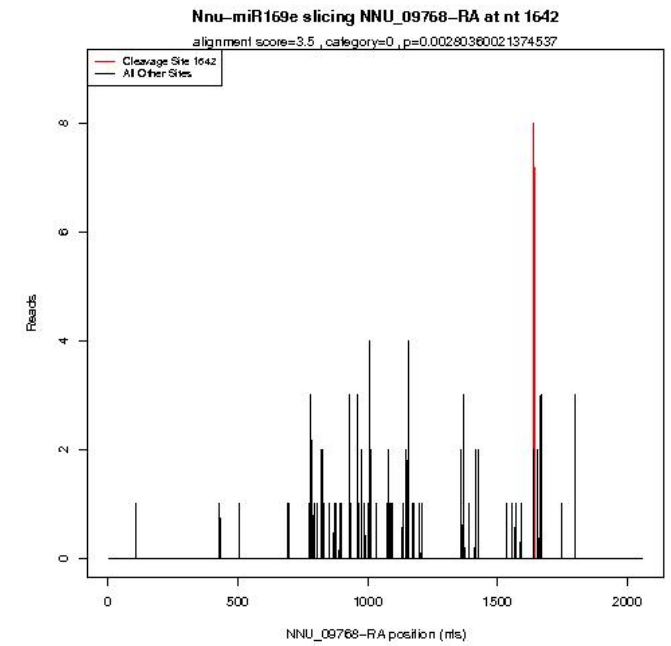
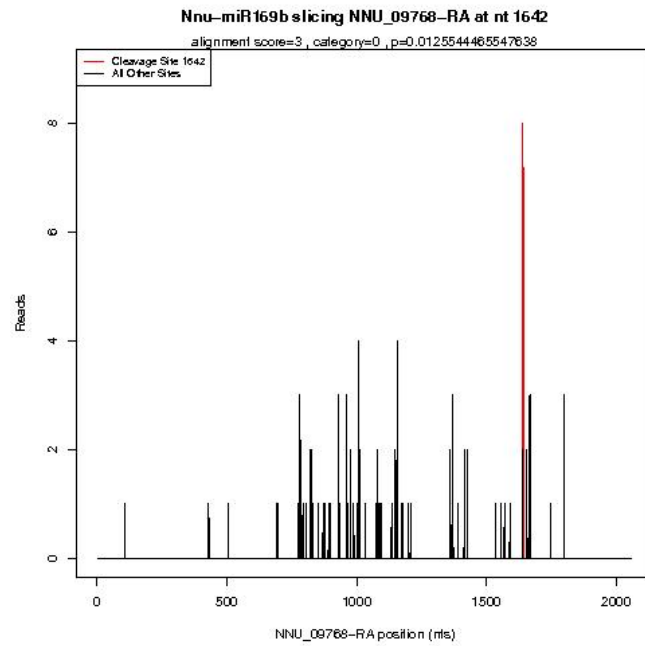
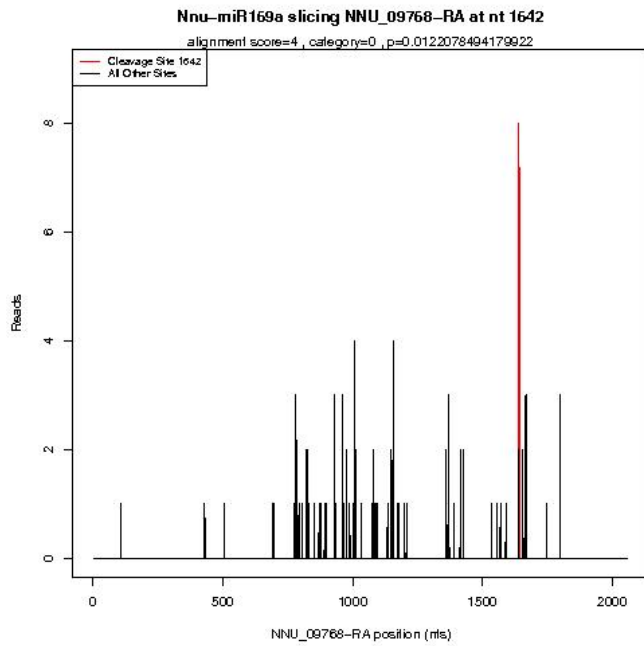
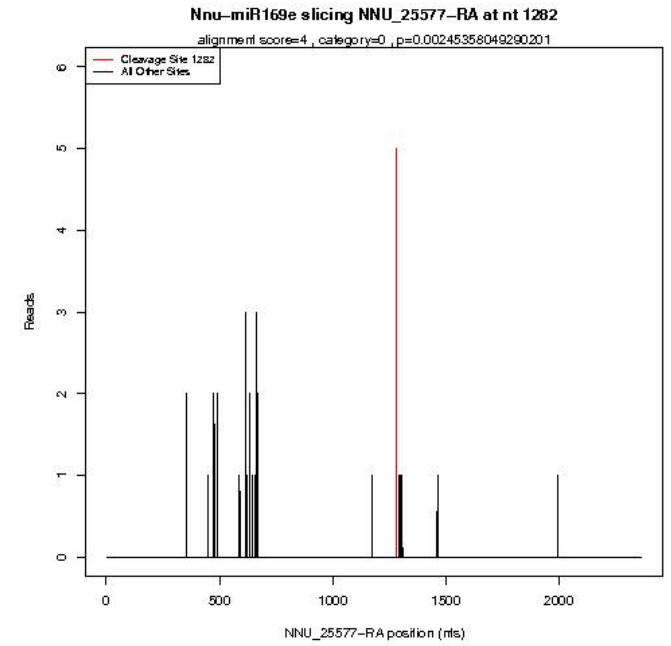
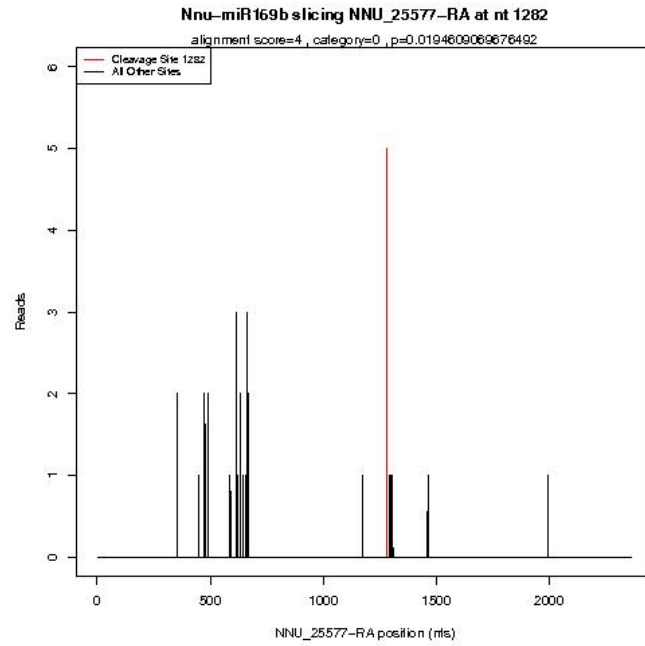
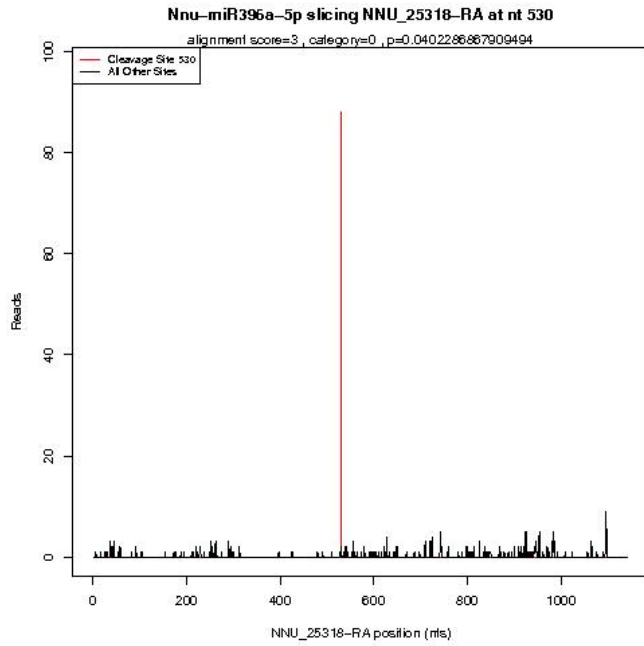
alignment score=4, category=1, p=0.0062626412600959



Slo-miR169m slicing NNU_25112-RA at nt 562

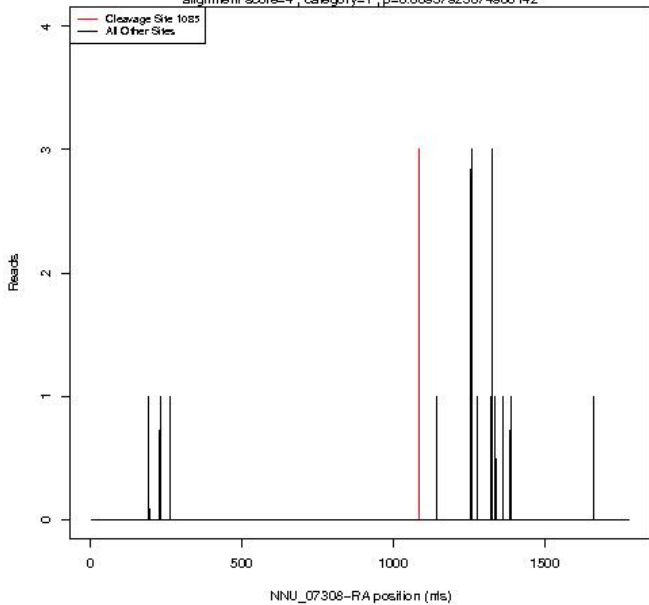
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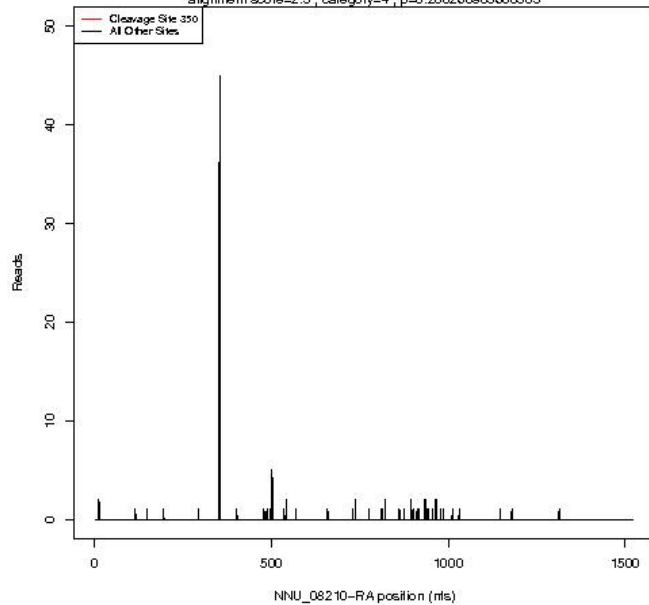
Nnu-miR164a-5p slicing NNU_07308-RA at nt 1085

alignment score=4 , category=1 , p=0.00937923874908142



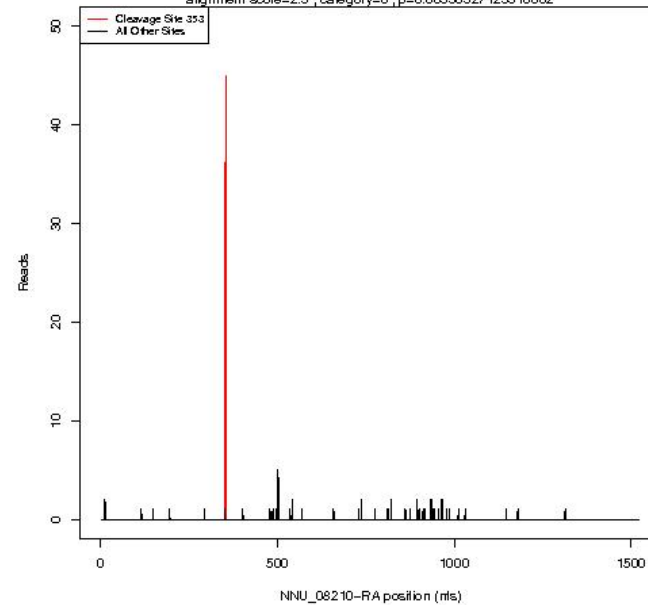
Nnu-miR171b slicing NNU_08210-RA at nt 350

alignment score=2.5 , category=4 , p=0.200260983600585



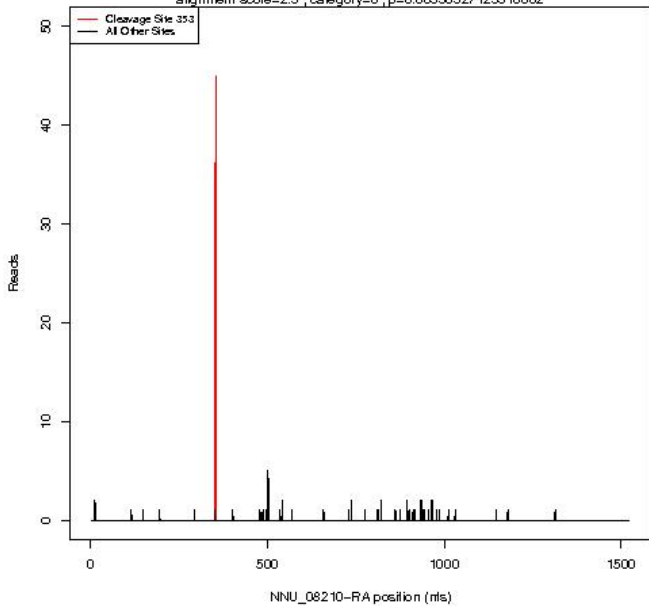
Nnu-miR170a slicing NNU_08210-RA at nt 353

alignment score=2.5 , category=0 , p=0.00350327125310002



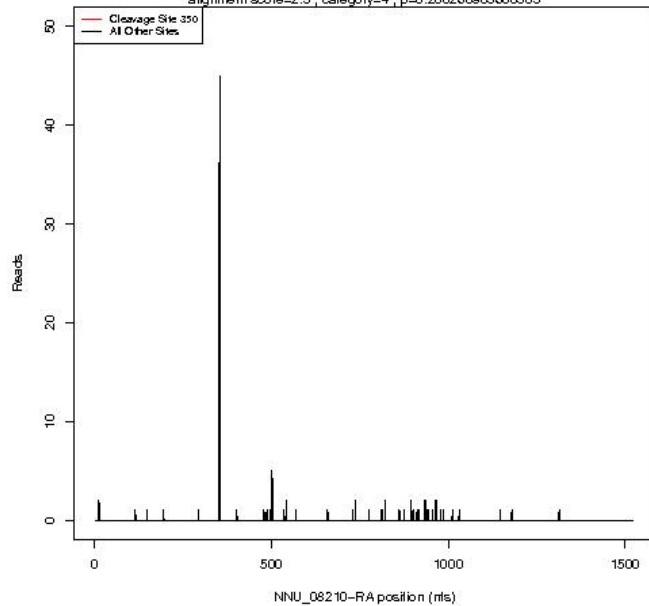
Nnu-miR170b slicing NNU_08210-RA at nt 353

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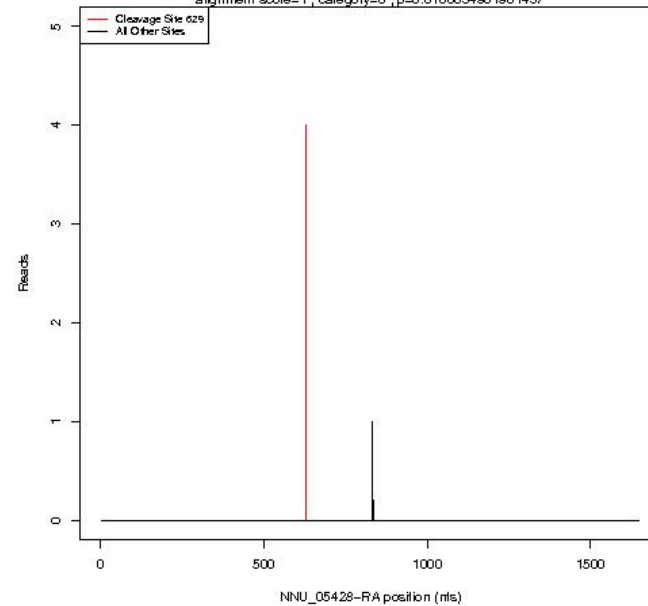
Nnu-miR171c slicing NNU_08210-RA at nt 350

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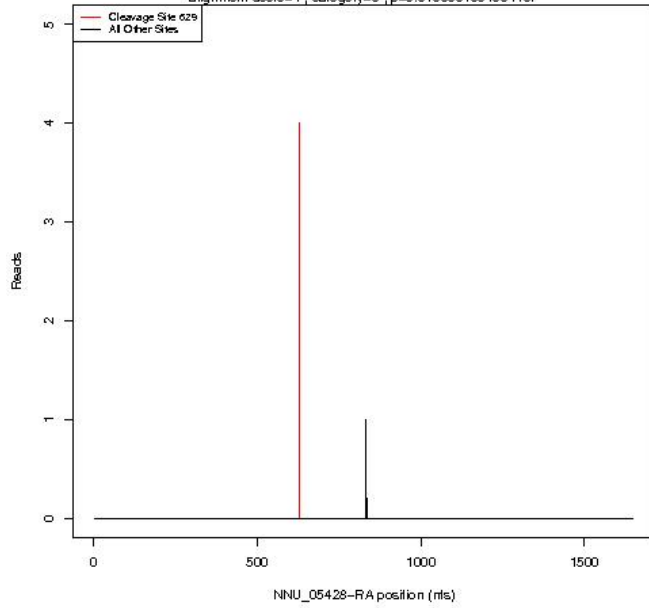
Nnu-miR170a slicing NNU_05428-RA at nt 629

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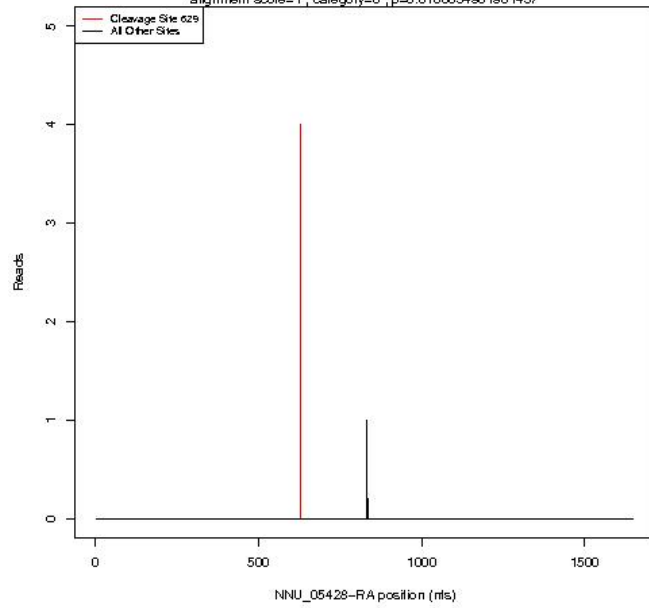
Nnu-miR170b slicing NNU_05428-RA at nt 629

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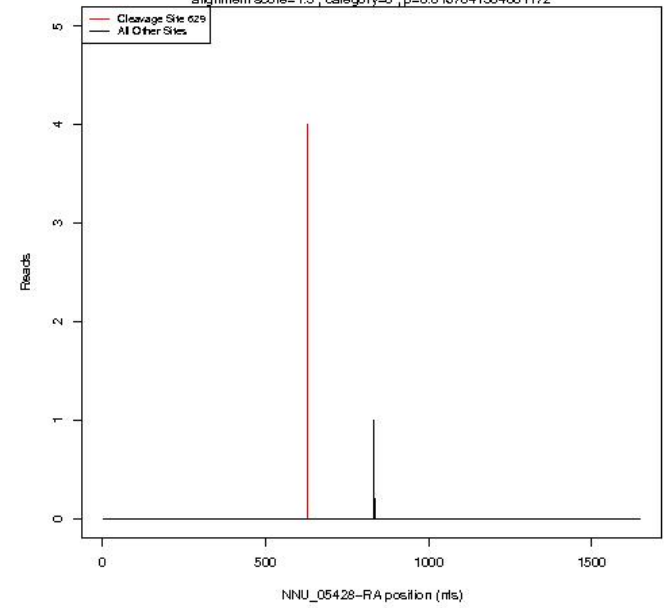
Nnu-miR171a slicing NNU_05428-RA at nt 629

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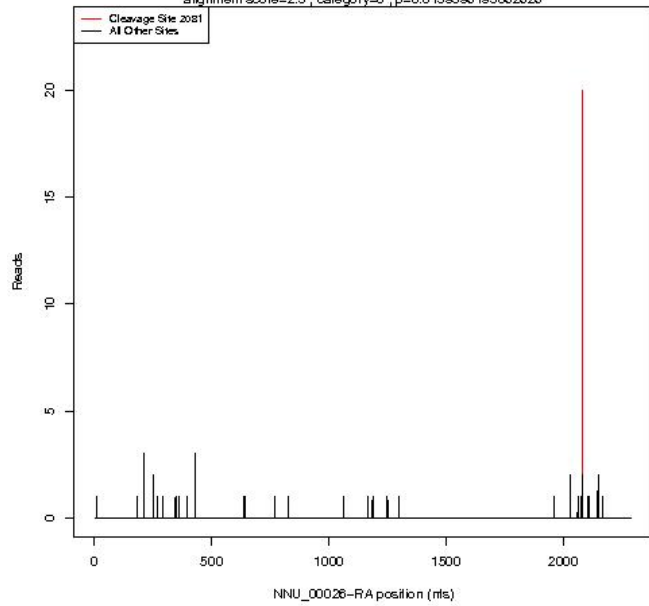
Nnu-miR171d slicing NNU_05428-RA at nt 629

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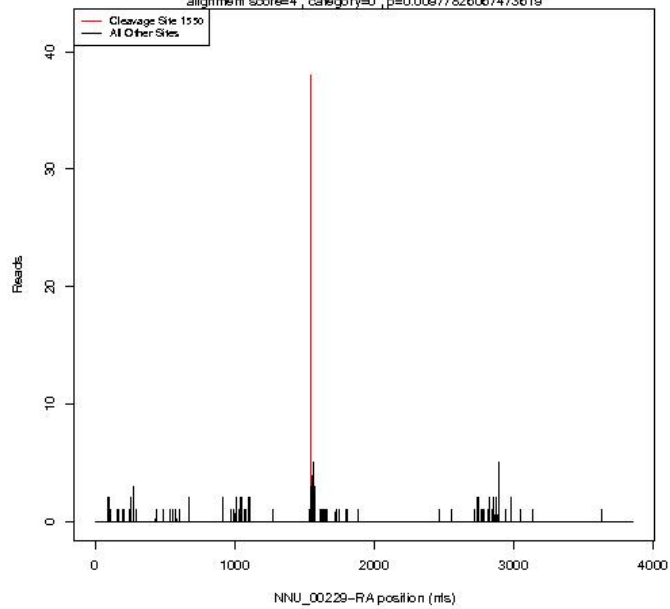
Nnu-miR319b slicing NNU_00026-RA at nt 2081

alignment score=2.5, category=0, p=0.0139396193862626



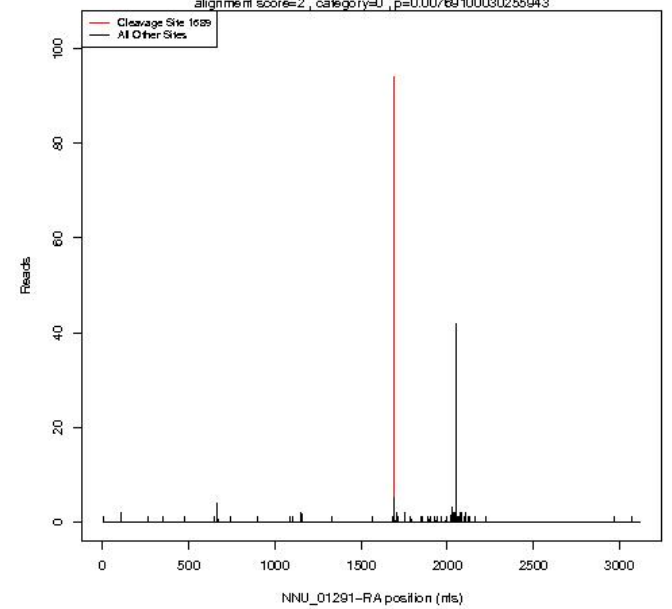
Nnu-miR319b slicing NNU_00229-RA at nt 1550

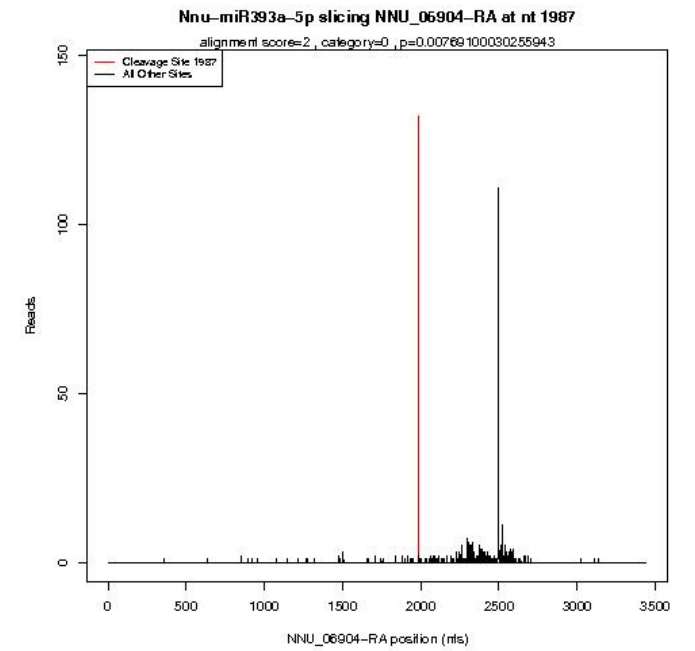
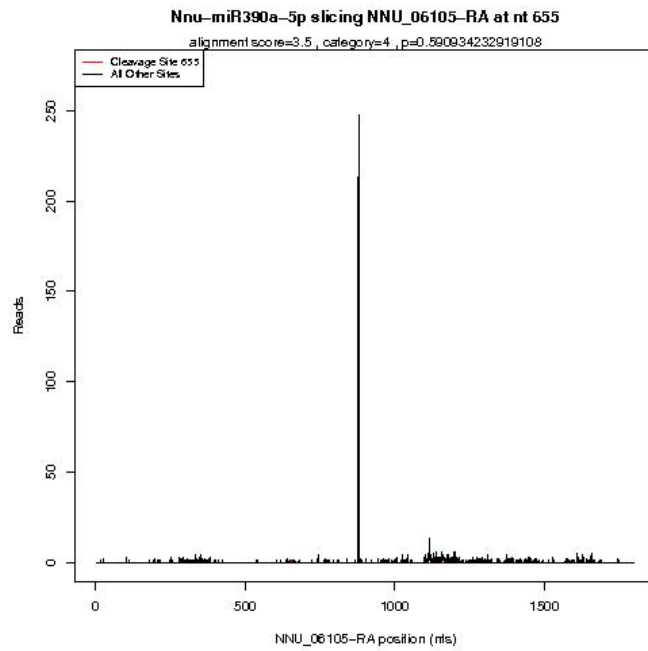
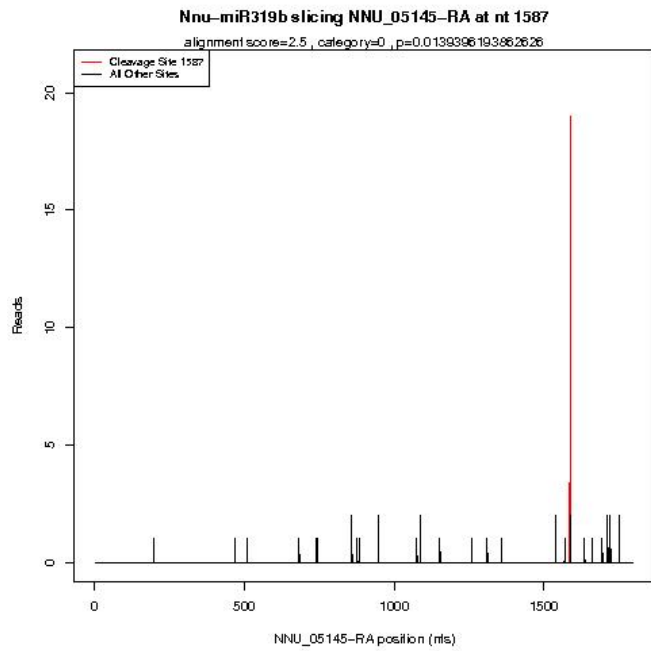
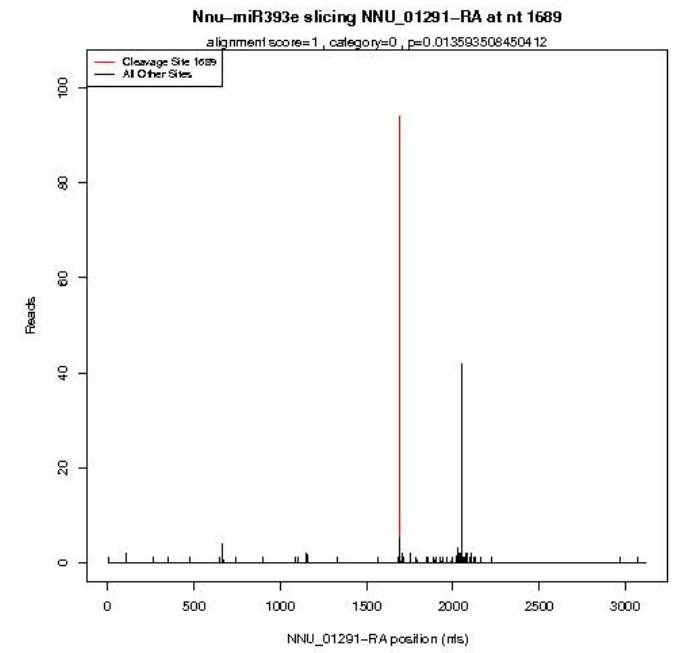
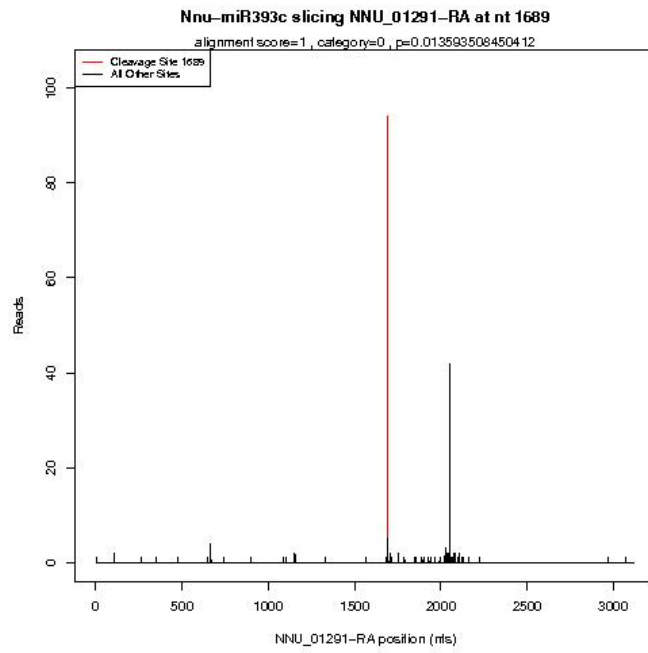
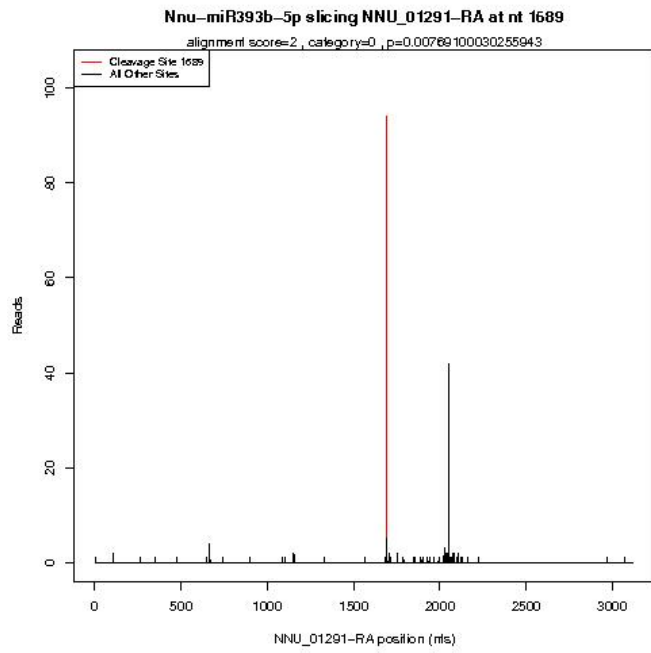
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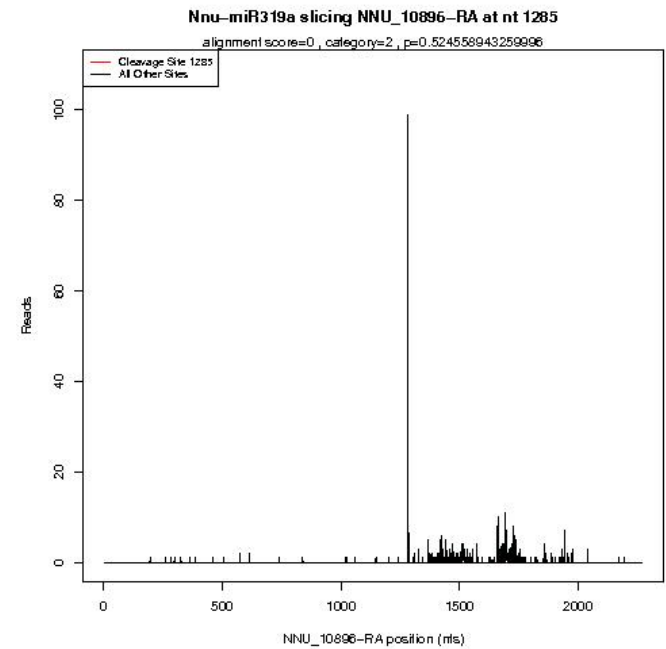
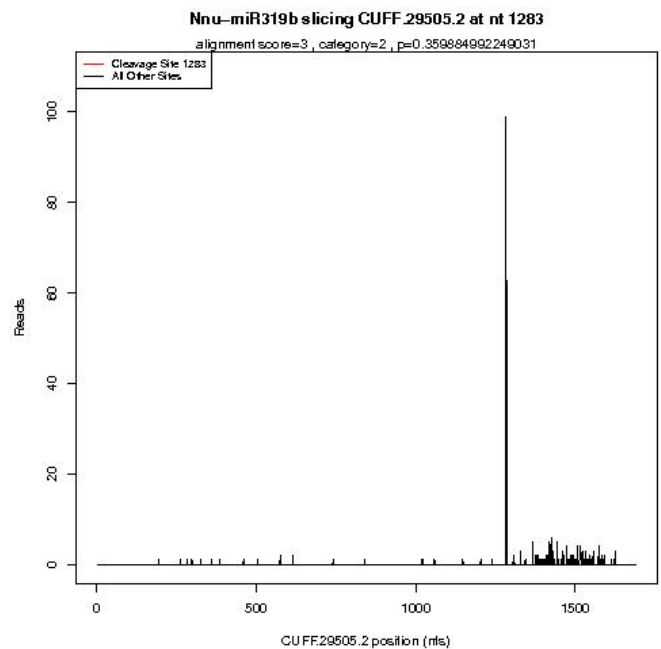
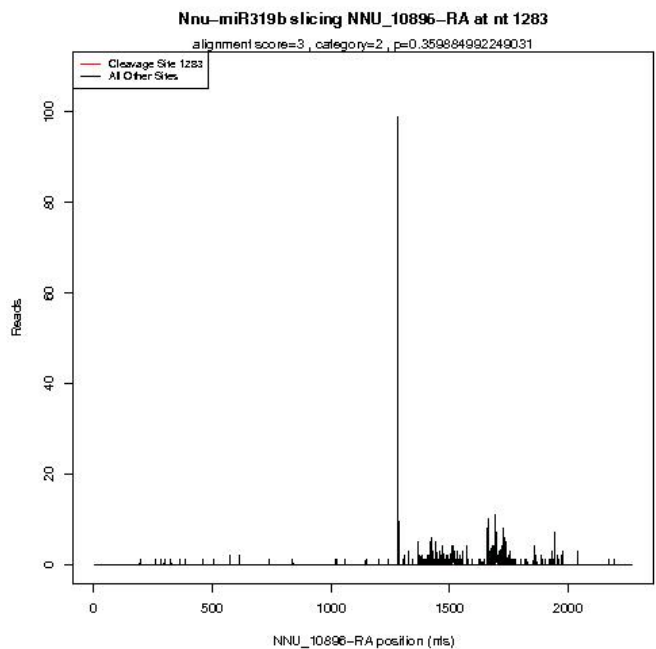
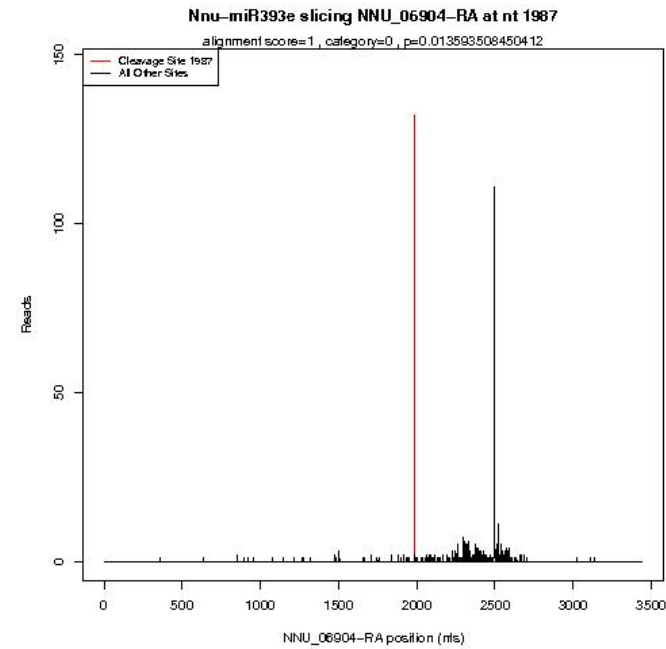
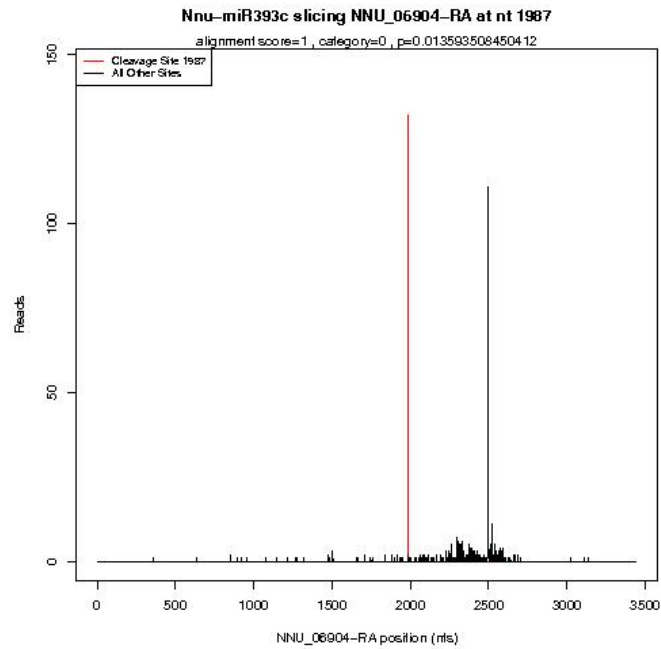
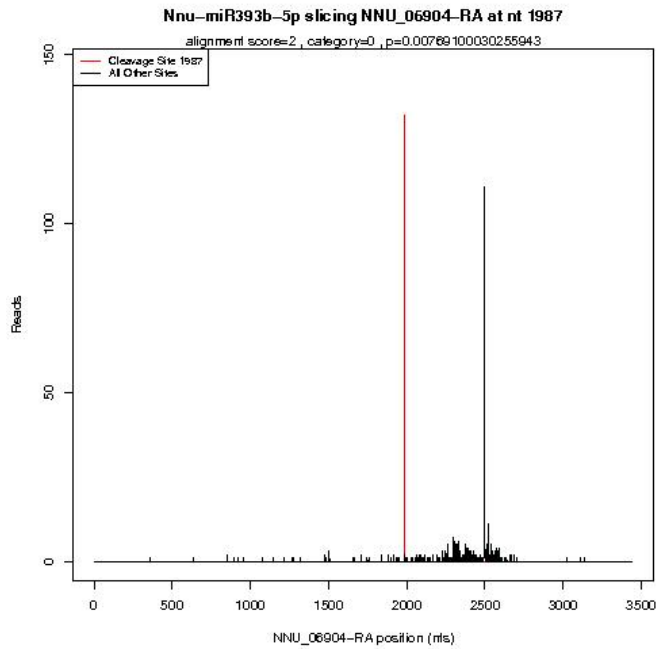


Nnu-miR393a-5p slicing NNU_01291-RA at nt 1689

alignment score=2, category=0, p=0.00769100030255943

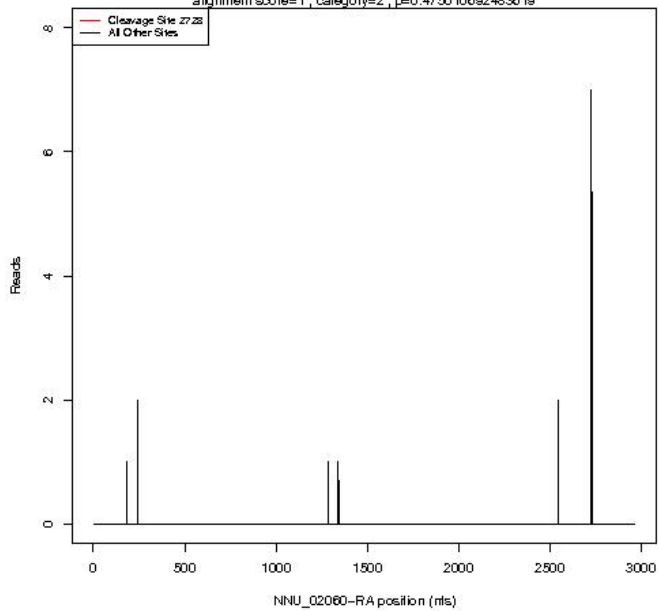






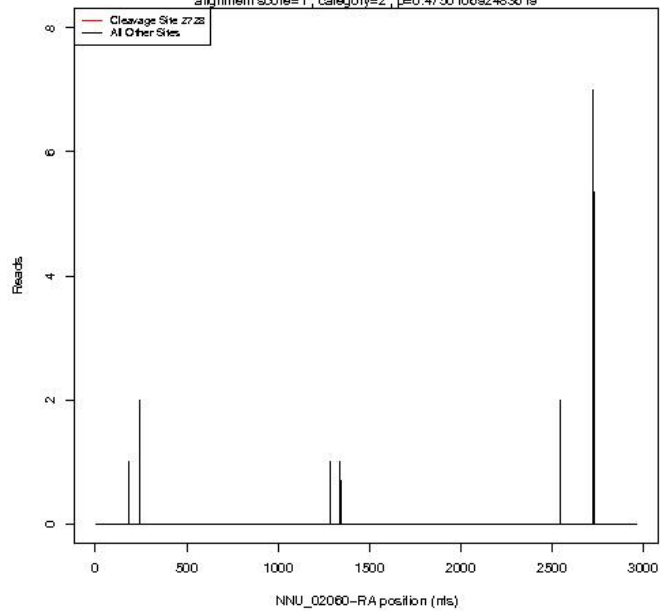
Nnu-miR394a slicing NNU_02060-RA at nt 2728

alignment score=1, category=2, p=0.475010692483619



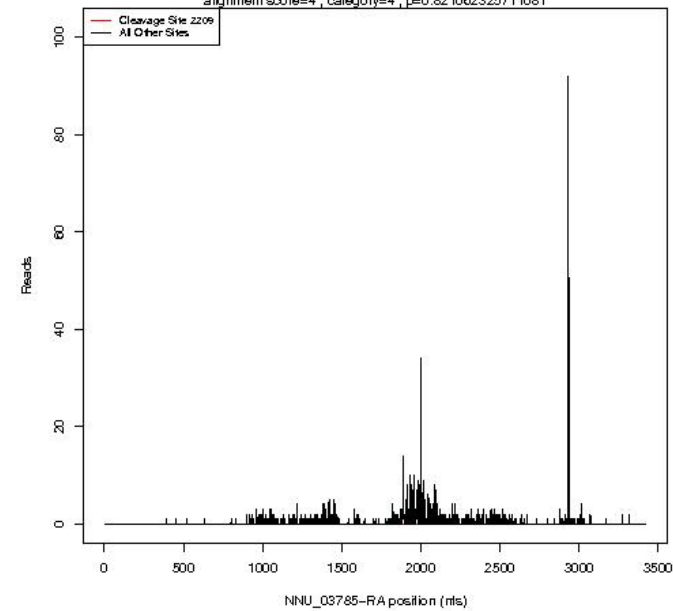
Nnu-miR394b slicing NNU_02060-RA at nt 2728

alignment score=1, category=2, p=0.475010692483619



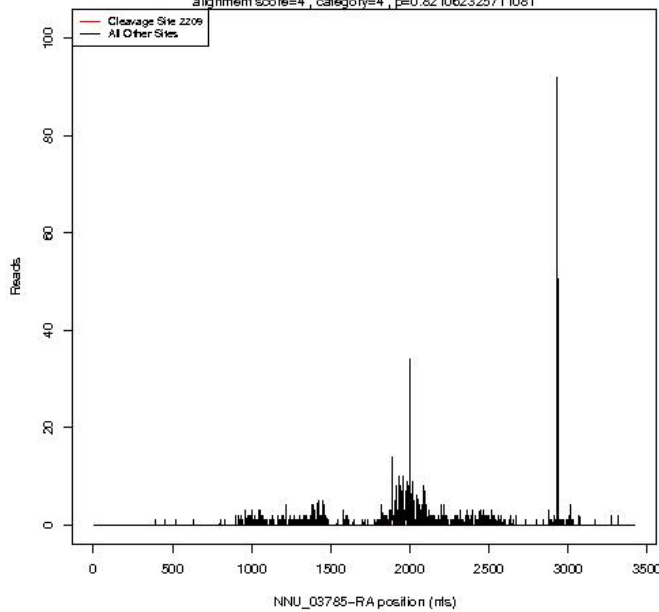
Nnu-miR394a slicing NNU_03785-RA at nt 2209

alignment score=4, category=4, p=0.821062325711081



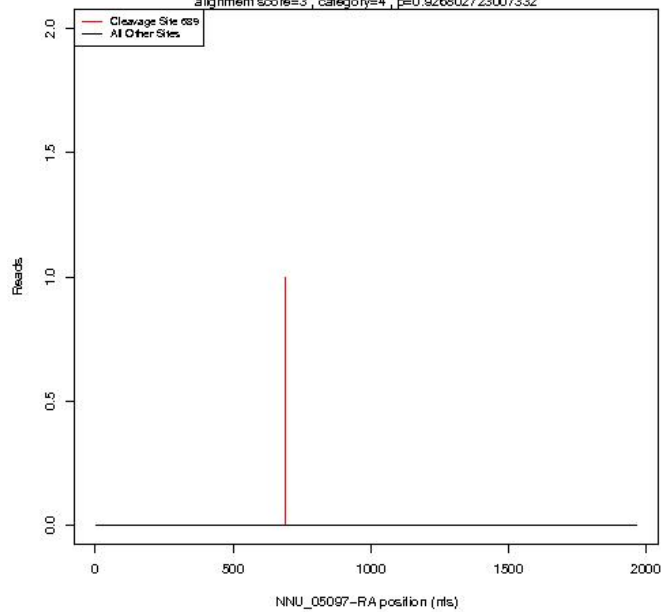
Nnu-miR394b slicing NNU_03785-RA at nt 2209

alignment score=4, category=4, p=0.821062325711081



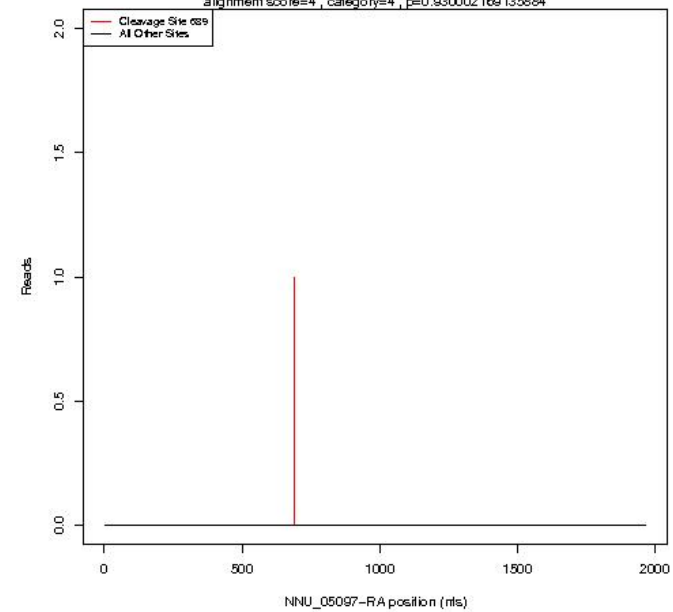
Nnu-miR396a-5p slicing NNU_05097-RA at nt 689

alignment score=3, category=4, p=0.926802723007332



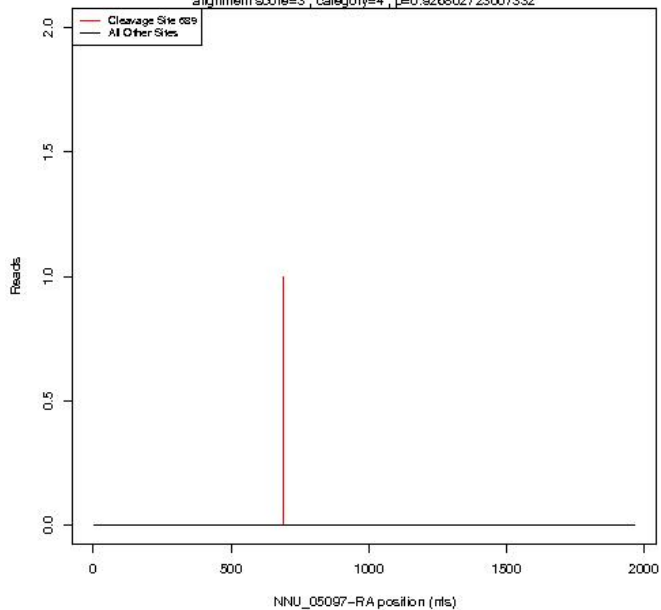
Nnu-miR396b-5p slicing NNU_05097-RA at nt 689

alignment score=4, category=4, p=0.930002169135884



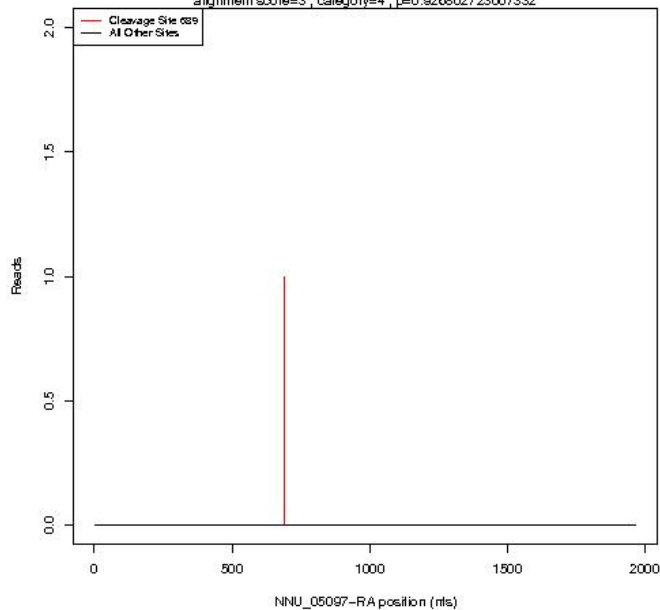
Nnu-miR396c-5p slicing NNU_05097-RA at nt 689

alignment score=3, category=4, p=0.926802723007332



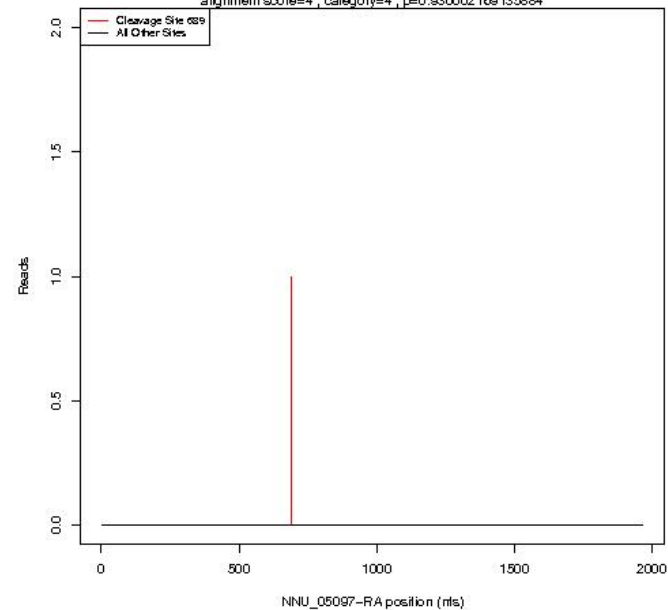
Nnu-miR396d-5p slicing NNU_05097-RA at nt 689

alignment score=3, category=4, p=0.926802723007332



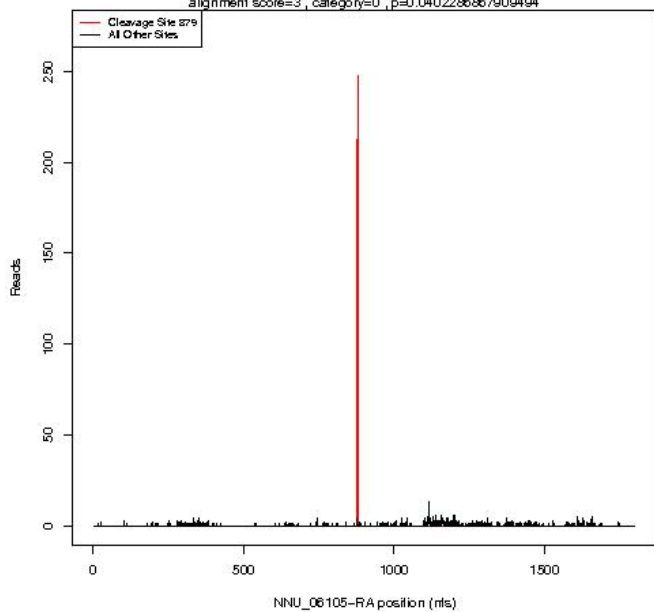
Nnu-miR396e-5p slicing NNU_05097-RA at nt 689

alignment score=4, category=4, p=0.930002169135884



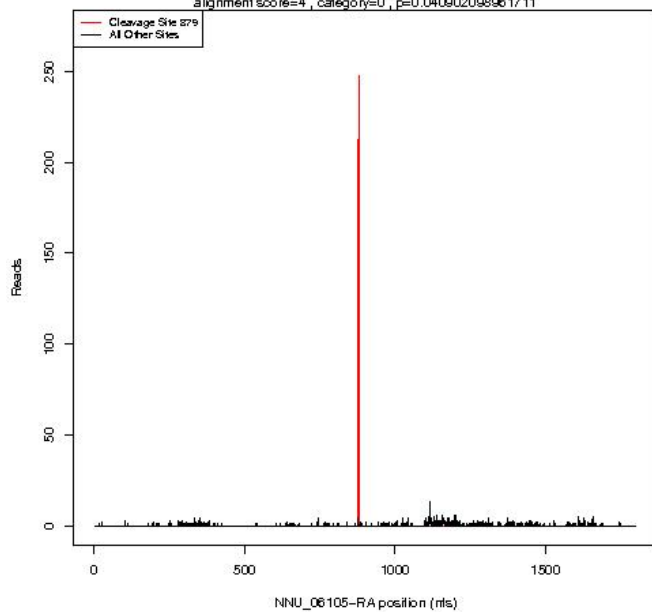
Nnu-miR396a-5p slicing NNU_06105-RA at nt 879

alignment score=3, category=0, p=0.0402286867909494



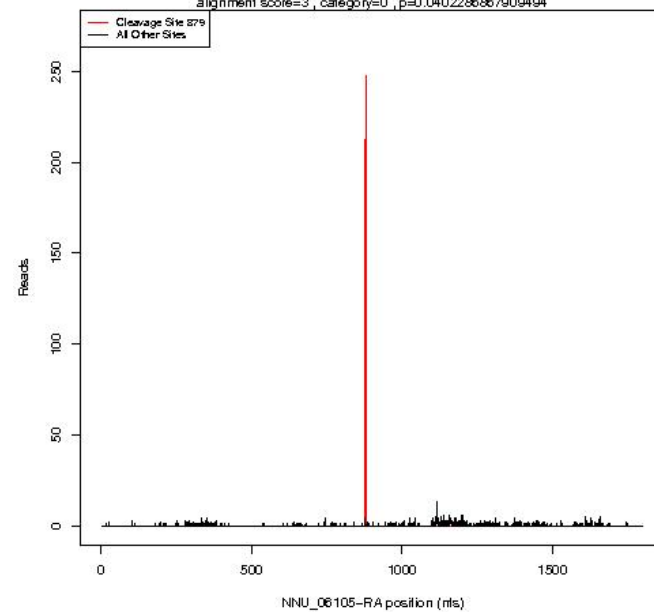
Nnu-miR396b-5p slicing NNU_06105-RA at nt 879

alignment score=4, category=0, p=0.040902098961711



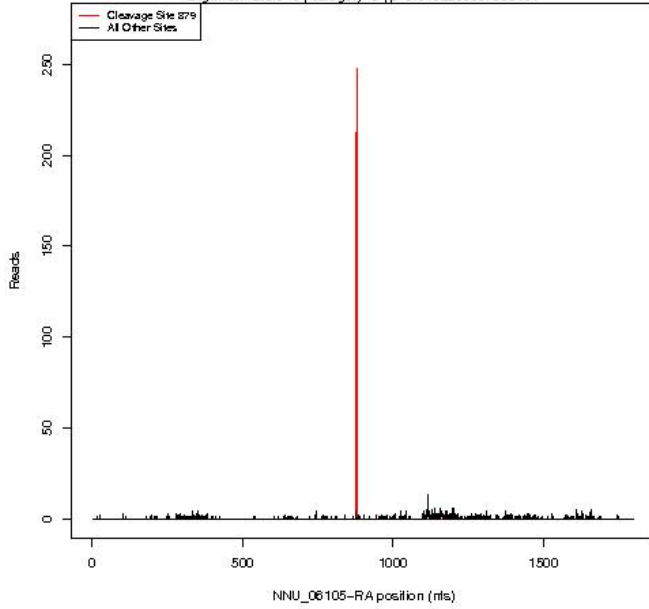
Nnu-miR396c-5p slicing NNU_06105-RA at nt 879

alignment score=3, category=0, p=0.0402286867909494



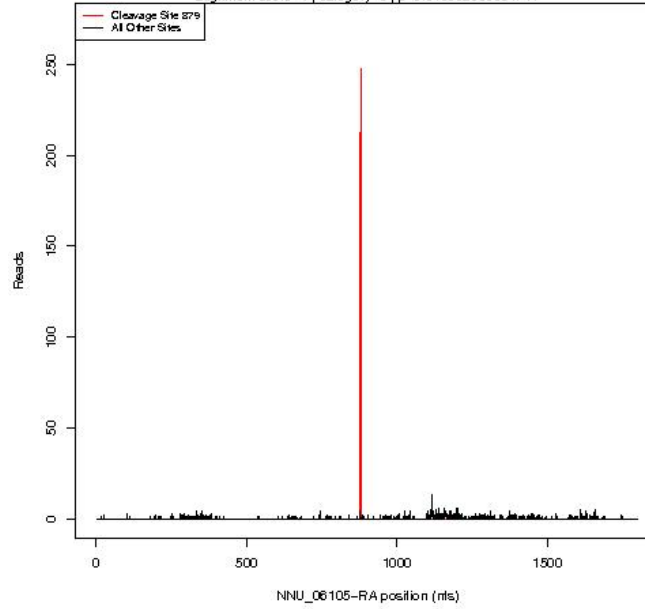
Nnu-miR396d-5p slicing NNU_06105-RA at nt 879

alignment score=3, category=0, p=0.0402286867909494



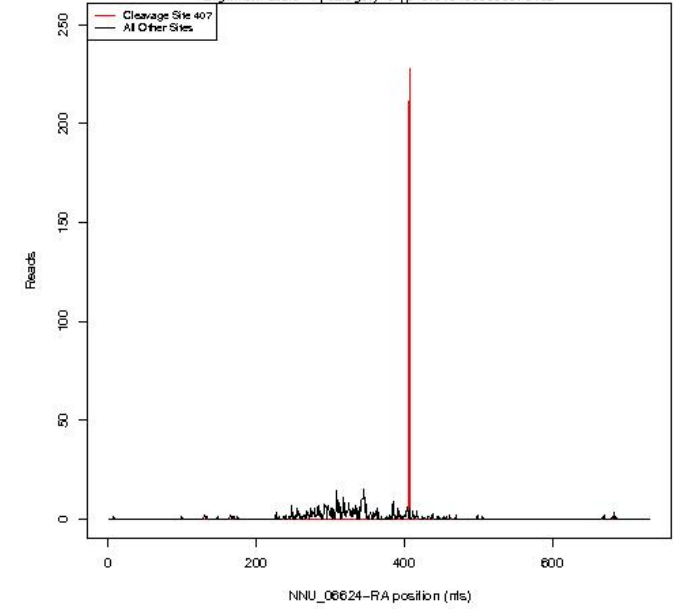
Nnu-miR396e-5p slicing NNU_06105-RA at nt 879

alignment score=4, category=0, p=0.040902098961711



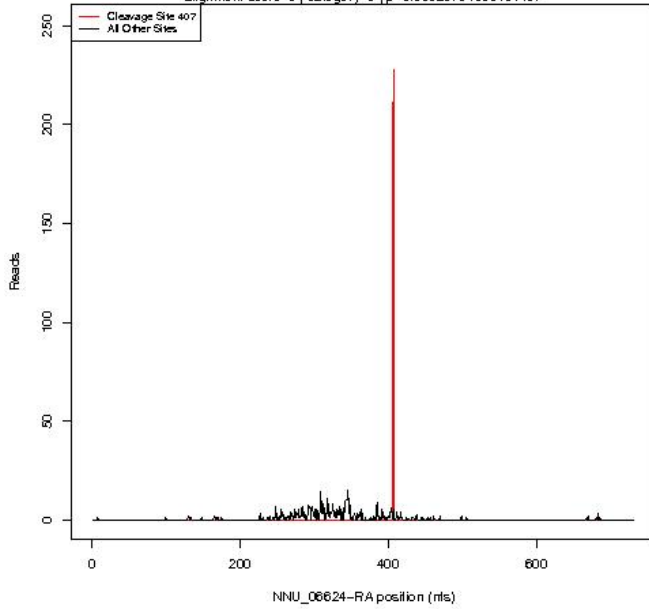
Nnu-miR396a-5p slicing NNU_06624-RA at nt 407

alignment score=4, category=0, p=0.0194609069676492



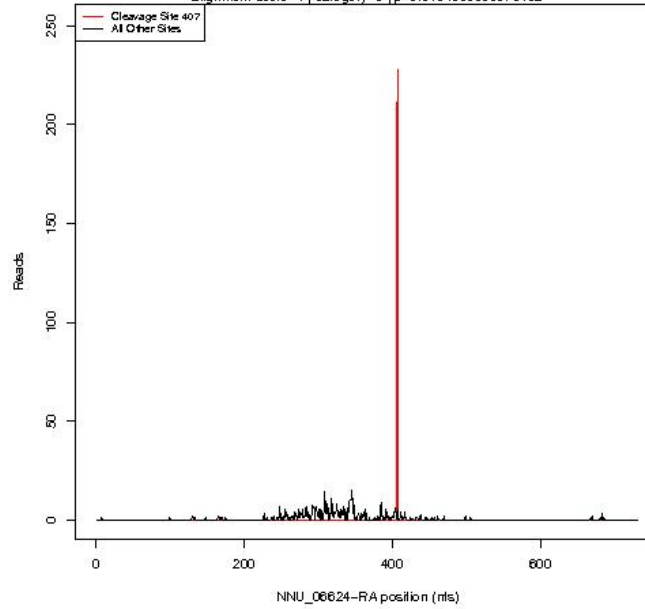
Nnu-miR396b-5p slicing NNU_06624-RA at nt 407

alignment score=3, category=0, p=0.00629704969481137



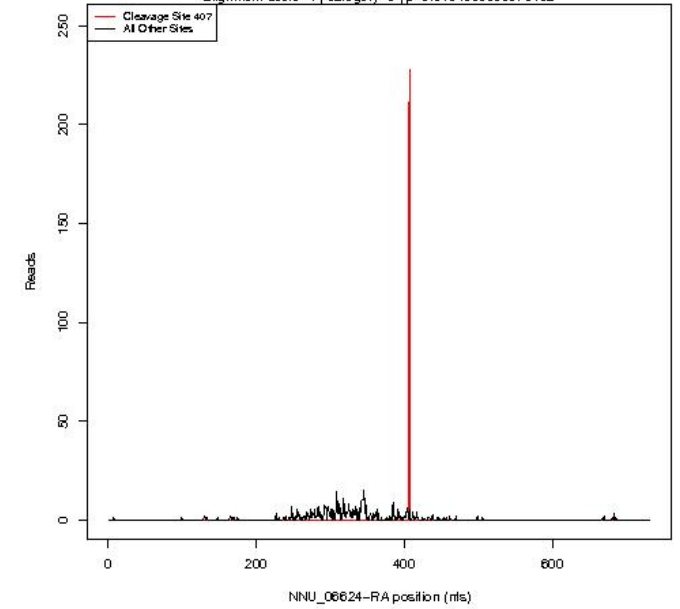
Nnu-miR396c-5p slicing NNU_06624-RA at nt 407

alignment score=4, category=0, p=0.0194609069676492



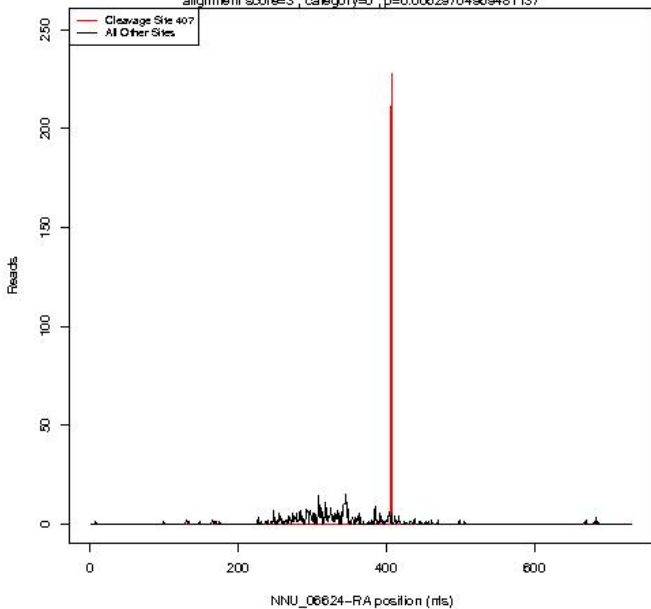
Nnu-miR396d-5p slicing NNU_06624-RA at nt 407

alignment score=4, category=0, p=0.0194609069676492



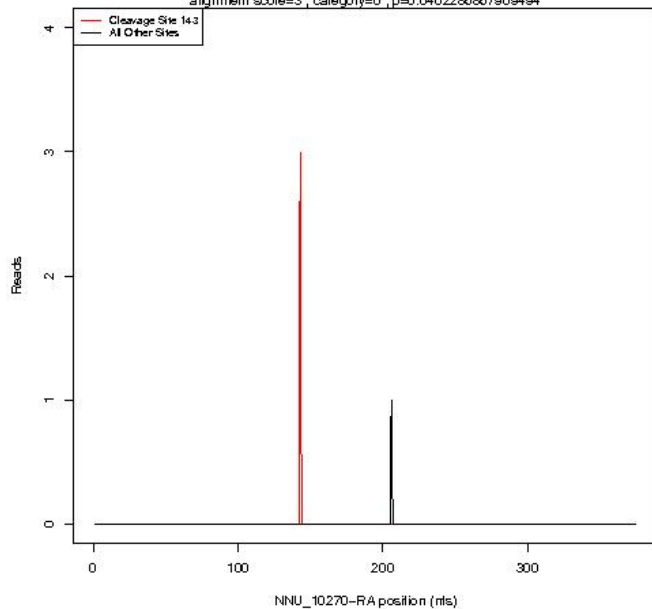
Nnu-miR396e-5p slicing NNU_06624-RA at nt 407

alignment score=3 , category=0 , p=0.00629704969481137



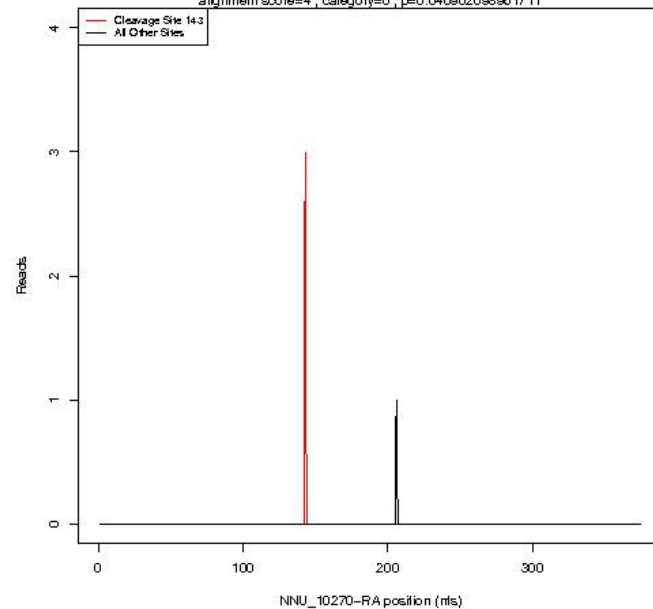
Nnu-miR396a-5p slicing NNU_10270-RA at nt 143

alignment score=3 , category=0 , p=0.040228687909494



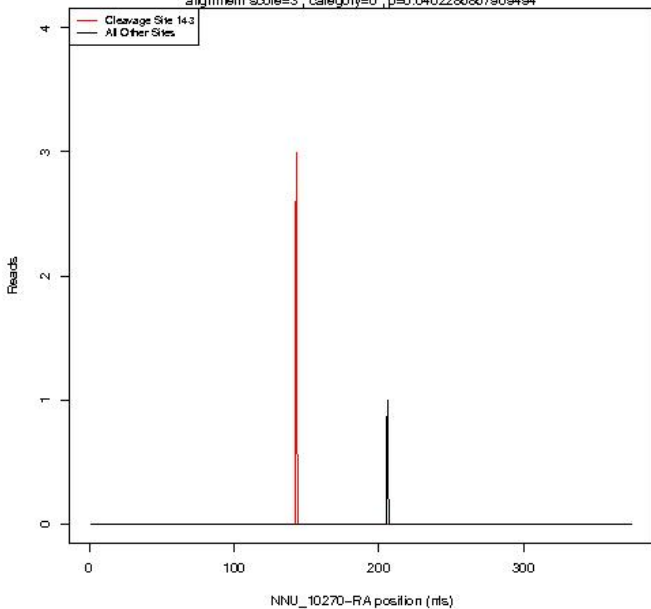
Nnu-miR396b-5p slicing NNU_10270-RA at nt 143

alignment score=4 , category=0 , p=0.04090209961711



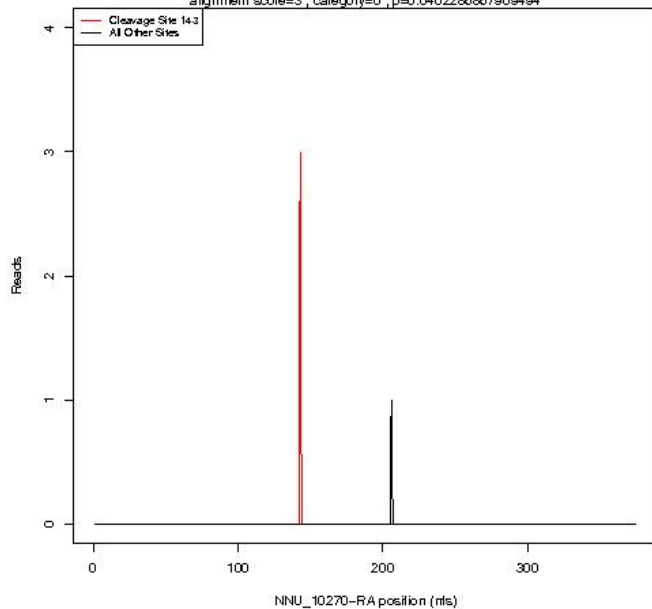
Nnu-miR396c-5p slicing NNU_10270-RA at nt 143

alignment score=3 , category=0 , p=0.040228687909494



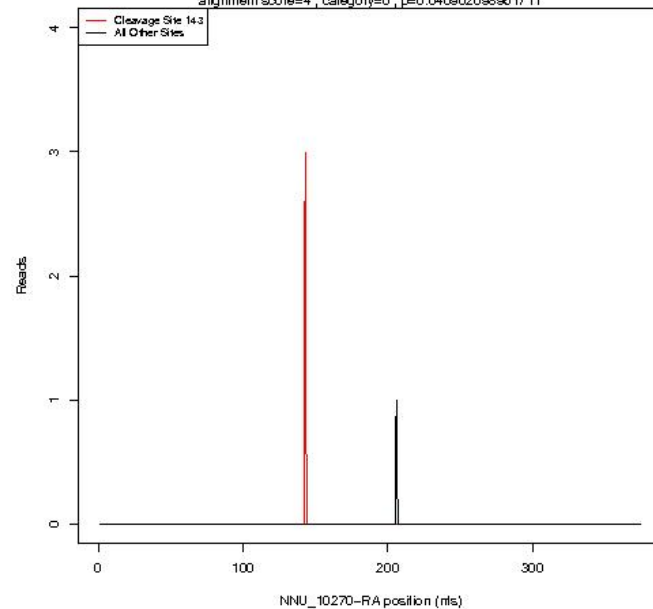
Nnu-miR396d-5p slicing NNU_10270-RA at nt 143

alignment score=3 , category=0 , p=0.040228687909494



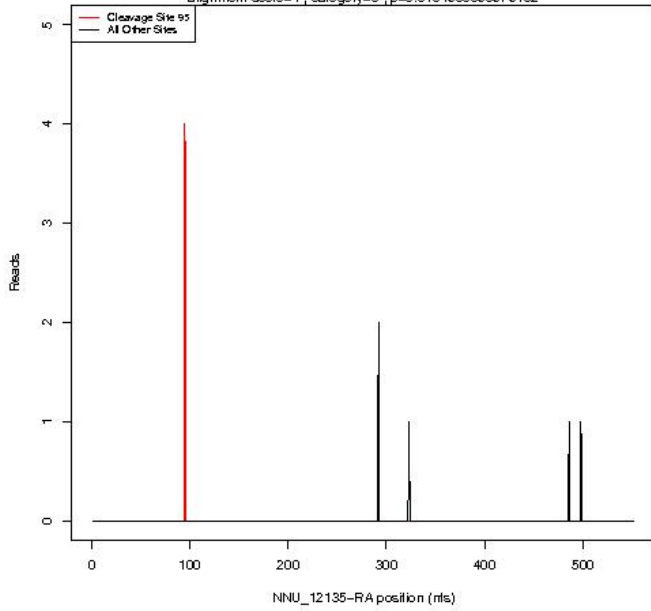
Nnu-miR396e-5p slicing NNU_10270-RA at nt 143

alignment score=4 , category=0 , p=0.04090209961711



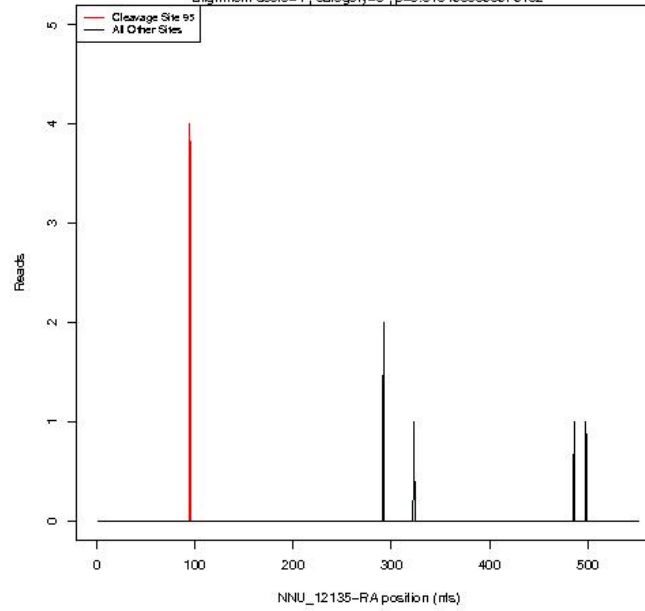
Nnu-miR396a-5p slicing NNU_12135-RA at nt 95

alignment score=4, category=0, p=0.0194609069676492



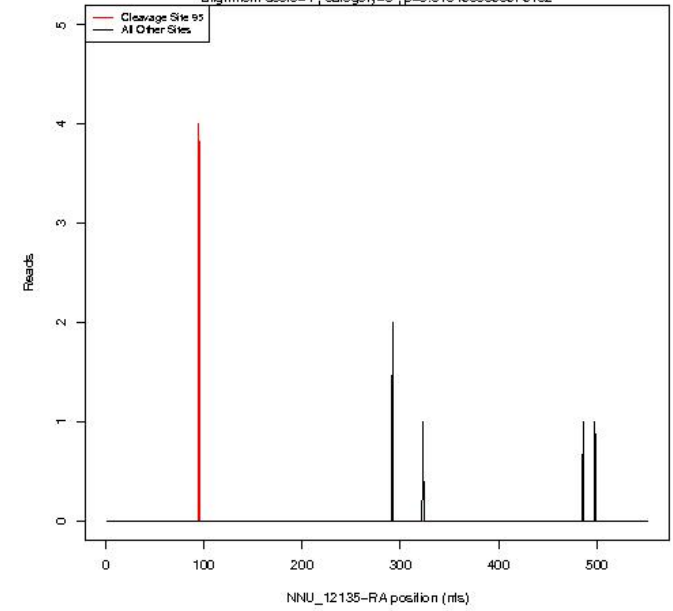
Nnu-miR396c-5p slicing NNU_12135-RA at nt 95

alignment score=4, category=0, p=0.0194609069676492



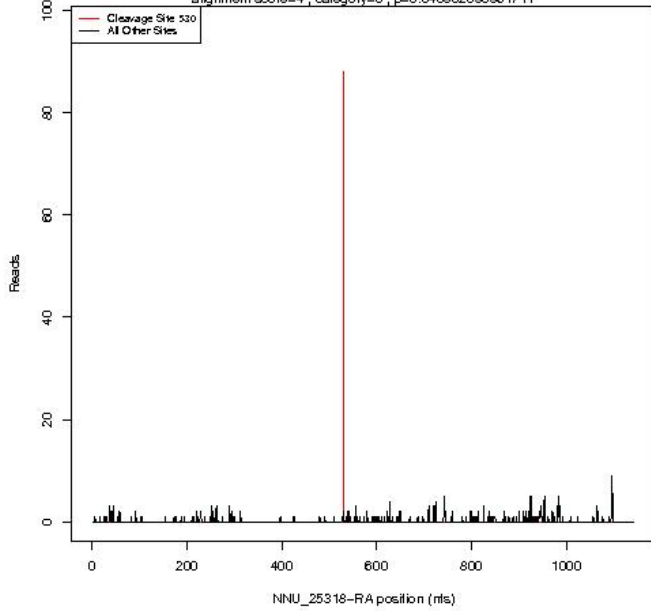
Nnu-miR396d-5p slicing NNU_12135-RA at nt 95

alignment score=4, category=0, p=0.0194609069676492



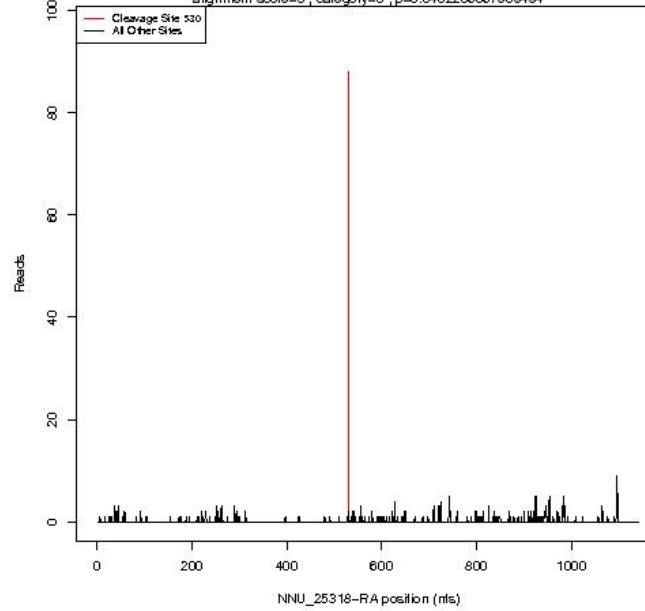
Nnu-miR396b-5p slicing NNU_25318-RA at nt 530

alignment score=4, category=0, p=0.040902098961711



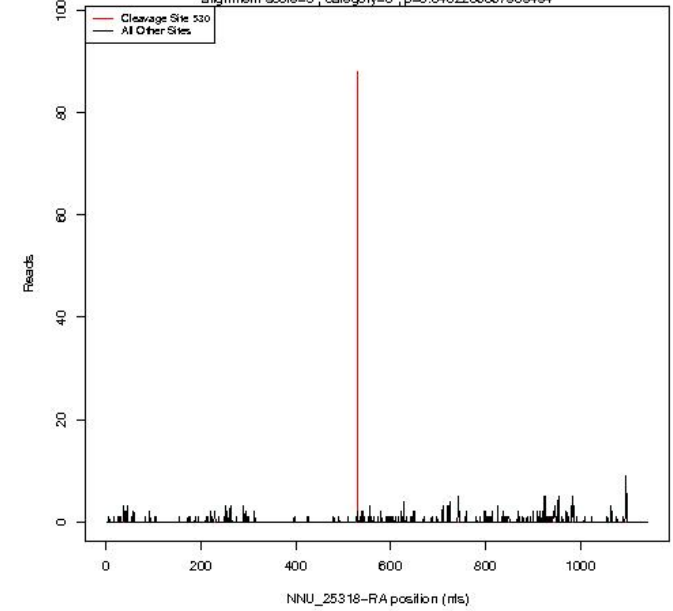
Nnu-miR396c-5p slicing NNU_25318-RA at nt 530

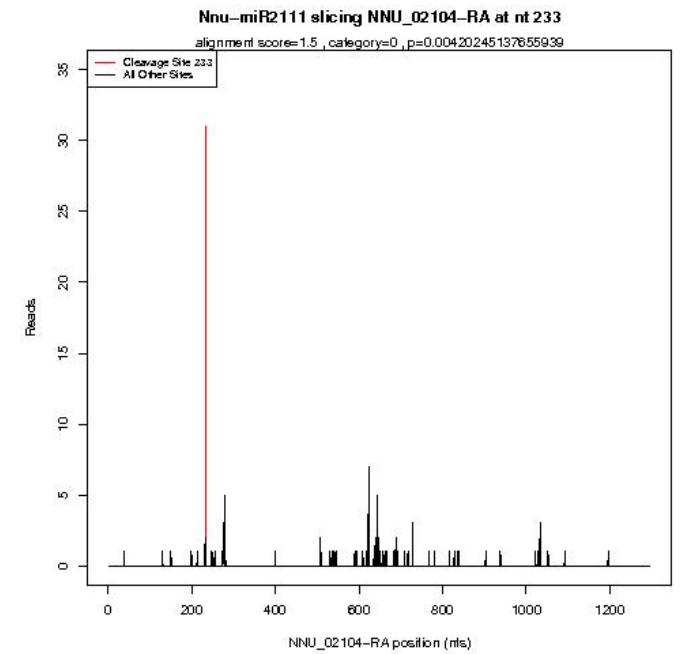
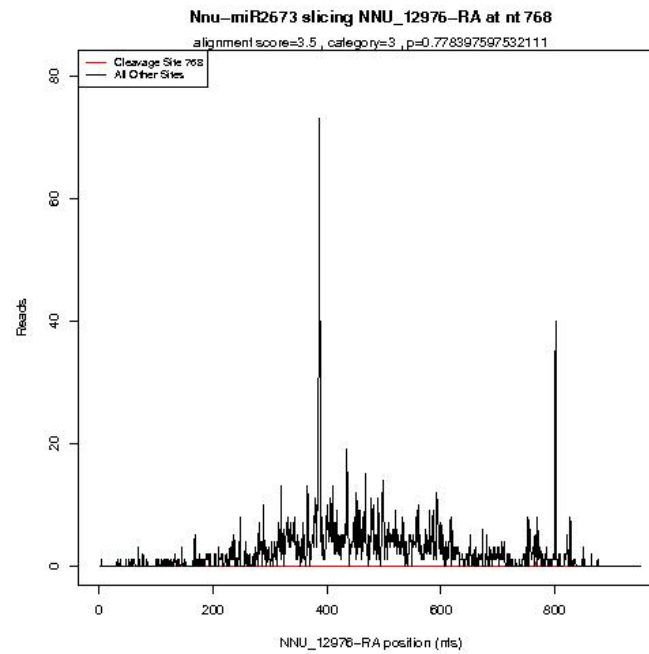
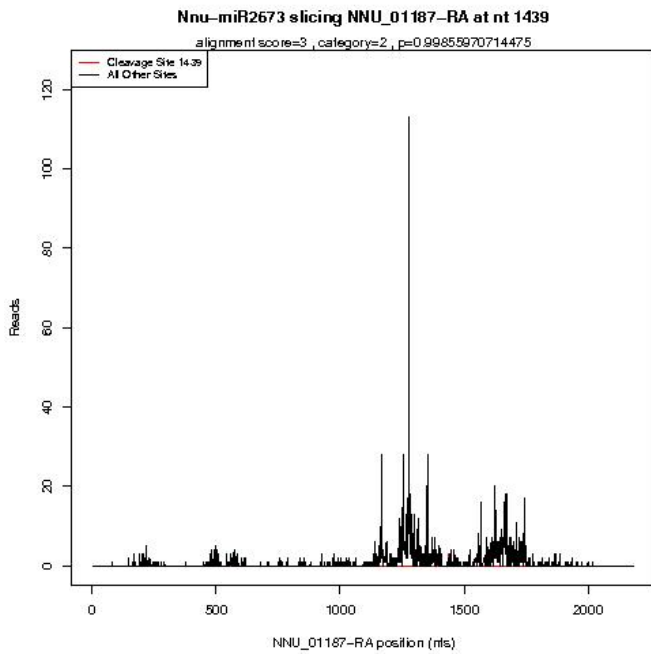
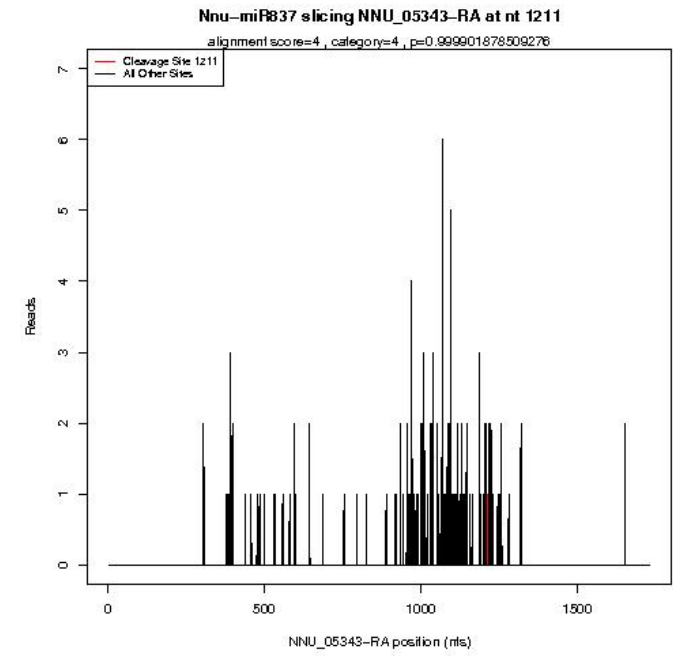
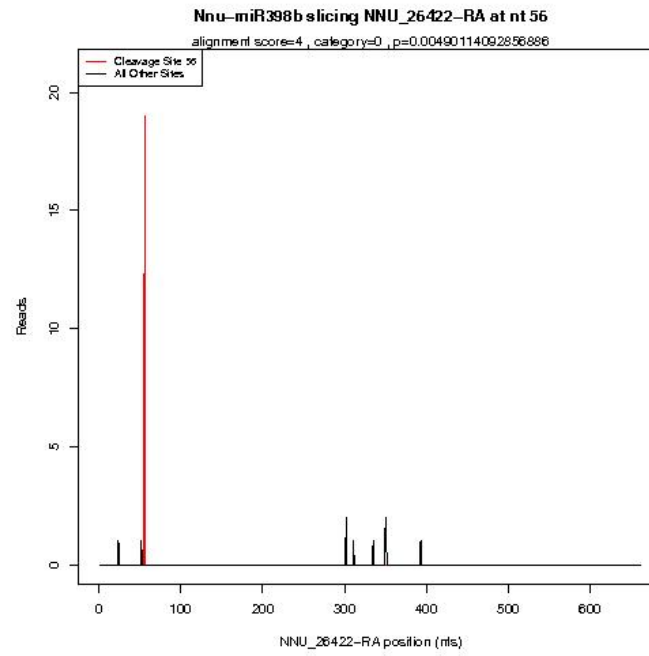
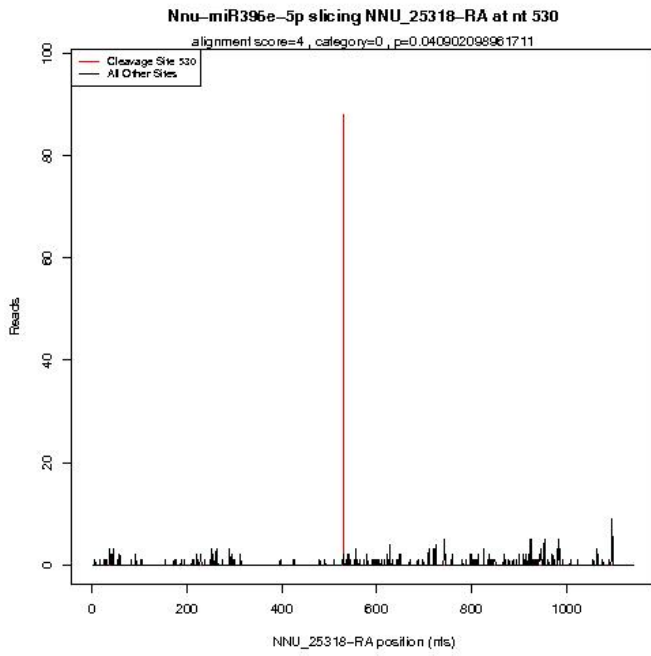
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Nnu-miR396d-5p slicing NNU_25318-RA at nt 530

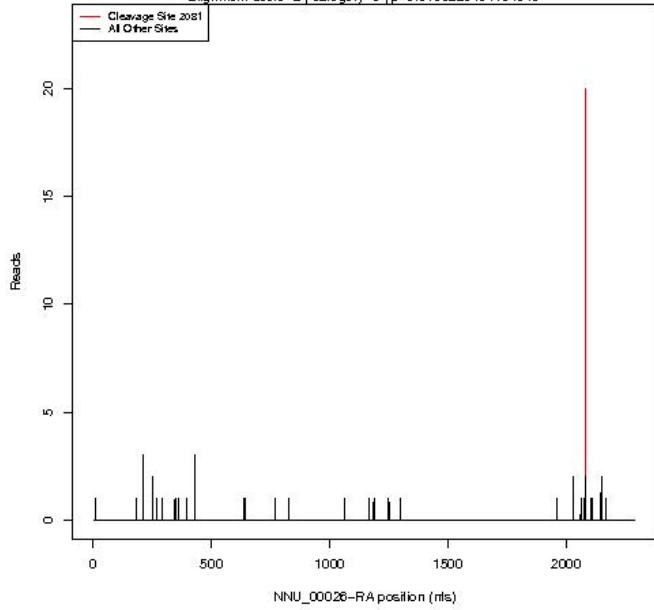
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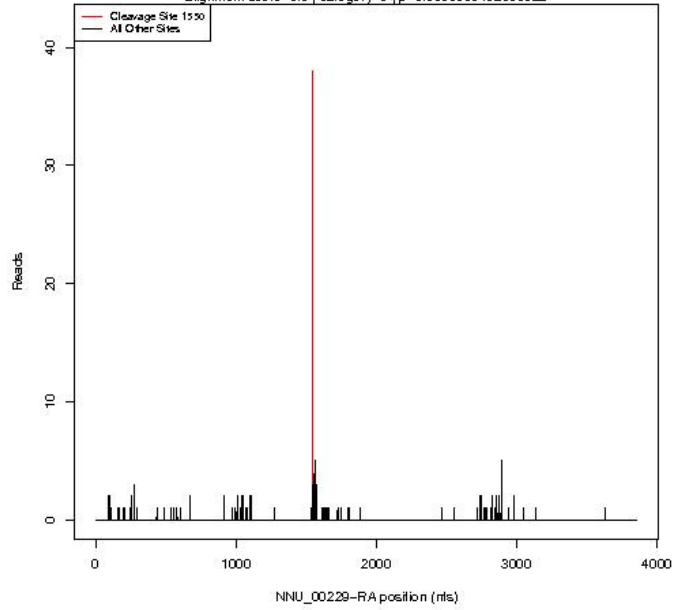
novel_mir_27 slicing NNU_00026-RA at nt 2081

alignment score=2, category=0, p=0.0153228491194648



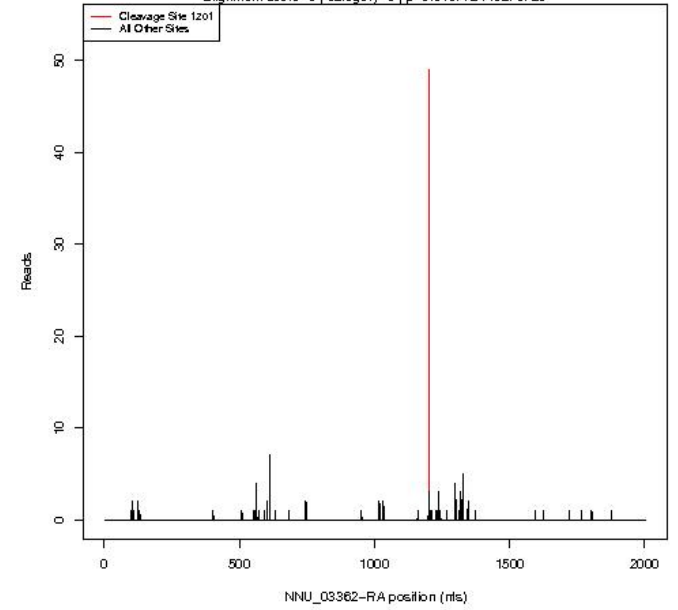
novel_mir_27 slicing NNU_00229-RA at nt 1550

alignment score=3.5, category=0, p=0.005993402533322



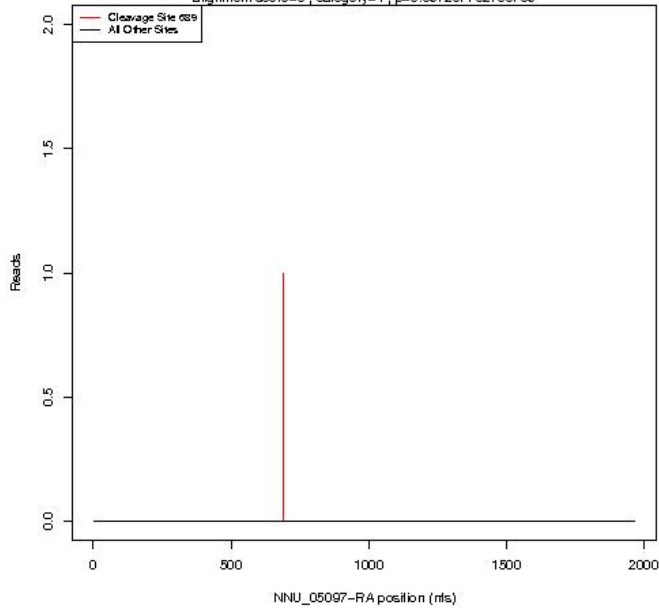
novel_mir_36 slicing NNU_03362-RA at nt 1201

alignment score=3, category=0, p=0.018772440275729



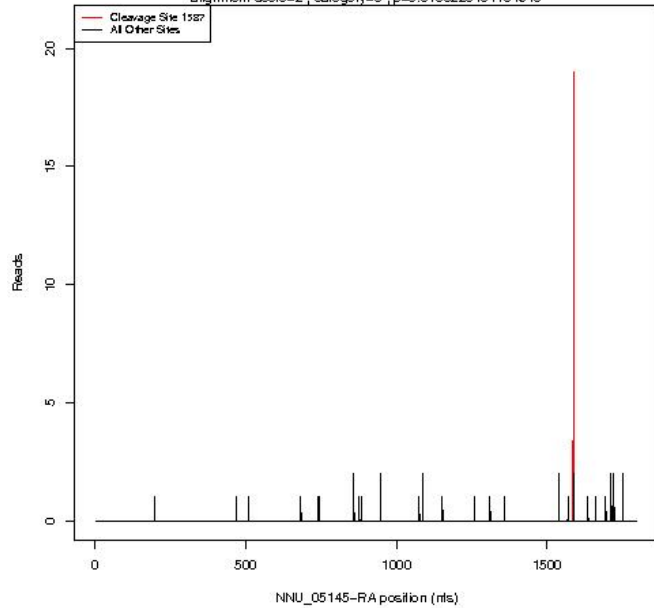
novel_mir_92 slicing NNU_05097-RA at nt 689

alignment score=3, category=4, p=0.987257732799706



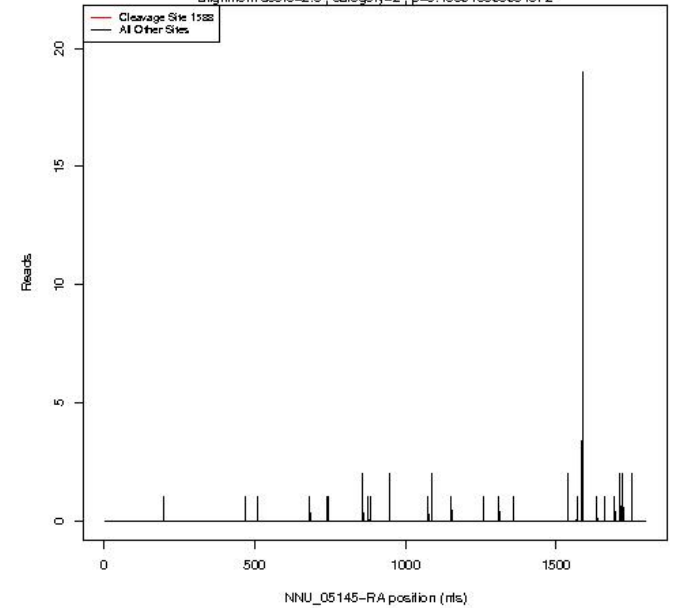
novel_mir_27 slicing NNU_05145-RA at nt 1587

alignment score=2, category=0, p=0.0153228491194648



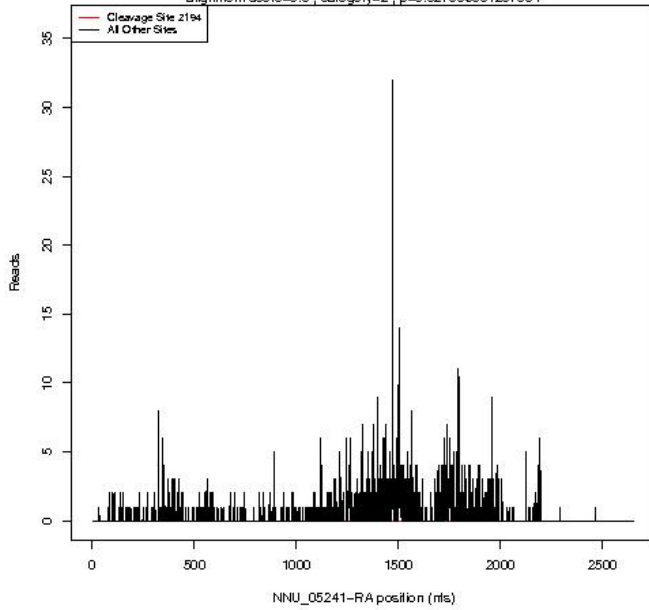
novel_mir_29 slicing NNU_05145-RA at nt 1588

alignment score=2.5, category=2, p=0.483813580604572



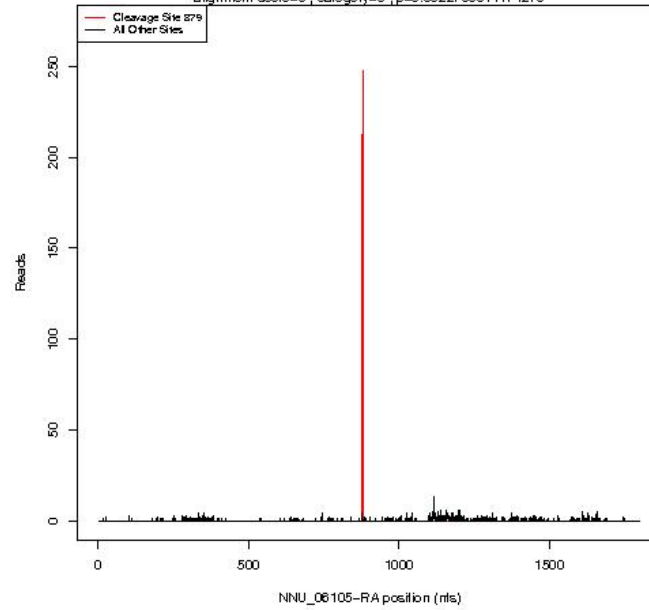
novel_mir_46 slicing NNU_05241-RA at nt 2194

alignment score=3.5 , category=2 , p=0.327356581237984



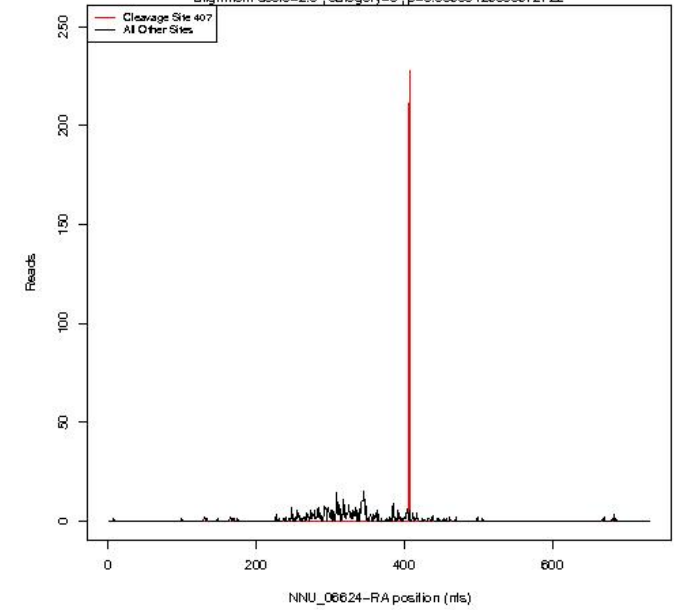
novel_mir_92 slicing NNU_06105-RA at nt 879

alignment score=3 , category=0 , p=0.0522780844474279



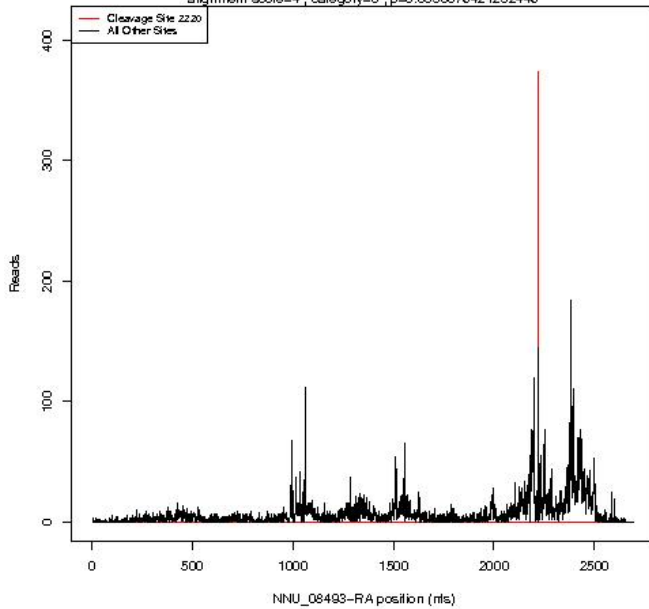
novel_mir_92 slicing NNU_06624-RA at nt 407

alignment score=2.5 , category=0 , p=0.00699426959672722



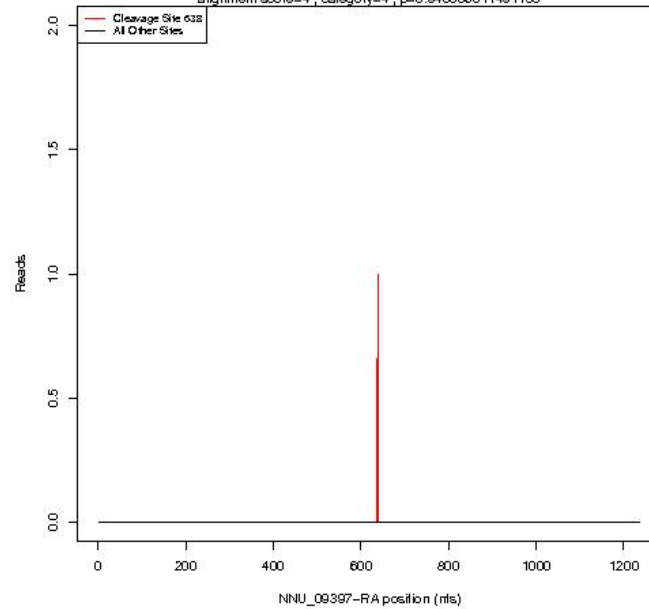
novel_mir_48 slicing NNU_08493-RA at nt 2220

alignment score=4 , category=0 , p=0.0338076421252446



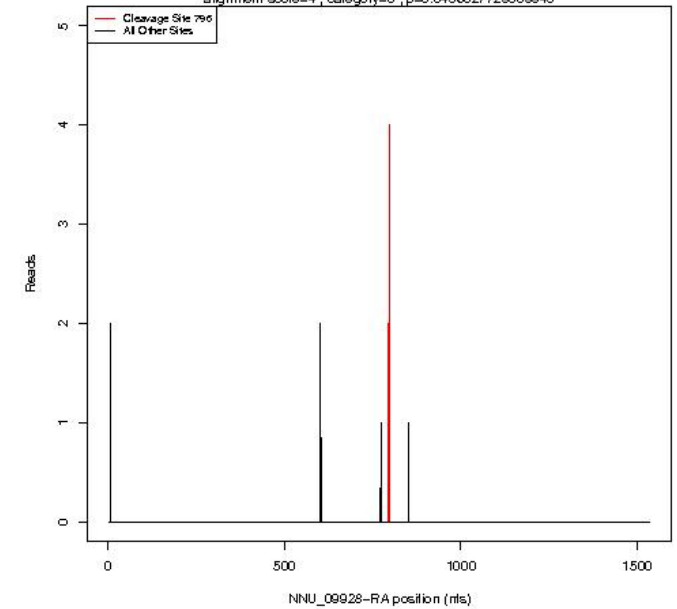
novel_mir_36 slicing NNU_09397-RA at nt 638

alignment score=4 , category=4 , p=0.948806811491155



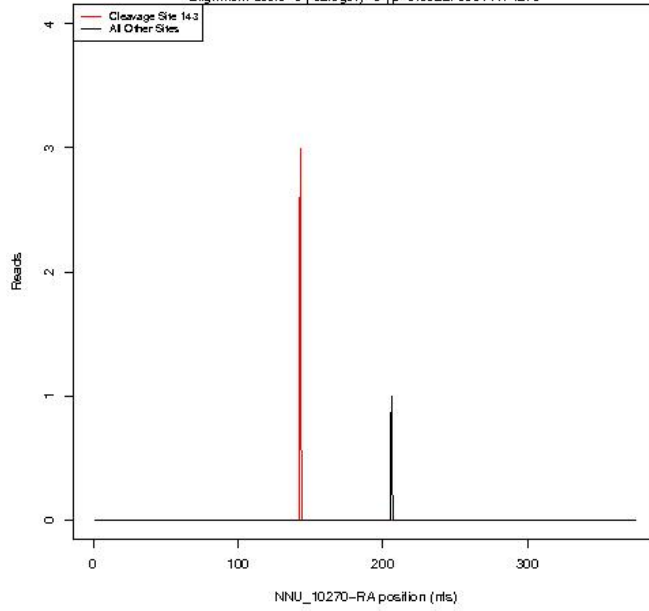
novel_mir_36 slicing NNU_09928-RA at nt 796

alignment score=4 , category=0 , p=0.045602729389943



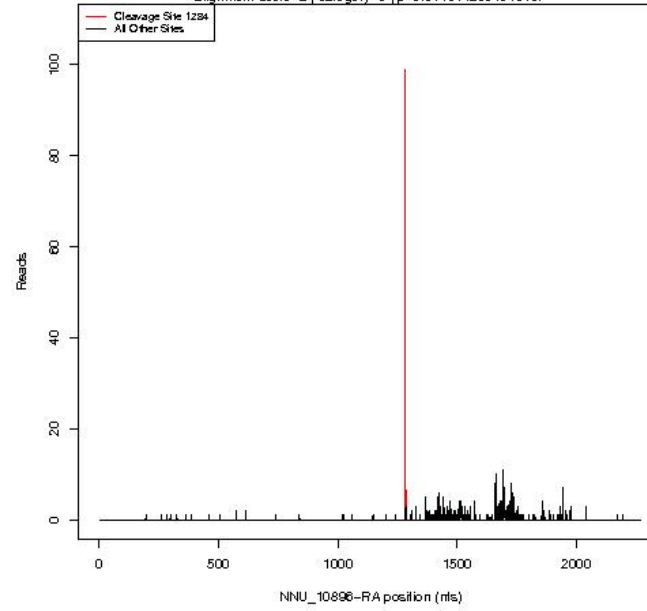
novel_mir_92 slicing NNU_10270-RA at nt 143

alignment score=3, category=0, p=0.0522780844474279



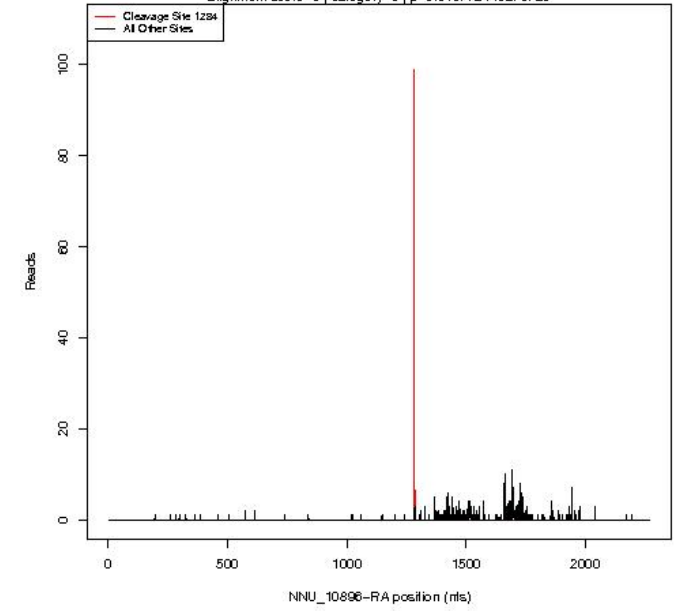
novel_mir_29 slicing NNU_10896-RA at nt 1284

alignment score=2, category=0, p=0.0115142901310157



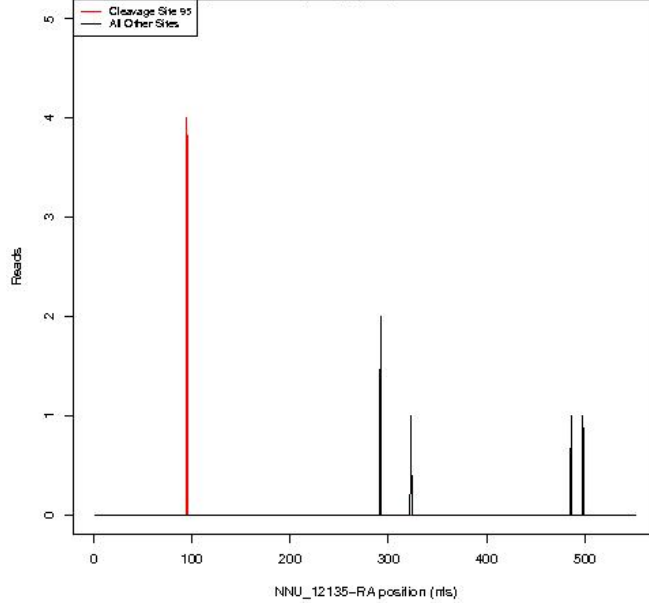
novel_mir_36 slicing NNU_10896-RA at nt 1284

alignment score=3, category=0, p=0.018772440275729



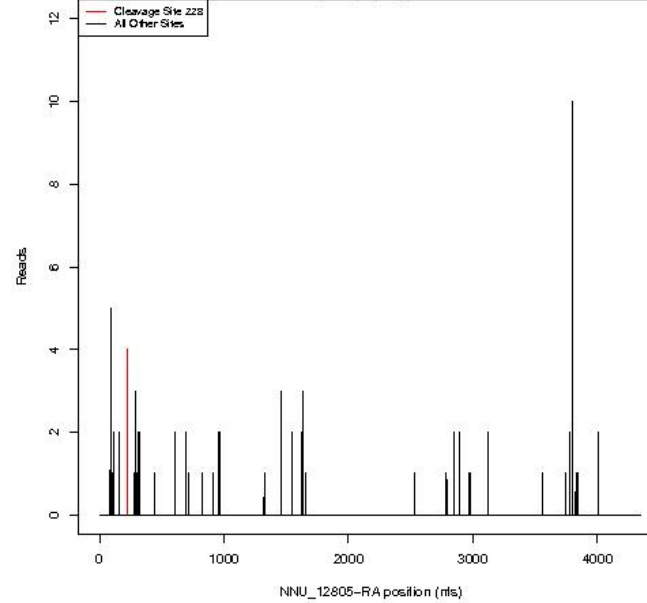
novel_mir_92 slicing NNU_12135-RA at nt 95

alignment score=4, category=0, p=0.0194609069676492



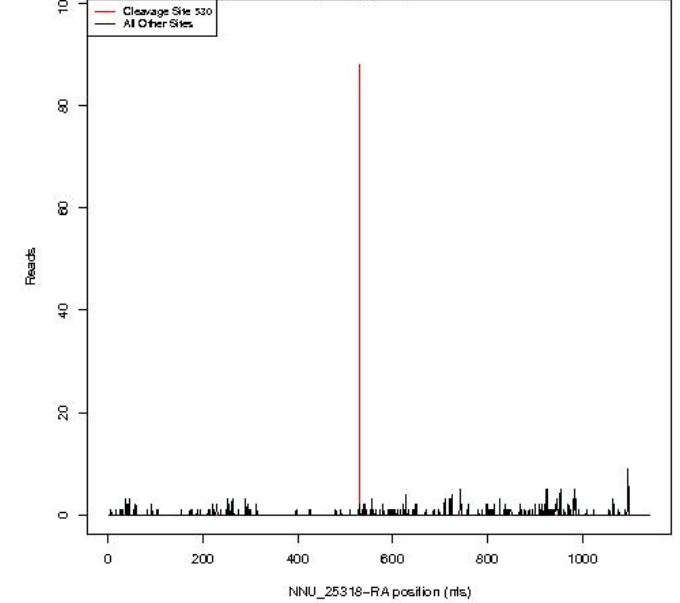
novel_mir_1 slicing NNU_12805-RA at nt 228

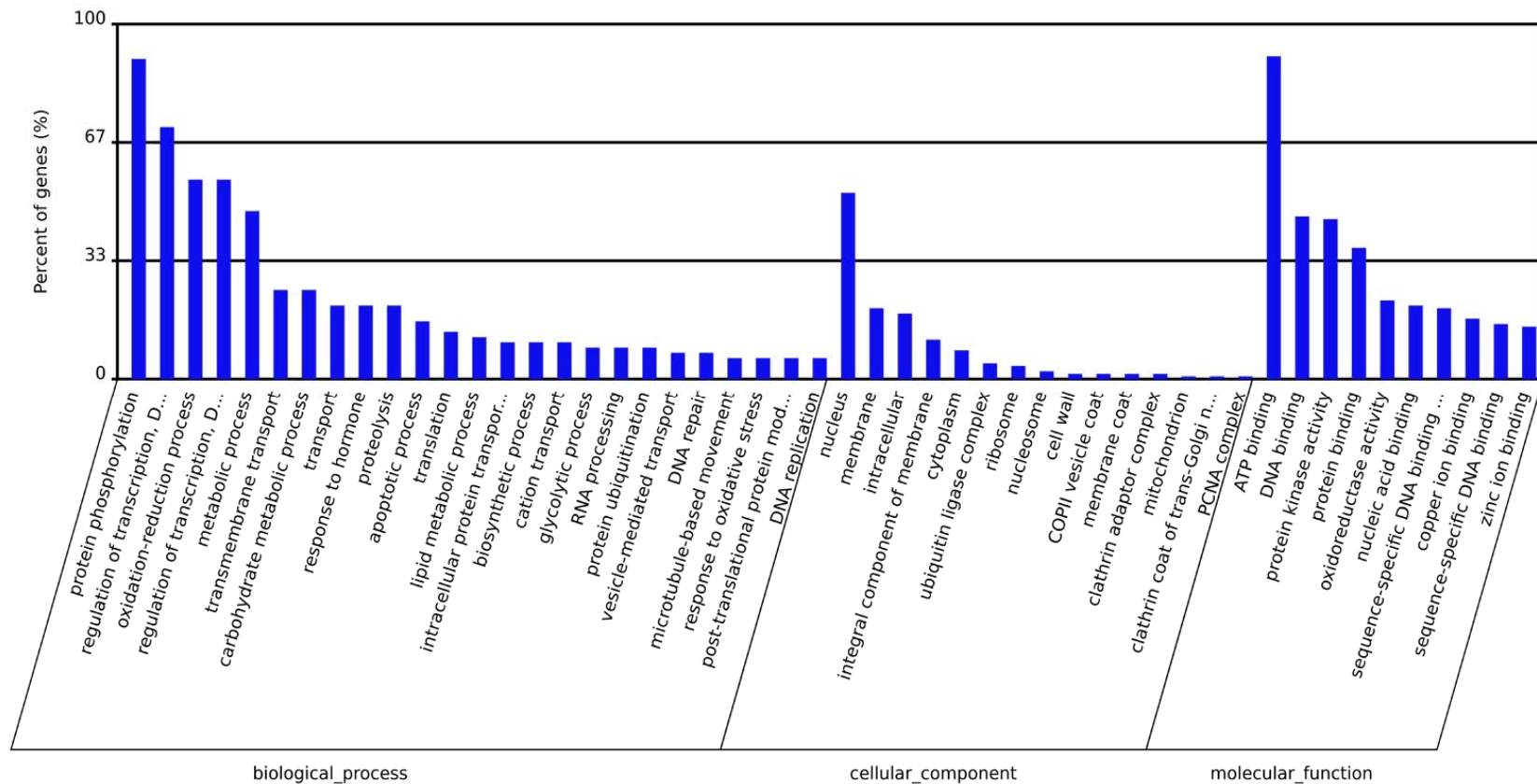
alignment score=3.5, category=2, p=0.232302844282898



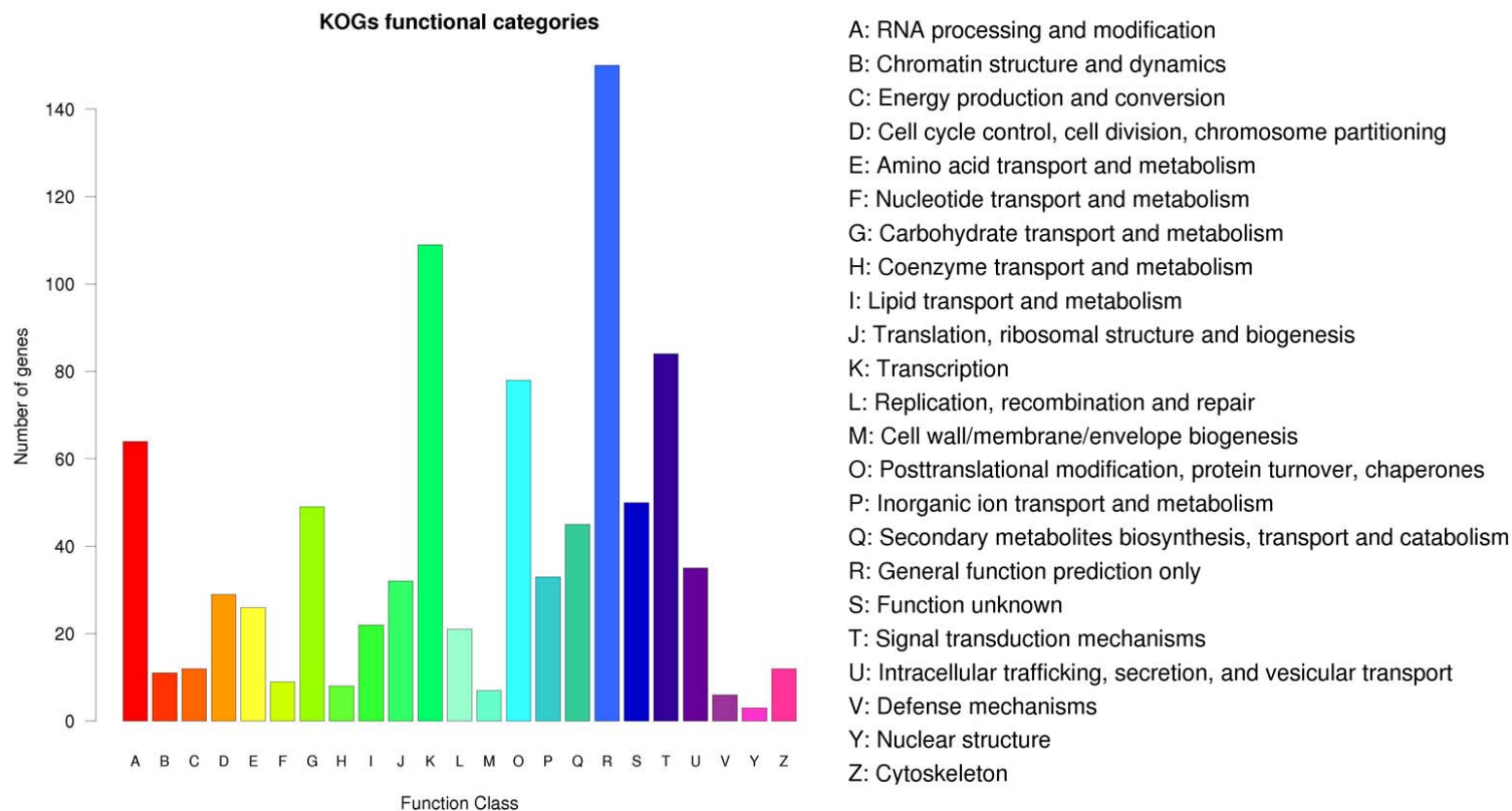
novel_mir_92 slicing NNU_25318-RA at nt 530

alignment score=3, category=0, p=0.0522780844474279





Additional file 1: Figure S5 GO classification of target transcripts for all identified miRNAs in sacred lotus.



Additional file 1: Figure S6 KOG function classification of the miRNA targets in sacred lotus.