Gene: BRCA1 - Sequence: NG_005905.2
Transcript: NM_007294.3 - Protein: NP_009225.1
Date : February 19, 2015

1st line: Base numbering. Full stops for intronic +/- 5, 10, 15...
2nd line: Base sequence. lower case Introns, upper case Exons
3rd line: Amino acid sequence. Printed on FIRST base of codon
4th line: Amino acid numbering. Numbered on 1st and increments of 10

Exon 1 | Start: 92501 | End: 92713 | Length: 212

```
   .     .     .     .     .     .     .     .     .     .     .     .
tacttatatttaccgaaactggagacctccattagggcggaaagagtgggggattgggac

   .     .     .     .     .     .     .     .     .     .     .     .
ctcttcttacgactgctttggacaataggtagcgattctgaccttcgtacagcaattact

   .     .     .     .     .     .     .     .     .     .     .     .
gtgatgcaataagccgcaactggaagagtagaggctagagggcaggcactttatggcaaa

   .     .     .     .     .     .     .     .     .     .     .     .
ctcaggtagaattcttcctcttccgtctctttccttttacgtcatccggggggcagactgg

   .     .     .     .     .     .     .     .     .     .     .     .
gtggccaatccagagccccgagagacgcttggctctttctgtccctcccatcctctgatt

    |-229      |-219      |-209      |-199      |-189      |-179
GTACCTTGATTTCGTATTCTGAGAGGCTGCTGCTTAGCGGTAGCCCCTTGGTTTCCGTGG

    |-169      |-159      |-149      |-139      |-129      |-119
CAACGGAAAAGCGCGGGAATTACAGATAAATTAAAACTGCGACTGCGCGGCGTGAGCTCG

    |-109      |-99       |-89       |-79       |-69       |-59
CTGAGACTTCCTGGACGGGGGACAGGCTGTGGGGTTTCTCAGATAACTGGGCCCCTGCGC

    |-49       |-39       |-29          .     .     .     .     .
TCAGGAGGCCTTCACCCTCTGCTCTGGGTAAAGgtagtagagtcccgggaaagggacagg

   .     .     .     .     .     .     .     .     .     .     .     .
gggcccaagtgatgctctggggtactggcgtgggagagtggatttccgaagctgacagat

   .     .     .     .     .     .     .     .     .     .     .     .
```

1

```
gggtattctttgacggggggtaggggcggaacctgagaggcgtaaggcgttgtgaaccct

   .     .     .     .     .     .     .     .     .     .     .     .
ggggagggggcagtttgtaggtcgcgagggaagcgctgaggatcaggaaggggcactg

   .     .     .     .     .     .     .     .     .     .     .     .
agtgtccgtgggggaatcctcgtgataggaactggaatatgccttgagggggacactatg

   .     .     .     .     .     .     .
tctttaaaaacgtcggctggtcatgaggtcagg
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Exon 2 | Start: 93869 | End: 93967 | Length: 98

```
   .     .     .     .     .     .     .     .     .     .     .     .
aggctaccaccacctacccggtcagtcactcctctgtagctttctctttcttggagaaag

   .     .     .     .     .     .     .     .     .     .     .     .
gaaaagacccaaggggttggcagcaatatgtgaaaaaattcagaatttatgttgtctaat

   .     .     .     .     .     .     .     .     .     .     .     .
tacaaaaagcaacttctagaatctttaaaaataaaggacgttgtcattagttctttggtt

   .     .     .     .     .     .     .     .     .     .     .     .
tgtattattctaaaaccttccaaatcttaaatttactttattttaaaatgataaaatgaa

   .     .     .     .     .     .     .     .     .     .     .     .
gttgtcattttataaacctttaaaaagatatatatatgttttttctaatgtgttaaag
|-19        |-9        |1        |11        |21        |31        |41
TTCATTGGAACAGAAAGAAATGGATTTATCTGCTCTTCGCGTTGAAGAAGTACAAAATGT
                   M  D  L  S  A  L  R  V  E  E  V  Q  N  V
                   |1                              |11

         |51        |61        |71       .     .     .     .
CATTAATGCTATGCAGAAAATCTTAGAGTGTCCCATCTGgtaagtcagcacaagagtgta
 I  N  A  M  Q  K  I  L  E  C  P  I  C
                   |21

   .     .     .     .     .     .     .     .     .     .     .     .
ttaatttgggattcctatgattatctcctatgcaaatgaacagaattgaccttacatact

   .     .     .     .     .     .     .     .     .     .     .     .
```

```
agggaagaaaagacatgtctagtaagattaggctattgtaattgctgattttcttaactg

     .     .     .     .     .     .     .     .     .     .     .     .
aagaactttaaaaatatagaaaatgattccttgttctccatccactctgcctctcccact

     .     .     .     .     .     .     .     .     .     .     .     .
cctctccttttcaacacaaatcctgtggtccgggaaagacagggactctgtcttgattgg

     .     .     .     .     .     .     .     .     .
ttctgcactggggcaggaatctagtttagattaactggc
```

Exon 3 | Start: 102205 | End: 102258 | Length: 53

```
  .     .     .     .     .     .     .     .     .     .     .     .
aattcgtacgaactattatcaactaatcttttaaatgctgatgatagtatagagtattga

  .     .     .     .     .     .     .     .     .     .     .     .
agggatcaatataattctgttttgatatctgaaagctcactgaaggtaaggatcgtattc

  .     .     .     .     .     .     .     .     .     .     .     .
tctgctgtattctcagttcctgacacagcagacatttaataaatattgaacgaacttgag

  .     .     .     .     .     .     .     .     .     .     .     .
gccttatgttgactcagtcataacagctcaaagttgaacttattcactaagaatagcttt

  .     .     .     .     .     .     .     .     .     .     .     .
attttaaataaattattgagcctcatttatttttcttttctcccccccctaccctgctag

|81       |91       |101      |111      |121      |131        .
TCTGGAGTTGATCAAGGAACCTGTCTCCACAAAGTGTGACCACATATTTTGCAAgtaagt
 L  E  L  I  K  E  P  V  S  T  K  C  D  H  I  F  C  K
          |31                              |41

     .     .     .     .     .     .     .     .     .     .     .     .
ttgaatgtgttatgtggctccattattagcttttgttttttgtccttcataacccaggaaa

     .     .     .     .     .     .     .     .     .     .     .     .
cacctaactttatagaagctttactttcttcaattaagtgagaacgaaaaatccaactcc

     .     .     .     .     .     .     .     .     .     .     .     .
atttcattctttctcagagagtatatagttatcaaaagttggttgtaatcatagttcctg
```

```
     .         .         .         .         .         .         .
gtaaagttttgacatatattatctttttttttttttttgagacaaagtctcgctctgtcg

     .         .         .         .         .         .         .
cccaggctggagtgcagtggcatgatcttggctcactgcaacctccgcccccccg
```

Exon 4 | Start: 111451 | End: 111528 | Length: 77

```
  .         .         .         .         .         .         .         .
tatgaatatatcattaaatatgccatattaacttttattaagtttttatgtgatcataaca

  .         .         .         .         .         .         .         .
gtaagccatatgcatgtaagttcagttttcatagatcattgcttatgtagtttaggttttt

  .         .         .         .         .         .         .         .
tgcttatgcagcatccaaaaacaattaggaaactattgcttgtaattcacctgccattac

  .         .         .         .         .         .         .         .
tttttaaatggctcttaagggcagttgtgagattatcttttcatggctatttgccttttg

  .         .         .         .         .         .         .         .
agtattctttctacaaaaggaagtaaattaaattgttctttctttctttataatttatag
        |141       |151       |161       |171       |181       |191
ATTTTGCATGCTGAAACTTCTCAACCAGAAGAAAGGGCCTTCACAGTGTCCTTTATGTAA
  F   C   M   L   K   L   L   N   Q   K   K   G   P   S   Q   C   P   L   C   K
                |51                                  |61

        |201       |211   .         .         .         .         .         .         .
GAATGATATAACCAAAAGgtatataatttggtaatgatgctaggttggaagcaaccacag
  N   D   I   T   K   R
                |71

     .         .         .         .         .         .         .         .
taggaaaaagtagaaattatttaataacatagcgttcctataaaaccattcatcagaaaa

     .         .         .         .         .         .         .         .
atttataaaagagtttttagcacacagtaaattatttccaaagttattttcctgaaagtt

     .         .         .         .         .         .         .         .
ttatgggacatctgccttatacaggtattagaaacttactgcctttctctaatgcttcta
```

4

```
         .         .         .         .         .         .         .         .         .         .         .         .
gtgtaaaaacttgcagacttatgtaaagtagggctgtatcgccgtgcccccattgtctgt

         .         .         .         .
taatcttgttttttatatt
```

Exon 5 | Start: 113028 | End: 113116 | Length: 88

```
         .         .         .         .         .         .         .         .         .         .         .         .
aaattaaacaaaaaaaaaagtactctagttttctatgcaatgcattatatctgctgtgga

         .         .         .         .         .         .         .         .         .         .         .         .
tttagggcagtattatatcagataattttaggcatttggtaggcttaaatgaatgacaaa

         .         .         .         .         .         .         .         .         .         .         .         .
aagttactaaatcactgccatcacacggtttatacagatgtcaatgatgtattgattata

         .         .         .         .         .         .         .         .         .         .         .         .
gaggttttctactgttgctgcatcttattttttatttgtttacatgtcttttcttatttta

         .         .         .         .         .         .         .         .         .         .         .         .
gtgtccttaaaaggttgataatcacttgctgagtgtgtttctcaaacaatttaatttcag
         |221       |231       |241       |251       |261       |271
GAGCCTACAAGAAAGTACGAGATTTAGTCAACTTGTTGAAGAGCTATTGAAAATCATTTG
 S  L  Q  E  S  T  R  F  S  Q  L  V  E  E  L  L  K  I  I  C
                                 |81                          |91

         |281       |291       |301 .         .         .         .         .         .
TGCTTTTCAGCTTGACACAGGTTTGGAGTgtaagtgttgaatatcccaagaatgacactc
 A  F  Q  L  D  T  G  L  E  Y
                                 |101

         .         .         .         .         .         .         .         .         .         .         .         .
aagtgctgtccatgaaaactcaggaagtttgcacaattactttctatgacgtggtgataa

         .         .         .         .         .         .         .         .         .         .         .         .
gaccttttagtctaggttaattttagttctgtatctgtaatctattttttaaaaaattact

         .         .         .         .         .         .         .         .         .         .         .         .
cccactggtctcacaccttattttatcaatcgtaaggtgcacattttttcacatcttaaca
```

5

```
          .         .         .         .         .         .         .         .         .         .         .         .
      tctctgaaattgggaacattttactattgagggtgtgtcatttgtttaatttgtgtgctt

          .         .         .         .         .         .
      tctttcttagtgatacagaaaataatagt



      Exon 6 | Start: 113723 | End: 113862 | Length: 139



          .         .         .         .         .         .         .         .         .         .         .         .
      tacattgttggtgtcttagctttagtgaaatacagtattgataggcaaatttcttagtgt

          .         .         .         .         .         .         .         .         .         .         .         .
      taaggtagaaaacaaggactctaaataactttgatggtctgtgtatttgttttttgtttcc

          .         .         .         .         .         .         .         .         .         .         .         .
      taggagtaaaatttccagttgatttttttaaaatttgatttttaaaaaaaatcacaggtaa

          .         .         .         .         .         .         .         .         .         .         .         .
      ccttaatgcattgtcttaacacaacaaagagcatacatagggtttctcttggtttctttg

          .         .         .         .         .         .         .         .         .         .         .         .
      attataattcatacattttttctctaactgcaaacataatgtttttcccttgtatttttacag

              |311       |321       |331       |341       |351       |361
      ATGCAAACAGCTATAATTTTGCAAAAAAGGAAAATAACTCTCCTGAACATCTAAAAGATG
        A   N   S   Y   N   F   A   K   K   E   N   N   S   P   E   H   L   K   D   E
                            |111                                             |121

              |371       |381       |391       |401       |411       |421
      AAGTTTCTATCATCCAAAGTATGGGCTACAGAAACCGTGCCAAAAGACTTCTACAGAGTG
        V   S   I   I   Q   S   M   G   Y   R   N   R   A   K   R   L   L   Q   S   E
                            |131                                             |141

              |431       |441 .        .         .         .         .         .         .
      AACCCGAAAATCCTTCCTTGgtaaaaccatttgttttcttcttcttcttcttcttctttt
        P   E   N   P   S   L



          .         .         .         .         .         .         .         .         .         .         .         .
      cttttttttttcttttttttttttttgagatggagtcttgctctgtggcccaggctagaagc

          .         .         .         .         .         .         .         .         .         .         .         .
```

agtcctcctgccttagccccccttagtagctgggattacaggcacgcgccaccatgccagg

```
     .         .         .         .         .         .         .         .         .         .
```

ctaattttttgtattttttagtagagacggggtttcatcatgttggccaggctggtctcgaa

```
     .         .         .         .         .         .         .         .         .         .
```

ctcctaacctcaggtgatccacccacctcggctccccaaattgctgggattacaggtgtg

```
     .         .         .         .
```

agccactgtgcccggccggt

Exon 7 | Start: 118104 | End: 118209 | Length: 105


```
     .         .         .         .         .         .         .         .         .         .
```

actactactattattttgtagagactgggtctcactctgttgcttatgctggtcttgaac

```
     .         .         .         .         .         .         .         .         .         .
```

tcctggcctcaagcagtcctgctccagcctcccaaagtgctgggattataggcatgagct

```
     .         .         .         .         .         .         .         .         .         .
```

accgctcccagccccagacattttagtgtgtaaattcctgggcattttttccaggcatca

```
     .         .         .         .         .         .         .         .         .         .
```

tacatgttagctgactgatgatggtcaatttattttgtccatggtgtcaagtttctcttc

```
     .         .         .         .         .         .         .         .         .         .
```

aggaggaaaagcacagaactggccaacaattgcttgactgttctttaccatactgtttag
```
        |451        |461        |471        |481        |491        |501
CAGGAAACCAGTCTCAGTGTCCAACTCTCTAACCTTGGAACTGTGAGAACTCTGAGGACA
Q   E   T   S   L   S   V   Q   L   S   N   L   G   T   V   R   T   L   R   T
        |151                             |161
```

```
        |511        |521        |531        |541        .         .
AAGCAGCGGATACAACCTCAAAAGACGTCTGTCTACATTGAATTGGgtaagggtctcagg
K   Q   R   I   Q   P   Q   K   T   S   V   Y   I   E   L   G
        |171                             |181
```

```
     .         .         .         .         .         .         .         .         .         .
```

tttttaagtatttaataataattgctggattccttatcttatagttttgccaaaaatct

```
     .         .         .         .         .         .         .         .         .         .
```

```
tggtcataatttgtatttgtggtaggcagctttgggaagtgaattttatgagccctatgg

 .      .      .      .      .      .      .      .      .      .
tgagttataaaaaatgtaaaagacgcagttcccaccttgaagaatcttacttttaaaaagg

 .      .      .      .      .      .      .      .      .      .
gagcaaaagaggccaggcatggtggctcacacctgtaatcccagcactttgggaggccaa

 .      .      .      .      .      .      .      .      .      .
agtgggtggatcacctgaggtcgggagttcgagaccagcctagcca


Exon 8 | Start: 120695 | End: 120740 | Length: 45


 .      .      .      .      .      .      .      .      .      .
tagaaacggggggtctcactttgttggccaggctggtcttgaactcctaacctcaaataat

 .      .      .      .      .      .      .      .      .      .
ccacccatctcggcctcctcaagtgctgggattacaggtgagagccactgtgcctggcga

 .      .      .      .      .      .      .      .      .      .
agcccatgcctttaaccacttctctgtattacatactagcttaactagcattgtacctgc

 .      .      .      .      .      .      .      .      .      .
cacagtagatgctcagtaaatatttctagttgaatatctgttttttcaacaagtacatttt

 .      .      .      .      .      .      .      .      .      .
tttaacccttttaattaagaaaacttttattgatttattttttggggggaaattttttag
   |551       |561       |571       |581       |591    .      .
GATCTGATTCTTCTGAAGATACCGTTAATAAGGCAACTTATTGCAGgtgagtcaaagaga
   S  D  S  S  E  D  T  V  N  K  A  T  Y  C  S
                    |191

 .      .      .      .      .      .      .      .      .      .
acctttgtctatgaagctggtattttcctatttagttaatattaaggattgatgtttctc

 .      .      .      .      .      .      .      .      .      .
tctttttaaaaatattttaacttttatttttaggttcagggatgtatgtgcagtttgttat

 .      .      .      .      .      .      .      .      .      .
ataggtaaacacacgacttgggatttggtgtatagattttttttcatcatccgggtactaa
```

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         .         .         .         .         .         .
gcataccccacagttttttgtttgctttctttctgaatttctccctcttcccaccttcct

         .         .         .         .         .         .
ccctcaagtaggctggtgtttctccagactagaatcatggtattgg
```

Exon 9 | Start: 122062 | End: 122138 | Length: 76

```
         .         .         .         .         .         .
gtatttttagtagagatggggtttcaccatgttggccaggctggtcttgaactcatgacc

         .         .         .         .         .         .
tcaagtggtccacccgcctcagcctcccaaagtgctggaattacaggcttgagccaccgt

         .         .         .         .         .         .
gcccagcaaccatttcatttcaactagaagtttctaaaggagagagcagctttcactaac

         .         .         .         .         .         .
taaataagattggtcagctttctgtaatcgaaagagctaaaatgtttgatcttggtcatt

         .         .         .         .         .         .
tgacagttctgcatacatgtaactagtgtttcttattaggactctgtctttttccctatag
        |601       |611       |621       |631       |641       |651
TGTGGGAGATCAAGAATTGTTACAAATCACCCCTCAAGGAACCAGGGATGAAATCAGTTT
  V   G   D   Q   E   L   L   Q   I   T   P   Q   G   T   R   D   E   I   S   L
        |201                           |211

        |661       .         .         .         .         .         .
GGATTCTGCAAAAAAGGgtaatggcaaagtttgccaacttaacaggcactgaaaagagag
  D   S   A   K   K   A
        |221

         .         .         .         .         .         .
tgggtagatacagtactgtaattagattattctgaagaccatttgggacctttacaaccc

         .         .         .         .         .         .
acaaaatctcttggcagagttagagtatcattctctgtcaaatgtcgtggtatggtctga

         .         .         .         .         .         .
tagatttaaatggtactagactaatgtacctataataagaccttctgtaactgattgttg
```

```
         .     .     .     .     .     .     .     .     .     .     .     .
   ccctttcgttttttttttttgtttgtttgtttgtttttttttttgagatggggtctcactctg

         .     .     .     .
   ttgcccaggctggagtg
```

Exon 10 | Start: 123124 | End: 126549 | Length: 3425

```
      .     .     .     .     .     .     .     .     .     .     .     .
   agttttctgatggccaatctgcttttaattcactcttagacgttagagaaataggtgtgg

      .     .     .     .     .     .     .     .     .     .     .     .
   tttctgcatagggaaaattctgaaattaaaaatttaatggatcctaagtggaaataatct

      .     .     .     .     .     .     .     .     .     .     .     .
   aggtaaataggaattaaatgaaagagtatgagctacatcttcagtatacttggtagttta

      .     .     .     .     .     .     .     .     .     .     .     .
   tgaggttagtttctctaatatagccagttggttgatttccacctccaaggtgtatgaagt

      .     .     .     .     .     .     .     .     .     .     .     .
   atgtattttttttaatgacaattcagttttttgagtaccttgttattttttgtatattttcag

   |671       |681       |691       |701       |711       |721
   CTGCTTGTGAATTTTCTGAGACGGATGTAACAAATACTGAACATCATCAACCCAGTAATA
     A   C   E   F   S   E   T   D   V   T   N   T   E   H   H   Q   P   S   N   N
                                 |231                           |241

   |731       |741       |751       |761       |771       |781
   ATGATTTGAACACCACTGAGAAGCGTGCAGCTGAGAGGCATCCAGAAAAGTATCAGGGTA
     D   L   N   T   T   E   K   R   A   A   E   R   H   P   E   K   Y   Q   G   S
                                 |251                           |261

   |791       |801       |811       |821       |831       |841
   GTTCTGTTTCAAACTTGCATGTGGAGCCATGTGGCACAAATACTCATGCCAGCTCATTAC
     S   V   S   N   L   H   V   E   P   C   G   T   N   T   H   A   S   S   L   Q
                                 |271                           |281

   |851       |861       |871       |881       |891       |901
   AGCATGAGAACAGCAGTTTATTACTCACTAAAGACAGAATGAATGTAGAAAAGGCTGAAT
     H   E   N   S   S   L   L   L   T   K   D   R   M   N   V   E   K   A   E   F
                                 |291                           |301
```

10

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|911        |921        |931        |941        |951        |961
TCTGTAATAAAAGCAAACAGCCTGGCTTAGCAAGGAGCCAACATAACAGATGGGCTGGAA
  C  N  K  S  K  Q  P  G  L  A  R  S  Q  H  N  R  W  A  G  S
                      |311                              |321

|971        |981        |991        |1001       |1011       |1021
GTAAGGAAACATGTAATGATAGGCGGACTCCCAGCACAGAAAAAAAGGTAGATCTGAATG
  K  E  T  C  N  D  R  R  T  P  S  T  E  K  K  V  D  L  N  A
                      |331                              |341

|1031      |1041       |1051       |1061       |1071       |1081
CTGATCCCCTGTGTGAGAGAAAAGAATGGAATAAGCAGAAACTGCCATGCTCAGAGAATC
  D  P  L  C  E  R  K  E  W  N  K  Q  K  L  P  C  S  E  N  P
                      |351                              |361

|1091      |1101       |1111       |1121       |1131       |1141
CTAGAGATACTGAAGATGTTCCTTGGATAACACTAAATAGCAGCATTCAGAAAGTTAATG
  R  D  T  E  D  V  P  W  I  T  L  N  S  S  I  Q  K  V  N  E
                      |371                              |381

|1151      |1161       |1171       |1181       |1191       |1201
AGTGGTTTTCCAGAAGTGATGAACTGTTAGGTTCTGATGACTCACATGATGGGGAGTCTG
  W  F  S  R  S  D  E  L  L  G  S  D  D  S  H  D  G  E  S  E
                      |391                              |401

|1211      |1221       |1231       |1241       |1251       |1261
AATCAAATGCCAAAGTAGCTGATGTATTGGACGTTCTAAATGAGGTAGATGAATATTCTG
  S  N  A  K  V  A  D  V  L  D  V  L  N  E  V  D  E  Y  S  G
                      |411                              |421

|1271      |1281       |1291       |1301       |1311       |1321
GTTCTTCAGAGAAAATAGACTTACTGGCCAGTGATCCTCATGAGGCTTTAATATGTAAAA
  S  S  E  K  I  D  L  L  A  S  D  P  H  E  A  L  I  C  K  S
                      |431                              |441

|1331      |1341       |1351       |1361       |1371       |1381
GTGAAAGAGTTCACTCCAAATCAGTAGAGAGTAATATTGAAGACAAAATATTTGGGAAAA
  E  R  V  H  S  K  S  V  E  S  N  I  E  D  K  I  F  G  K  T
                      |451                              |461

|1391      |1401       |1411       |1421       |1431       |1441
CCTATCGGAAGAAGGCAAGCCTCCCCAACTTAAGCCATGTAACTGAAAATCTAATTATAG
  Y  R  K  K  A  S  L  P  N  L  S  H  V  T  E  N  L  I  I  G
                      |471                              |481
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|1451      |1461      |1471      |1481      |1491      |1501
GAGCATTTGTTACTGAGCCACAGATAATACAAGAGCGTCCCCTCACAAATAAATTAAAGC
  A   F   V   T   E   P   Q   I   I   Q   E   R   P   L   T   N   K   L   K   R
                        |491                               |501


|1511      |1521      |1531      |1541      |1551      |1561
GTAAAAGGAGACCTACATCAGGCCTTCATCCTGAGGATTTTATCAAGAAAGCAGATTTGG
  K   R   R   P   T   S   G   L   H   P   E   D   F   I   K   K   A   D   L   A
                        |511                               |521


|1571      |1581      |1591      |1601      |1611      |1621
CAGTTCAAAAGACTCCTGAAATGATAAATCAGGGAACTAACCAAACGGAGCAGAATGGTC
  V   Q   K   T   P   E   M   I   N   Q   G   T   N   Q   T   E   Q   N   G   Q
                        |531                               |541


|1631      |1641      |1651      |1661      |1671      |1681
AAGTGATGAATATTACTAATAGTGGTCATGAGAATAAAACAAAAGGTGATTCTATTCAGA
  V   M   N   I   T   N   S   G   H   E   N   K   T   K   G   D   S   I   Q   N
                        |551                               |561


|1691      |1701      |1711      |1721      |1731      |1741
ATGAGAAAAATCCTAACCCAATAGAATCACTCGAAAAAGAATCTGCTTTCAAAACGAAAG
  E   K   N   P   N   P   I   E   S   L   E   K   E   S   A   F   K   T   K   A
                        |571                               |581


|1751      |1761      |1771      |1781      |1791      |1801
CTGAACCTATAAGCAGCAGTATAAGCAATATGGAACTCGAATTAAATATCCACAATTCAA
  E   P   I   S   S   S   I   S   N   M   E   L   E   L   N   I   H   N   S   K
                        |591                               |601


|1811      |1821      |1831      |1841      |1851      |1861
AAGCACCTAAAAAGAATAGGCTGAGGAGGAAGTCTTCTACCAGGCATATTCATGCGCTTG
  A   P   K   K   N   R   L   R   R   K   S   S   T   R   H   I   H   A   L   E
                        |611                               |621


|1871      |1881      |1891      |1901      |1911      |1921
AACTAGTAGTCAGTAGAAATCTAAGCCCACCTAATTGTACTGAATTGCAAATTGATAGTT
  L   V   V   S   R   N   L   S   P   P   N   C   T   E   L   Q   I   D   S   C
                        |631                               |641


|1931      |1941      |1951      |1961      |1971      |1981
GTTCTAGCAGTGAAGAGATAAAGAAAAAAAAGTACAACCAAATGCCAGTCAGGCACAGCA
  S   S   S   E   E   I   K   K   K   K   Y   N   Q   M   P   V   R   H   S   R
                        |651                               |661


|1991      |2001      |2011      |2021      |2031      |2041
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GAAACCTACAACTCATGGAAGGTAAAGAACCTGCAACTGGAGCCAAGAAGAGTAACAAGC
  N   L   Q   L   M   E   G   K   E   P   A   T   G   A   K   K   S   N   K   P
                    |671                               |681

|2051     |2061     |2071     |2081     |2091     |2101
CAAATGAACAGACAAGTAAAAGACATGACAGCGATACTTTCCCAGAGCTGAAGTTAACAA
  N   E   Q   T   S   K   R   H   D   S   D   T   F   P   E   L   K   L   T   N
                    |691                               |701

|2111     |2121     |2131     |2141     |2151     |2161
ATGCACCTGGTTCTTTTACTAAGTGTTCAAATACCAGTGAACTTAAAGAATTTGTCAATC
  A   P   G   S   F   T   K   C   S   N   T   S   E   L   K   E   F   V   N   P
                    |711                               |721

|2171     |2181     |2191     |2201     |2211     |2221
CTAGCCTTCCAAGAGAAGAAAAAGAAGAGAAACTAGAAACAGTTAAAGTGTCTAATAATG
  S   L   P   R   E   E   K   E   E   K   L   E   T   V   K   V   S   N   N   A
                    |731                               |741

|2231     |2241     |2251     |2261     |2271     |2281
CTGAAGACCCCAAAGATCTCATGTTAAGTGGAGAAAGGGGTTTTGCAAACTGAAAGATCTG
  E   D   P   K   D   L   M   L   S   G   E   R   V   L   Q   T   E   R   S   V
                    |751                               |761

|2291     |2301     |2311     |2321     |2331     |2341
TAGAGAGTAGCAGTATTTCATTGGTACCTGGTACTGATTATGGCACTCAGGAAAGTATCT
  E   S   S   I   S   L   V   P   G   T   D   Y   G   T   Q   E   S   I   S
                    |771                               |781

|2351     |2361     |2371     |2381     |2391     |2401
CGTTACTGGAAGTTAGCACTCTAGGGAAGGCAAAAACAGAACCAAATAAATGTGTGAGTC
  L   L   E   V   S   T   L   G   K   A   K   T   E   P   N   K   C   V   S   Q
                    |791                               |801

|2411     |2421     |2431     |2441     |2451     |2461
AGTGTGCAGCATTTGAAAACCCCAAGGGACTAATTCATGGTTGTTCCAAAGATAATAGAA
  C   A   A   F   E   N   P   K   G   L   I   H   G   C   S   K   D   N   R   N
                    |811                               |821

|2471     |2481     |2491     |2501     |2511     |2521
ATGACACAGAAGGCTTTAAGTATCCATTGGGACATGAAGTTAACCACAGTCGGGAAACAA
  D   T   E   G   F   K   Y   P   L   G   H   E   V   N   H   S   R   E   T   S
                    |831                               |841

|2531     |2541     |2551     |2561     |2571     |2581
GCATAGAAATGGAAGAAAGTGAACTTGATGCTCAGTATTTGCAGAATACATTCAAGGTTT
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          I   E   M   E   E   S   E   L   D   A   Q   Y   L   Q   N   T   F   K   V   S
                          |851                                           |861

|2591     |2601     |2611     |2621     |2631     |2641
CAAAGCGCCAGTCATTTGCTCCGTTTTCAAATCCAGGAAATGCAGAAGAGGAATGTGCAA
    K   R   Q   S   F   A   P   F   S   N   P   G   N   A   E   E   E   C   A   T
                          |871                                           |881

|2651     |2661     |2671     |2681     |2691     |2701
CATTCTCTGCCCACTCTGGGTCCTTAAAGAAACAAAGTCCAAAAGTCACTTTTGAATGTG
    F   S   A   H   S   G   S   L   K   K   Q   S   P   K   V   T   F   E   C   E
                          |891                                           |901

|2711     |2721     |2731     |2741     |2751     |2761
AACAAAAGGAAGAAAATCAAGGAAAGAATGAGTCTAATATCAAGCCTGTACAGACAGTTA
    Q   K   E   E   N   Q   G   K   N   E   S   N   I   K   P   V   Q   T   V   N
                          |911                                           |921

|2771     |2781     |2791     |2801     |2811     |2821
ATATCACTGCAGGCTTTCCTGTGGTTGGTCAGAAAGATAAGCCAGTTGATAATGCCAAAT
    I   T   A   G   F   P   V   V   G   Q   K   D   K   P   V   D   N   A   K   C
                          |931                                           |941

|2831     |2841     |2851     |2861     |2871     |2881
GTAGTATCAAAGGAGGCTCTAGGTTTTGTCTATCATCTCAGTTCAGAGGCAACGAAACTG
    S   I   K   G   G   S   R   F   C   L   S   S   Q   F   R   G   N   E   T   G
                          |951                                           |961

|2891     |2901     |2911     |2921     |2931     |2941
GACTCATTACTCCAAATAAACATGGACTTTTACAAAACCCATATCGTATACCACCACTTT
    L   I   T   P   N   K   H   G   L   L   Q   N   P   Y   R   I   P   P   L   F
                          |971                                           |981

|2951     |2961     |2971     |2981     |2991     |3001
TTCCCATCAAGTCATTTGTTAAAAACTAAATGTAAGAAAAATCTGCTAGAGGAAAACTTTG
    P   I   K   S   F   V   K   T   K   C   K   K   N   L   L   E   E   N   F   E
                          |991                                          |1001

|3011     |3021     |3031     |3041     |3051     |3061
AGGAACATTCAATGTCACCTGAAAGAGAAATGGGAAATGAGAACATTCCAAGTACAGTGA
    E   H   S   M   S   P   E   R   E   M   G   N   E   N   I   P   S   T   V   S
                          |1011                                         |1021

|3071     |3081     |3091     |3101     |3111     |3121
GCACAATTAGCCGTAATAACATTAGAGAAAATGTTTTTAAAGAAGCCAGCTCAAGCAATA
    T   I   S   R   N   N   I   R   E   N   V   F   K   E   A   S   S   S   N   I
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                        |1031                          |1041

|3131     |3141     |3151     |3161     |3171     |3181
TTAATGAAGTAGGTTCCAGTACTAATGAAGTGGGCTCCAGTATTAATGAAATAGGTTCCA
  N   E   V   G   S   S   T   N   E   V   G   S   S   I   N   E   I   G   S   S
                        |1051                          |1061

|3191     |3201     |3211     |3221     |3231     |3241
GTGATGAAAACATTCAAGCAGAACTAGGTAGAAACAGAGGGCCAAAATTGAATGCTATGC
  D   E   N   I   Q   A   E   L   G   R   N   R   G   P   K   L   N   A   M   L
                        |1071                          |1081

|3251     |3261     |3271     |3281     |3291     |3301
TTAGATTAGGGGTTTTGCAACCTGAGGTCTATAAACAAAGTCTTCCTGGAAGTAATTGTA
  R   L   G   V   L   Q   P   E   V   Y   K   Q   S   L   P   G   S   N   C   K
                        |1091                          |1101

|3311     |3321     |3331     |3341     |3351     |3361
AGCATCCTGAAATAAAAAAAGCAAGAATATGAAGAAGTAGTTCAGACTGTTAATACAGATT
  H   P   E   I   K   K   Q   E   Y   E   E   V   V   Q   T   V   N   T   D   F
                        |1111                          |1121

|3371     |3381     |3391     |3401     |3411     |3421
TCTCTCCATATCTGATTTCAGATAACTTAGAACAGCCTATGGGAAGTAGTCATGCATCTC
  S   P   Y   L   I   S   D   N   L   E   Q   P   M   G   S   S   H   A   S   Q
                        |1131                          |1141

|3431     |3441     |3451     |3461     |3471     |3481
AGGTTTGTTCTGAGACACCTGATGACCTGTTAGATGATGGTGAAATAAAGGAAGATACTA
  V   C   S   E   T   P   D   D   L   L   D   D   G   E   I   K   E   D   T   S
                        |1151                          |1161

|3491     |3501     |3511     |3521     |3531     |3541
GTTTTGCTGAAAATGACATTAAGGAAAGTTCTGCTGTTTTTAGCAAAAGCGTCCAGAAAG
  F   A   E   N   D   I   K   E   S   S   A   V   F   S   K   S   V   Q   K   G
                        |1171                          |1181

|3551     |3561     |3571     |3581     |3591     |3601
GAGAGCTTAGCAGGAGTCCTAGCCCTTTCACCCATACACATTTGGCTCAGGGTTACCGAA
  E   L   S   R   S   P   S   P   F   T   H   T   H   L   A   Q   G   Y   R   R
                        |1191                          |1201

|3611     |3621     |3631     |3641     |3651     |3661
GAGGGGCCAAGAAATTAGAGTCCTCAGAAGAGAACTTATCTAGTGAGGATGAAGAGCTTC
  G   A   K   K   L   E   S   S   E   E   N   L   S   S   E   D   E   E   L   P
                        |1211                          |1221
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|3671      |3681      |3691      |3701      |3711      |3721
CCTGCTTCCAACACTTGTTATTTGGTAAAGTAAACAATATACCTTCTCAGTCTACTAGGC
  C  F  Q  H  L  L  F  G  K  V  N  N  I  P  S  Q  S  T  R  H
                         |1231                      |1241

|3731      |3741      |3751      |3761      |3771      |3781
ATAGCACCGTTGCTACCGAGTGTCTGTCTAAGAACACAGAGGAGAATTTATTATCATTGA
  S  T  V  A  T  E  C  L  S  K  N  T  E  E  N  L  L  S  L  K
                         |1251                      |1261

|3791      |3801      |3811      |3821      |3831      |3841
AGAATAGCTTAAATGACTGCAGTAACCAGGTAATATTGGCAAAGGCATCTCAGGAACATC
  N  S  L  N  D  C  S  N  Q  V  I  L  A  K  A  S  Q  E  H  H
                         |1271                      |1281

|3851      |3861      |3871      |3881      |3891      |3901
ACCTTAGTGAGGAAACAAAATGTTCTGCTAGCTTGTTTTCTTCACAGTGCAGTGAATTGG
  L  S  E  E  T  K  C  S  A  S  L  F  S  S  Q  C  S  E  L  E
                         |1291                      |1301

|3911      |3921      |3931      |3941      |3951      |3961
AAGACTTGACTGCAAATACAAACACCCAGGATCCTTTCTTGATTGGTTCTTCCAAACAAA
  D  L  T  A  N  T  N  T  Q  D  P  F  L  I  G  S  S  K  Q  M
                         |1311                      |1321

|3971      |3981      |3991      |4001      |4011      |4021
TGAGGCATCAGTCTGAAAGCCAGGGAGTTGGTCTGAGTGACAAGGAATTGGTTTCAGATG
  R  H  Q  S  E  S  Q  G  V  G  L  S  D  K  E  L  V  S  D  D
                         |1331                      |1341

|4031      |4041      |4051      |4061      |4071      |4081
ATGAAGAAAGAGGAACGGGCTTGGAAGAAAATAATCAAGAAGAGCAAAGCATGGATTCAA
  E  E  R  G  T  G  L  E  E  N  N  Q  E  E  Q  S  M  D  S  N
                         |1351                      |1361

|4091      .    .    .    .    .    .    .    .    .    .
ACTTAGgtattggaaccaggttttttgtgtttgccccagtctatttatagaagtgagctaa
  L  G


   .    .    .    .    .    .    .    .    .    .    .    .
atgtttatgcttttggggagcacattttacaaatttccaagtatagttaaaggaactgct

   .    .    .    .    .    .    .    .    .    .    .    .
tcttaaacttgaaacatgttcctcctaaggtgcttttcatagaaaaaagtccttcacaca
```

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```
     .         .         .         .         .         .
gctaggacgtcatctttgactgaatgagctttaacatcctaattactggtggacttactt

     .         .         .         .         .         .
ctggtttcattttataaaagcaaatccaggtgtcccaaagcaaggaatttaatcattttg

     .         .
tgtgac
```

Exon 11 | Start: 126952 | End: 127040 | Length: 88

```
     .         .         .         .         .         .
aaaggaactgcttcttaaacttgaaacatgttcctcctaaggtgcttttcatagaaaaaa

     .         .         .         .         .         .
gtccttcacacagctaggacgtcatctttgactgaatgagctttaacatcctaattactg

     .         .         .         .         .         .
gtggacttacttctggtttcattttataaaagcaaatccaggtgtcccaaagcaaggaat

     .         .         .         .         .         .
ttaatcattttgtgtgacatgaaagtaaatccagtcctgccaatgagaagaaaaagacac

     .         .         .         .         .         .
agcaagttgcagcgtttatagtctgcttttacatctgaacctctgttttttgttatttaag
```

```
      |4101      |4111      |4121      |4131      |4141      |4151
GTGAAGCAGCATCTGGGTGTGAGAGTGAAACAAGCGTCTCTGAAGACTGCTCAGGGCTAT
   E   A   A   S   G   C   E   S   E   T   S   V   S   E   D   C   S   G   L   S
                |1371                                      |1381
```

```
      |4161      |4171      |4181      .         .         .         .
CCTCTCAGAGTGACATTTTAACCACTCAGgtaaaaagcgtgtgtgtgtgtgcacatgcgt
   S   Q   S   D   I   L   T   T   Q
                |1391
```

```
     .         .         .         .         .         .
gtgtgtggtgtcctttgcattcagtagtatgtatcccacattcttaggtttgctgacatc

      .         .         .         .         .         .         .
atctctttgaattaatggcacaattgtttgtggttcattgtctccttaaattagactgta
```

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```
           .         .         .         .         .         .
      agcaccttgatggaactcatactaccttttatttcacacacacgcacacgcgcacacaca

           .         .         .         .         .         .
      gcctacacatacactgcctagctcattgtagcatactaaatactgattttaatgaataag

           .         .         .         .
      ctaaaccttcgaaacccatttgctaatcc
```

Exon 12 | Start: 135409 | End: 135580 | Length: 171

```
     .         .         .         .         .         .         .
  tatttttcactccctagctttaaaagaaaataaccaacttcaaaaggacatcacaataa

     .         .         .         .         .         .         .
  catcaagtctatttgggggaatttgaggattttttccctcactaacatcatttggaaata

     .         .         .         .         .         .         .
  atttcatgggcattaattgcatgaatgtggttagattaaaaggtgttcagctagaacttg

     .         .         .         .         .         .         .
  tagttccatactaggtgatttcaattcctgtgctaaaattaatttgtatgatatattttc

     .         .         .         .         .         .         .
  atttaatggaaagcttctcaaagtatttcattttcttggtgccatttatcgttttttgaag

      |4191      |4201      |4211      |4221      |4231      |4241
  CAGAGGGATACCATGCAACATAACCTGATAAAGCTCCAGCAGGAAATGGCTGAACTAGAA
  Q   R   D   T   M   Q   H   N   L   I   K   L   Q   Q   E   M   A   E   L   E
              |1401                                    |1411

      |4251      |4261      |4271      |4281      |4291      |4301
  GCTGTGTTAGAACAGCATGGGAGCCAGCCTTCTAACAGCTACCCTTCCATCATAAGTGAC
  A   V   L   E   Q   H   G   S   Q   P   S   N   S   Y   P   S   I   I   S   D
              |1421                                    |1431

      |4311      |4321      |4331      |4341      |4351        .
  TCTTCTGCCCTTGAGGACCTGCGAAATCCAGAACAAAGCACATCAGAAAAAGgtgtgtat
  S   S   A   L   E   D   L   R   N   P   E   Q   S   T   S   E   K   A
              |1441                                    |1451
```

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```
         .         .         .         .         .         .         .         .         .         .         .         .
    tgttggccaaacactgatatcttaagcaaaattctttccttcccctttatctccttctga

         .         .         .         .         .         .         .         .         .         .         .         .
    agagtaaggacctagctccaacattttatgatccttgctcagcacatgggtaattatgga

         .         .         .         .         .         .         .         .         .         .         .         .
    gccttggttcttgtccctgctcacaactaatataccagtcagagggacccaaggcagtca

         .         .         .         .         .         .         .         .         .         .         .         .
    ttcatgttgtcatctgagtacctacaacaagtagatgctatggggagcccatggaagata

         .         .         .         .         .         .         .         .         .         .         .         .
    catggtatacaacatagctcttgctctattggaagctaagtggaatgggaga
```

Exon 13 | Start: 141370 | End: 141496 | Length: 126

```
         .         .         .         .         .         .         .         .         .         .         .         .
    tcagggccaaggaatatagattttttttttcagccttgtctcagctgggtgtctttatttt

         .         .         .         .         .         .         .         .         .         .         .         .
    actctgtcttaaagtgttccttttattatcattattattttttaatcattgaattccatt

         .         .         .         .         .         .         .         .         .         .         .         .
    tggtgctagcatctgtctgttgcattgcttgtgtttataaaattctgcctgatatacttg

         .         .         .         .         .         .         .         .         .         .         .         .
    tttaaaaaccaatttgtgtatcatagattgatgcttttgaaaaaaatcagtattctaacc

         .         .         .         .         .         .         .         .         .         .         .         .
    tgaattatcactatcagaacaaagcagtaaagtagatttgtttttctcattccatttaaag

      |4361      |4371      |4381      |4391      |4401      |4411
    CAGTATTAACTTCACAGAAAAGTAGTGAATACCCTATAAGCCAGAATCCAGAAGGCCTTT
      V  L  T  S  Q  K  S  S  E  Y  P  I  S  Q  N  P  E  G  L  S
                         |1461                              |1471

      |4421      |4431      |4441      |4451      |4461      |4471
    CTGCTGACAAGTTTGAGGTGTCTGCAGATAGTTCTACCAGTAAAAATAAAGAACCAGGAG
      A  D  K  F  E  V  S  A  D  S  S  T  S  K  N  K  E  P  G  V
                         |1481                              |1491
```

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```
    |4481       .       .       .       .       .       .       .       .       .       .
TGGAAAGgtaagaaacatcaatgtaaagatgctgtggtatctgacatctttatttatatt
  E  R


        .       .       .       .       .       .       .       .       .       .
gaactctgattgttaattttttttcaccatactttctccagttttttttgcatacaggcattt

        .       .       .       .       .       .       .       .       .       .
atacacttttattgctctaggatacttcttttgtttaatcctatataggtttttttgaacc

        .       .       .       .       .       .       .       .       .       .
tataacataagctacaacatgagaaatgtgcggttagatagatatgtcccttctgaaggt

        .       .       .       .       .       .       .       .       .       .
cagaaaaaaatataatggaggtaaaacctgaacaagcttggaaactgatggtagacttct

        .       .
tcaaggc



Exon 14 | Start: 143463 | End: 143653 | Length: 190



        .       .       .       .       .       .       .       .       .       .
agcctcccgagtagctgagattacaggcgccagccaccacacccagctactgacctgctt

        .       .       .       .       .       .       .       .       .       .
ttaaacagctgggagatatggtgcctcagaccaacccaaccccatgttatatgtcaaccc

        .       .       .       .       .       .       .       .       .       .
tgacatattggcaggcaacatgaatccagacttctaggctgtcttgcgggctctttttttg

        .       .       .       .       .       .       .       .       .       .
ccagtcatttctgatctctctgacatgagctgtttcatttatgctttggctgcccagcaa

        .       .       .       .       .       .       .       .       .       .
gtatgatttgtcctttcacaattggtggcgatggttttctccttccatttatctttctag

      |4491       |4501       |4511       |4521       |4531       |4541
GTCATCCCCTTCTAAATGCCCATCATTAGATGATAGGTGGTACATGCACAGTTGCTCTGG
  S    S    P    S    K    C    P    S    L    D    D    R    W    Y    M    H    S    C    S    G
                   |1501                                          |1511
```

```
        |4551      |4561      |4571      |4581      |4591      |4601
GAGTCTTCAGAATAGAAACTACCCATCTCAAGAGGAGCTCATTAAGGTTGTTGATGTGGA
  S  L  Q  N  R  N  Y  P  S  Q  E  E  L  I  K  V  V  D  V  E
              |1521                              |1531

        |4611      |4621      |4631      |4641      |4651      |4661
GGAGCAACAGCTGGAAGAGTCTGGGCCACACGATTTGACGGAAACATCTTACTTGCCAAG
  E  Q  Q  L  E  E  S  G  P  H  D  L  T  E  T  S  Y  L  P  R
              |1541                              |1551

        |4671     .       .       .       .       .       .       .       .       .
GCAAGATCTAGgtaatatttcatctgctgtattggaacaaacactttgattttactctga
  Q  D  L  E


     .       .       .       .       .       .       .       .       .       .       .
atcctacataaagatattctggttaaccaacttttagatgtactagtctatcatggacac

     .       .       .       .       .       .       .       .       .       .       .
ttttgttatacttaattaagcccactttagaaaaatagctcaagtgttaatcaaggttta

     .       .       .       .       .       .       .       .       .       .       .
cttgaaaattattgaaactgttaatccatctatattttaattaatggtttaactaatgat

     .       .       .       .       .       .       .       .       .       .       .
tttgaggatgagggagtcttggtgtactctaaatgtattatttcaggccaggcatagtgg

     .       .       .
ctcacgcctgt


Exon 15 | Start: 146746 | End: 147056 | Length: 310


     .       .       .       .       .       .       .       .       .       .       .
tctaaaattatactattcctatgactaaacctttgcatatatcttttatctccctaggat

     .       .       .       .       .       .       .       .       .       .       .
atatttctaaaactagcattgttgactgaaagtgtaaatacgtgttaaggtgtttgctac

     .       .       .       .       .       .       .       .       .       .       .
ataatgccatatttccttttaggaaactaagctactttggatttccaccaacactgtat

     .       .       .       .       .       .       .       .       .       .       .
```

21

```
tcatgtacccattttctcttaacctaactttattggtctttttaattcttaacagagac


 .     .     .     .     .     .     .     .     .     .     .
cagaactttgtaattcaacattcatcgttgtgtaaattaaacttctcccattcctttcag


    |4681    |4691    |4701    |4711    |4721    |4731
AGGGAACCCCTTACCTGGAATCTGGAATCAGCCTCTTCTCTGATGACCCTGAATCTGATC
  G  T  P  Y  L  E  S  G  I  S  L  F  S  D  D  P  E  S  D  P
    |1561                            |1571


    |4741    |4751    |4761    |4771    |4781    |4791
CTTCTGAAGACAGAGCCCCAGAGTCAGCTCGTGTTGGCAACATACCATCTTCAACCTCTG
  S  E  D  R  A  P  E  S  A  R  V  G  N  I  P  S  S  T  S  A
    |1581                            |1591


    |4801    |4811    |4821    |4831    |4841    |4851
CATTGAAAGTTCCCCAATTGAAAGTTGCAGAATCTGCCCAGAGTCCAGCTGCTGCTCATA
  L  K  V  P  Q  L  K  V  A  E  S  A  Q  S  P  A  A  A  H  T
    |1601                            |1611


    |4861    |4871    |4881    |4891    |4901    |4911
CTACTGATACTGCTGGGTATAATGCAATGGAAGAAAGTGTGAGCAGGGAGAAGCCAGAAT
  T  D  T  A  G  Y  N  A  M  E  E  S  V  S  R  E  K  P  E  L
    |1621                            |1631


    |4921    |4931    |4941    |4951    |4961    |4971
TGACAGCTTCAACAGAAAGGGTCAACAAAAGAATGTCCATGGTGGTGTCTGGCCTGACCC
  T  A  S  T  E  R  V  N  K  R  M  S  M  V  V  S  G  L  T  P
    |1641                            |1651


    |4981    .     .     .     .     .     .     .     .     .
CAGAAGAATTTgtgagtgtatccatatgtatctccctaatgactaagacttaacaacatt
  E  E  F
    |1661


 .     .     .     .     .     .     .     .     .     .     .
ctggaaagagtttttatgtaggtattgtcaattaataacctagaggaagaaatctagaaaa


 .     .     .     .     .     .     .     .     .     .     .
caatcacagttctgtgtaatttaatttcgattactaatttctgaaaatttagatctagat


 .     .     .     .     .     .     .     .     .     .     .
aaagctatagtgtggattattttatgtatatttacttgagaaaataattattaaatatta


 .     .     .     .     .     .     .     .     .     .     .
gtggaaaagctatactttgggtatgatataggactttcgaattggaattttcctttctat
```

22

```
         .          .          .
ctgtaaaagca
```

Exon 16 | Start: 150289 | End: 150376 | Length: 87

```
       .         .         .         .         .         .         .         .         .         .         .         .
gagacttcaggtgtcttagaatttttttaaatgtacccttctgagaaaaacagagactta

       .         .         .         .         .         .         .         .         .         .         .         .
aagctaggataactggtattctattttttttttttttttttttttttacctccagcctgggt

       .         .         .         .         .         .         .         .         .         .         .         .
gacagagcaagactctgtctaaaaaaaaaaaaaaaaaaaattcactttaaatagttccagg

       .         .         .         .         .         .         .         .         .         .         .         .
acacgtgtagaacgtgcaggattgctacataggtaaacatatgccatggtggaataacta

       .         .         .         .         .         .         .         .         .         .         .         .
gtattctgagctgtgtgctagaggtaactcatgataatggaatatttgatttaatttcag
    |4991      |5001      |5011      |5021      |5031      |5041
ATGCTCGTGTACAAGTTTGCCAGAAAACACCACATCACTTTAACTAATCTAATTACTGAA
M   L   V   Y   K   F   A   R   K   H   H   I   T   L   T   N   L   I   T   E
                                |1671                                |1681

    |5051      |5061      |5071      .         .         .         .         .         .
GAGACTACTCATGTTGTTATGAAAACAGgtataccaagaacctttacagaataccttgca
E   T   T   H   V   V   M   K   T   D
                                |1691

       .         .         .         .         .         .         .         .         .         .         .         .
tctgctgcataaaaccacatgaggcgaggcacggtggcgcatgcctgtaatcgcagcact

       .         .         .         .         .         .         .         .         .         .         .         .
ttgggaggccgaggcgggcagatcacgagattaggagatcgagaccatcctggccagcat

       .         .         .         .         .         .         .         .         .         .         .         .
ggtgaaaccccgtctctactaaaaaataaaaaaattagctgggtgtggtcgcgtgcgcct

       .         .         .         .         .         .         .         .         .         .         .         .
gtagtcccagctactcgtgaggctgaggcaggagaatcacttgaaccggggagatggagg
```

23

```
      .         .         .         .         .         .
ttgcagtgagccgagatcatgccactgc
```

Exon 17 | Start: 154033 | End: 154110 | Length: 77

```
    .       .       .       .       .       .       .       .       .       .       .       .
tataatggagatctatagctagccttggcgtctagaagatgggtgttgagaagagggagt

    .       .       .       .       .       .       .       .       .       .       .       .
ggacagatatttcctctggtcttaacttcatatcagcctcccctagacttccaaatatcc

    .       .       .       .       .       .       .       .       .       .       .       .
atacctgctggttataattagtggtgttttcagcctctgattctgtcaccaggggtttta

    .       .       .       .       .       .       .       .       .       .       .       .
gaatcataaatccagattgatcttgggagtgtaaaaaactgaggctctttagcttcttag

    .       .       .       .       .       .       .       .       .       .       .       .
gacagcacttcctgattttgttttcaacttctaatcctttgagtgttttttcattctgcag

        |5081        |5091        |5101        |5111        |5121        |5131
ATGCTGAGTTTGTGTGTGAACGGACACTGAAATATTTTCTAGGAATTGCGGGAGGAAAAT
  A   E   F   V   C   E   R   T   L   K   Y   F   L   G   I   A   G   G   K   W
                                        |1701                            |1711

        |5141        |5151 .        .        .        .        .        .        .
GGGTAGTTAGCTATTTCTgtaagtataatactatttctcccctcctccctttaacacctc
  V   V   S   Y   F   W


    .       .       .       .       .       .       .       .       .       .       .       .
agaattgcatttttacacctaacgtttaacacctaaggttttttgctgatgctgagtctga

    .       .       .       .       .       .       .       .       .       .       .       .
gttaccaaaaggtctttaattgtaatactaaactacttttatctttaatatcactttgtt

    .       .       .       .       .       .       .       .       .       .       .       .
cagataagctggtgatgctgggaaaatgggtctcttttataactaataggacctaatctg

    .       .       .       .       .       .       .       .       .       .       .       .
ctcctagcaatgttagcatatgagctagggatttatttaatagtcggcaggaatccatgt
```

```
       .        .        .        .
gcagcaggcaaacttata


Exon 18 | Start: 154611 | End: 154651 | Length: 40


       .        .        .        .        .        .        .        .        .        .        .        .
ataactaataggacctaatctgctcctagcaatgttagcatatgagctagggatttatttt

       .        .        .        .        .        .        .        .        .        .        .        .
aatagtcggcaggaatccatgtgcagcaggcaaacttataatgtttaaattaaacatcaa

       .        .        .        .        .        .        .        .        .        .        .        .
ctctgtctccagaaggaaactgctgctacaagccttattaaagggctgtggctttagagg

       .        .        .        .        .        .        .        .        .        .        .        .
gaaggacctctcctctgtcattcttcctgtgctctttgtgaatcgctgacctctctatc

       .        .        .        .        .        .        .        .        .        .        .        .
tccgtgaaaagagcacgttcttctgctgtatgtaacctgtcttttctatgatctctttag

            |5161      |5171      |5181      |5191  .        .        .
GGGTGACCCAGTCTATTAAAGAAAGAAAAATGCTGAATGAGgtaagtacttgatgttaca
  V   T   Q   S   I   K   E   R   K   M   L   N   E
            |1721                            |1731


       .        .        .        .        .        .        .        .        .        .        .        .
aactaaccagagatattcattcagtcatatagttaaaaatgtatttgcttccttccatca

       .        .        .        .        .        .        .        .        .        .        .        .
atgcaccactttccttaacaatgcacaaattttccatgataatgaggatcatcaagaatt

       .        .        .        .        .        .        .        .        .        .        .        .
atgcaggcctgcactgtggctcatacctataatcccagcgctttgggaggctgaggcgct

       .        .        .        .        .        .        .        .        .        .        .        .
tggatcacctgatgtcgggagttcaagaccagcctgaccaacatggagaaaccccgtttc

       .        .        .        .        .        .        .        .        .        .        .        .
tactaaaaatacaaaattagccgggcttggtggcacttgcc
```

Exon 19 | Start: 160849 | End: 160932 | Length: 83


```
           .         .         .         .         .         .         .         .         .         .         .         .
gcattcaaaagattctcctgcctcagcctcccaagtagctgggattacaggtgcctgcca

           .         .         .         .         .         .         .         .         .         .         .         .
ccacgcccaactaattttttgtattttttagtagagatgaggtttcaccatgttggtcaga

           .         .         .         .         .         .         .         .         .         .         .         .
ctggtgtcgaactcctgacctcaagtgatctgcctgcctcagtctcccaaagtgctagga

           .         .         .         .         .         .         .         .         .         .         .         .
ttacaggggtgagccactgcgcctggcctgaatgccttaaatatgacgtgtctgctccac

           .         .         .         .         .         .         .         .         .         .         .         .
ttccattgaaggaagcttctctttctcttatcctgatgggttgtgtttggtttctttcag

        |5201      |5211      |5221      |5231      |5241      |5251
CATGATTTTGAAGTCAGAGGAGATGTGGTCAATGGAAGAAACCACCAAGGTCCAAAGCGA
H   D   F   E   V   R   G   D   V   V   N   G   R   N   H   Q   G   P   K   R
                                    |1741                            |1751

        |5261      |5271      .         .         .         .         .         .         .
GCAAGAGAATCCCAGGACAGAAAGgtaaagctccctccctcaagttgacaaaaatctcac
A   R   E   S   Q   D   R   K


        .         .         .         .         .         .         .         .         .         .         .         .
cccaccactctgtattccactcccctttgcagagatgggccgcttcattttgtaagactt

        .         .         .         .         .         .         .         .         .         .         .         .
attacatacatacacagtgctagatactttcacacaggttctttttttcactcttccatcc

        .         .         .         .         .         .         .         .         .         .         .         .
caaccacataaataagtattgtctctactttatgaatgataaaactaagagatttagaga

        .         .         .         .         .         .         .         .         .         .         .         .
ggctgtgtaatttggattcccgtctcgggttcagatcttagctgataagtggaagagctg

        .         .         .         .         .
ggactttaagcagatgagaatcta
```

Exon 20 | Start: 166867 | End: 166921 | Length: 54

```
      .         .         .         .         .         .         .         .         .         .         .         .

cttggcctgattggtgacaaaagtgagatgctcagtccttgaatgacaaagaatgcctgt

      .         .         .         .         .         .         .         .         .         .         .         .

agagtgcaggtcaactacatatgcacttcaagaagatcttctgaaatccagtagtgttct

      .         .         .         .         .         .         .         .         .         .         .         .

ggacattggactgcttgtccctgggaagtagcagcagaaatcatcaggtggtgaacagaa

      .         .         .         .         .         .         .         .         .         .         .         .

gaaaaagaaaagctcttccttttttgaaagtctgtttttttgaataaaagccaatattcttt

      .         .         .         .         .         .         .         .         .         .         .         .

tataactagattttccttctctccattcccctgtccctctctcttcctctcttcttccag

    |5281      |5291      |5301      |5311      |5321      |5331      .
ATCTTCAGGGGGGCTAGAAATCTGTTGCTATGGGCCCTTCACCAACATGCCCACAGgtaag
 I   F   R   G   L   E   I   C   C   Y   G   P   F   T   N   M   P   T   D
    |1761                               |1771

      .         .         .         .         .         .         .         .         .         .         .         .

agcctgggagaaccccagagttccagcaccagcctttgtcttacatagtggagtattata

      .         .         .         .         .         .         .         .         .         .         .         .

agcaagatcccacgatgggggttcctcagattgctgaaatgttctagaggctattctatt

      .         .         .         .         .         .         .         .         .         .         .         .

tctctaccactctccaaacaaaacagcacctaaatgttatcctatggcaaaaaaaaacta

      .         .         .         .         .         .         .         .         .         .         .         .

taccttgtcccccttctcaagagcatgaaggtggttaatagttaggattcagtatgttat

      .         .         .         .         .         .         .         .         .         .         .         .

gtgttcagatggcgttgagctgctgttagtgccaacatgttagtgagaaaatatc
```

Exon 21 | Start: 168790 | End: 168863 | Length: 73

27

```
      .         .         .         .         .         .
attaatggaaattagatctttgattttttttctttcaagcattttatttgagagactat

      .         .         .         .         .         .
caaaccttataccaagtggccttatggagactgataaccagagtacatggcatatcagtg

      .         .         .         .         .         .
gcaaattgacttaaaatccatacccctactattttaagaccattgtcctttggagcagag

      .         .         .         .         .         .
agacagactctcccattgagaggtcttgctataagccttcatccggagagtgtagggtag

      .         .         .         .         .         .
agggcctgggttaagtatgcagattactgcagtgattttacatctaaatgtccattttag

         |5341      |5351      |5361      |5371      |5381      |5391
ATCAACTGGAATGGATGGTACAGCTGTGTGGTGCTTCTGTGGTGAAGGAGCTTTCATCAT
  Q  L  E  W  M  V  Q  L  C  G  A  S  V  V  K  E  L  S  S  F
         |1781                          |1791

         |5401      .         .         .         .         .
TCACCCTTGGCACAgtaagtattgggtgccctgtcagagagggaggacacaatattctct
  T  L  G  T
         |1801


      .         .         .         .         .         .
cctgtgagcaagactggcacctgtcagtccctatggatgcccctactgtagcctcagaag


      .         .         .         .         .         .
tcttctctgcccacatacctgtgccaaaagactccatctgtaagggatgggtaaggattt


      .         .         .         .         .         .
gagaactgcacatattaaatatactgagggaagactttttccctctaactctttttccca


      .         .         .         .         .         .
tatgtccctcccctcctctctgtgactgccccagcatactgtgtttcaacaaatcatca


      .         .         .
agaaatgatgggct



Exon 22 | Start: 170281 | End: 170341 | Length: 60
```

28

```
        .         .         .         .         .         .         .         .         .         .
        ccaggagtttgagaccagcctgggcaacatggcaaaaccctgtctctaccaaaaatacaa

        .         .         .         .         .         .         .         .         .         .
        aaaaattagccaggggtggtggtacgtgtctgtagttccagctacttaggaggctgagat

        .         .         .         .         .         .         .         .         .         .
        ggaaggattgcttgagcccaggaggcagaggtggcagtgagctgagatcacaccactgca

        .         .         .         .         .         .         .         .         .         .
        ctccagcctgggtgacagagcaagaccctgtctcaaaaacaaacaaaaaaaatgatgaag

        .         .         .         .         .         .         .         .         .         .
        tgacagttccagtagtcctactttgacactttgaatgctcttttccttcctggggatccag

           |5411      |5421      |5431      |5441      |5451      |5461
        GGTGTCCACCCAATTGTGGTTGTGCAGCCAGATGCCTGGACAGAGGACAATGGCTTCCAT
        G  V  H  P  I  V  V  V  Q  P  D  A  W  T  E  D  N  G  F  H
                                         |1811                      |1821

                  .         .         .         .         .         .         .         .         .
        Ggtaaggtgcctgcatgtacctgtgctatatggggtccttttgcatgggtttggtttatc
        A

        .         .         .         .         .         .         .         .         .         .
        actcattacctggtgcttgagtagcacagttcttggcacattttaaatatttgttgaatg

        .         .         .         .         .         .         .         .         .         .
        aatggctaaaatgtcttttttgatgttttttattgttatttgtttttatattgtaaaagtaat

        .         .         .         .         .         .         .         .         .         .
        acatgaactgtttccatggggtgggagtaagatatgaatgttcatcacaaaaacataaat

        .         .         .         .         .         .         .         .         .         .
        caaggccgggcatggtggctcatgcctataattccagcactttgggaggtcaagatggag

        .
        g


        Exon 23 | Start: 172182 | End: 173689 | Length: 1507
```

29

```
      .         .         .         .         .         .         .
taaaaatacaaaaattagctgggtgtgatggcatgtgcctgtaattccagctactcagga

      .         .         .         .         .         .         .
ggcagagacaggagaattgcttgaacccaggaggcggaggttgaatgagccgagattgcg

      .         .         .         .         .         .         .
ccatcacactctagcctcggcgacagagcaagactccgtctcaaaaaaaaaaaaaaaaaa

      .         .         .         .         .         .         .
ttagcttctacctcattaatcctaagaactcatacaaccaggaccctggagtcgattgat

      .         .         .         .         .         .         .
tagagcctagtccaggagaatgaattgacactaatctctgcttgtgttctctgtctccag

     |5471     |5481     |5491     |5501     |5511     |5521
CAATTGGGCAGATGTGTGAGGCACCTGTGGTGACCCGAGAGTGGGTGTTGGACAGTGTAG
   I  G  Q  M  C  E  A  P  V  V  T  R  E  W  V  L  D  S  V  A
                     |1831                              |1841

     |5531     |5541     |5551     |5561     |5571     |5581
CACTCTACCAGTGCCAGGAGCTGGACACCTACCTGATACCCCAGATCCCCCACAGCCACT
   L  Y  Q  C  Q  E  L  D  T  Y  L  I  P  Q  I  P  H  S  H  Y
                     |1851                              |1861

     |5591         |+11      |+21      |+31      |+41      |+51
ACTGACTGCAGCCAGCCACAGGTACAGAGCCACAGGACCCCAAGAATGAGCTTACAAAGT
   *

     |+61      |+71      |+81      |+91      |+101     |+111
GGCCTTTCCAGGCCCTGGGAGCTCCTCTCACTCTTCAGTCCTTCTACTGTCCTGGCTACT

     |+121     |+131     |+141     |+151     |+161     |+171
AAATATTTTATGTACATCAGCCTGAAAAGGACTTCTGGCTATGCAAGGGTCCCTTAAAGA

     |+181     |+191     |+201     |+211     |+221     |+231
TTTTCTGCTTGAAGTCTCCCTTGGAAATCTGCCATGAGCACAAAATTATGGTAATTTTTC

     |+241     |+251     |+261     |+271     |+281     |+291
ACCTGAGAAGATTTTAAAACCATTTAAACGCCACCAATTGAGCAAGATGCTGATTCATTA

     |+301     |+311     |+321     |+331     |+341     |+351
TTTATCAGCCCTATTCTTTCTATTCAGGCTGTTGTTGGCTTAGGGCTGGAAGCACAGAGT

     |+361     |+371     |+381     |+391     |+401     |+411
```

30

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GGCTTGGCCTCAAGAGAATAGCTGGTTTCCCTAAGTTTACTTCTCTAAAACCCTGTGTTC

     |+421      |+431      |+441      |+451      |+461      |+471
ACAAAGGCAGAGAGTCAGACCCTTCAATGGAAGGAGAGTGCTTGGGATCGATTATGTGAC

     |+481      |+491      |+501      |+511      |+521      |+531
TTAAAGTCAGAATAGTCCTTGGGCAGTTCTCAAATGTTGGAGTGGAACATTGGGGAGGAA

     |+541      |+551      |+561      |+571      |+581      |+591
ATTCTGAGGCAGGTATTAGAAATGAAAAGGAAACTTGAAACCTGGGCATGGTGGCTCACG

     |+601      |+611      |+621      |+631      |+641      |+651
CCTGTAATCCCAGCACTTTGGGAGGCCAAGGTGGGCAGATCACTGGAGGTCAGGAGTTCG

     |+661      |+671      |+681      |+691      |+701      |+711
AAACCAGCCTGGCCAACATGGTGAAACCCCATCTCTACTAAAAATACAGAAATTAGCCGG

     |+721      |+731      |+741      |+751      |+761      |+771
TCATGGTGGTGGACACCTGTAATCCCAGCTACTCAGGTGGCTAAGGCAGGAGAATCACTT

     |+781      |+791      |+801      |+811      |+821      |+831
CAGCCCGGGAGGTGGAGGTTGCAGTGAGCCAAGATCATACCACGGCACTCCAGCCTGGGT

     |+841      |+851      |+861      |+871      |+881      |+891
GACAGTGAGACTGTGGCTCAAAAAAAAAAAAAAAAAAAAAAGGAAAATGAAACTAGAAGAGAT

     |+901      |+911      |+921      |+931      |+941      |+951
TTCTAAAAGTCTGAGATATATTTGCTAGATTTCTAAAGAATGTGTTCTAAAACAGCAGAA

     |+961      |+971      |+981      |+991      |+1001     |+1011
GATTTTCAAGAACCGGTTTCCAAAGACAGTCTTCTAATTCCTCATTAGTAATAAGTAAAA

     |+1021     |+1031     |+1041     |+1051     |+1061     |+1071
TGTTTATTGTTGTAGCTCTGGTATATAATCCATTCCTCTTAAAATATAAGACCTCTGGCA

     |+1081     |+1091     |+1101     |+1111     |+1121     |+1131
TGAATATTTCATATCTATAAAATGACAGATCCCACCAGGAAGGAAGCTGTTGCTTTCTTT

     |+1141     |+1151     |+1161     |+1171     |+1181     |+1191
GAGGTGATTTTTTTCCTTTGCTCCCTGTTGCTGAAACCATACAGCTTCATAAATAATTTT

     |+1201     |+1211     |+1221     |+1231     |+1241     |+1251
GCTTGCTGAAGGAAGAAAAAGTGTTTTTCATAAACCCATTATCCAGGACTGTTTATAGCT

     |+1261     |+1271     |+1281     |+1291     |+1301     |+1311
GTTGGAAGGACTAGGTCTTCCCTAGCCCCCCCAGTGTGCAAGGGCAGTGAAGACTTGATT
```

```
      |+1321    |+1331    |+1341    |+1351    |+1361    |+1371
GTACAAAATACGTTTTGTAAATGTTGTGCTGTTAACACTGCAAATAAACTTGGTAGCAAA

      |+1381  .      .      .      .      .      .      .      .      .      .
CACTTCCAccatgaatgactgttcttgagacttaggccagccgactttctcagagccttt


       .      .      .      .      .      .      .      .      .      .      .
tcactgtgcttcagtctcccactctgtaaaatgggggtaatgatagtatctacctcctag


       .      .      .      .      .      .      .      .      .      .      .
gatttattgaggcagcttaaataccttttgtatttcctgttgctgccaaaacaaattgtt


       .      .      .      .      .      .      .      .      .      .      .
gcaaggtcagaagtctgaggtggctcaactgtttctttgtttcaggtttcatgaggccaa


       .      .      .      .      .      .      .      .      .      .      .
aataaaggtgttcgcagggcgtgttcccttctagaggctctgggtccttgcagttctagg


       .      .
actaagat


LRG Parser: Version: 0.3, Version Date: 11/02/2015
Reader: Version: 0.3, Version Date: 11/02/2015
Writer: Version: 0.3, Version Date: 11/02/2015
Control: Version: 0.3, Version Date: 11/02/2015
```