Gene: EGFR - Sequence: NG_007726.3
Transcript: NM_005228.3 - Protein: NP_005219.2
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: 5000 | End: 5334 | Length: 334

```
   .     .     .     .     .     .     .     .     .     .     .     .
gggaccgggtccagaggggcagtgctgggaacgcccctctcggaaattaactcctcaggg

   .     .     .     .     .     .     .     .     .     .     .     .
cacccgctcccctcccatgcgccgcccccactcccgccggagactaggtcccgcggggggcc

   .     .     .     .     .     .     .     .     .     .     .     .
accgctgtccaccgcctccggcggccgctggccttgggtccccgctgctggttctcctcc

   .     .     .     .     .     .     .     .     .     .     .     .
ctcctcctcgcattctcctcctcctctgctcctcccgatccctcctccgccgcctggtcc

   .     .     .     .     .     .     .     .     .     .     .     .
ctcctcctcccgccctgcctccccgcgcctcggcccgcgcgagctagacgtccgggcagc

        |-239      |-229      |-219      |-209      |-199      |-189
CCCCGGCGCAGCGCGGCCGCAGCAGCCTCCGCCCCCCGCACGGTGTGAGCGCCCGACGCG

        |-179      |-169      |-159      |-149      |-139      |-129
GCCGAGGCGGCCGGAGTCCCGAGCTAGCCCCGGCGGCCGCCGCCGCCCAGACCGGACGAC

        |-119      |-109      |-99       |-89       |-79       |-69
AGGCCACCTCGTCGGCGTCCGCCCGAGTCCCCGCCTCGCCGCCAACGCCACAACCACCGC

        |-59       |-49       |-39       |-29       |-19       |-9
GCACGGCCCCCTGACTCCGTCCAGTATTGATCGGGAGAGCCGGAGCGAGCTCTTCGGGGA

        |1         |11        |21        |31        |41        |51
GCAGCGATGCGACCCTCCGGGACGGCCGGGGCAGCGCTCCTGGCGCTGCTGGCTGCGCTC
        M   R   P   S   G   T   A   G   A   A   L   L   A   L   L   A   A   L
        |1                                  |11
```
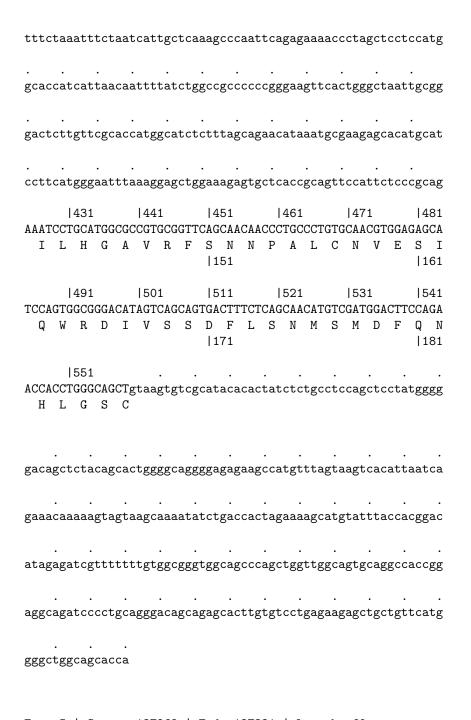
1

```
     |61        |71        |81        .    .    .    .    .
TGCCCGGCGAGTCGGGCTCTGGAGGAAAAGAAAGgtaagggcgtgtctcgccggctcccg
C  P  A  S  R  A  L  E  E  K  K  V
        |21


       .    .    .    .    .    .    .    .    .    .    .    .
cgccgcccccggatcgcgccccggaccccgcagcccgcccaaccgcgcaccggcgcaccg


       .    .    .    .    .    .    .    .    .    .    .    .
gctcggcgcccgcgcccccgcccgtcctttcctgtttccttgagatcagctgcgccgccg


       .    .    .    .    .    .    .    .    .    .    .    .
accgggaccgcgggaggaacgggacgtttcgttcttcggccgggagagtctggggcgggc


       .    .    .    .    .    .    .    .    .    .    .    .
ggaggaggagacgcgtgggacaccgggctgcaggccaggcggggaacggccgccgggacc


       .    .    .    .    .    .    .
tccggcgccccgaaccgctcccaactttcttccc



Exon 2 | Start: 128254 | End: 128406 | Length: 152



     .    .    .    .    .    .    .    .    .    .    .    .
attcaatgcattatagggacaagctatctcttattatgaattgcaccttatataaactta


     .    .    .    .    .    .    .    .    .    .    .    .
aagatcttttatcacaaatttctttgctgtgtcctttagtgagaatttgtattatcagtc


     .    .    .    .    .    .    .    .    .    .    .    .
actaaagctcactaagttagtaagctttgcgcccagatgacctgggcaggaatgggtgag


     .    .    .    .    .    .    .    .    .    .    .    .
tctctgtgtggagagagtgaagaaactgctacccttaatacctggaccttgagggattgt


     .    .    .    .    .    .    .    .    .    .    .    .
tttattttagttttttctgcatttctcagtatttcatgtgatatctgtcttttttcttccag

  |91        |101       |111       |121       |131       |141
TTTGCCAAGGCACGAGTAACAAGCTCACGCAGTTGGGCACTTTTGAAGATCATTTTCTCA
  C  Q  G  T  S  N  K  L  T  Q  L  G  T  F  E  D  H  F  L  S
  |31                             |41
```

2

```
      |151       |161       |171       |181       |191       |201
GCCTCCAGAGGATGTTCAATAACTGTGAGGTGGTCCTTGGGAATTTGGAAATTACCTATG
  L   Q   R   M   F   N   N   C   E   V   V   L   G   N   L   E   I   T   Y   V
  |51                                |61

      |211       |221       |231        .         .         .         .         .
TGCAGAGGAATTATGATCTTTCCTTCTTAAAGgttggtgactttgattttcctacacaaa
  Q   R   N   Y   D   L   S   F   L   K
  |71


     .         .         .         .         .         .         .         .         .         .         .         .
taaaattggagaaaatctaagtggagaaaggcctgggcagaattccacttgaagtgtgtt

     .         .         .         .         .         .         .         .         .         .         .         .
tattttttgctatggcaatgacaagtcttacagagctacaaacgagagttttatgagaaag

     .         .         .         .         .         .         .         .         .         .         .         .
ccattttaccagctaatgtcaagtaataactagaaaaggatatcaaatagaaacaggcta

     .         .         .         .         .         .         .         .         .         .         .         .
atctggagttccatgtcatcatagacactgacgtttatccctgaccattacctcagtcat

     .         .         .         .         .         .         .
gatgtgctgccatactcgctcttaaaaacttt



Exon 3 | Start: 129273 | End: 129457 | Length: 184



     .         .         .         .         .         .         .         .         .         .         .         .
aatttccattttcactggagagtgttgaaccccgtgaggcatgagagcacagtgttccag

     .         .         .         .         .         .         .         .         .         .         .         .
aacaatgcttactgctcattatcacagggggtcaaaggctaacgtgcagggattgttgcag

     .         .         .         .         .         .         .         .         .         .         .         .
atcgtggacatgctgcctcctgtgtccatgactgcaatcgtctacctattttacagttgt

     .         .         .         .         .         .         .         .         .         .         .         .
tgagcactcgtgtgcattagggttcaactgggcgtcctagggctccctggacccatttta

     .         .         .         .         .         .         .         .         .         .         .         .
gaccttgagttcttgagttcctcaaaagagaaatcacgcatttatgttttctcttcttag
```

3

```
|241        |251        |261        |271        |281        |291
ACCATCCAGGAGGTGGCTGGTTATGTCCTCATTGCCCTCAACACAGTGGAGCGAATTCCT
T  I  Q  E  V  A  G  Y  V  L  I  A  L  N  T  V  E  R  I  P
|81                                 |91

|301        |311        |321        |331        |341        |351
TTGGAAAACCTGCAGATCATCAGAGGAAATATGTACTACGAAAATTCCTATGCCTTAGCA
L  E  N  L  Q  I  I  R  G  N  M  Y  Y  E  N  S  Y  A  L  A
|101                                |111

|361        |371        |381        |391        |401        |411
GTCTTATCTAACTATGATGCAAATAAAACCGGACTGAAGGAGCTGCCCATGAGAAATTTA
V  L  S  N  Y  D  A  N  K  T  G  L  K  E  L  P  M  R  N  L
|121                                |131

|421    .     .     .     .     .     .     .     .     .     .
CAGGgtgagaggctgggatgccaaggctgggggttcataaatgcagacagcagttccgat
Q  E
|141


       .     .     .     .     .     .     .     .     .     .
ggctcccagcgagcttgtcactcaattccacctcggagaaggcttttattttttacccagt


       .     .     .     .     .     .     .     .     .     .
acacgtgcactgagtgccggctgtgtgtaagatactgcaggggaagttactgagaagatg


gcagatactggaatgggaagatttaagcggggtaccagtgtttacatggacatgaaaaaa


       .     .     .     .     .     .     .     .     .     .
tactgagagatagtaagaaatcgtaaagattctgagtaaaagagagtatgaccaaacaag


       .
ctga



Exon 4 | Start: 132574 | End: 132709 | Length: 135



       .     .     .     .     .     .     .     .     .     .
acatgcatatcatttatgctgtgaccactgactaaaccattctcttccttcctccccata


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

4

```
tttctaaatttctaatcattgctcaaagcccaattcagagaaaaccctagctcctccatg

   .     .     .     .     .     .     .     .     .     .     .     .
gcaccatcattaacaattttatctggccgcccccccgggaagttcactgggctaattgcgg

   .     .     .     .     .     .     .     .     .     .     .     .
gactcttgttcgcaccatggcatctctttagcagaacataaatgcgaagagcacatgcat

   .     .     .     .     .     .     .     .     .     .     .     .
ccttcatgggaatttaaaggagctggaaagagtgctcaccgcagttccattctcccgcag

      |431        |441        |451        |461        |471        |481
AAATCCTGCATGGCGCCGTGCGGTTCAGCAACAACCCTGCCCTGTGCAACGTGGAGAGCA
   I   L   H   G   A   V   R   F   S   N   N   P   A   L   C   N   V   E   S   I
                                       |151                                 |161

      |491        |501        |511        |521        |531        |541
TCCAGTGGCGGGACATAGTCAGCAGTGACTTTCTCAGCAACATGTCGATGGACTTCCAGA
   Q   W   R   D   I   V   S   S   D   F   L   S   N   M   S   M   D   F   Q   N
                                       |171                                 |181

      |551              .     .     .     .     .     .     .     .     .
ACCACCTGGGCAGCTgtaagtgtcgcatacacactatctctgcctccagctcctatgggg
 H   L   G   S   C

         .     .     .     .     .     .     .     .     .     .     .     .
gacagctctacagcactggggcaggggagagaagccatgtttagtaagtcacattaatca

         .     .     .     .     .     .     .     .     .     .     .     .
gaaacaaaaagtagtaagcaaaatatctgaccactagaaaagcatgtatttaccacggac

         .     .     .     .     .     .     .     .     .     .     .     .
atagagatcgtttttttgtggcgggtggcagcccagctggttggcagtgcaggccaccgg

         .     .     .     .     .     .     .     .     .     .     .     .
aggcagatcccctgcagggacagcagagcacttgtgtcctgagaagagctgctgttcatg

         .     .     .
gggctggcagcacca


Exon 5 | Start: 137262 | End: 137331 | Length: 69
```

5

```
         .       .       .       .       .       .       .       .       .       .       .       .
    agcagattgtaaacaaggaacctcaaattcatgaaaaattcttgcttatgtggcccatgt

         .       .       .       .       .       .       .       .       .       .       .       .
    cagtaattactctctgcctcagtttccgcagctgacatgtaaataaaagcagttcatggt

         .       .       .       .       .       .       .       .       .       .       .       .
    tcatcttcttttcttatcggggtctcaagtgattctacaaaccagccagccaaacaatca

         .       .       .       .       .       .       .       .       .       .       .       .
    gagaataagttgaaaagattgtcttcatttattgaatgtgcttaactcaggcccgggaaa

         .       .       .       .       .       .       .       .       .       .       .       .
    gggcgtcatcagtttctcatcatttcactgagatatgcatctattacttttacatttcag

     |561        |571        |581        |591        |601        |611
    GCCAAAAGTGTGATCCAAGCTGTCCCAATGGGAGCTGCTGGGGTGCAGGAGAGGAGAACT
     Q  K  C  D  P  S  C  P  N  G  S  C  W  G  A  G  E  E  N  C
              |191                                |201

     |621          .       .       .       .       .       .       .       .       .       .
    GCCAGAAACgtaagtcagtgaacagcctcagacccatgtgtgaccgcccctctcttcctt
     Q  K  L


         .       .       .       .       .       .       .       .       .       .       .       .
    cacttgcttaggtgattggatttgttttccctctgaagactccaaagagttactttatta

         .       .       .       .       .       .       .       .       .       .       .       .
    cagggtcagatgtgaaccagtaggtgaaggacagtcttgcaaatctcaccgcatgcagtt

         .       .       .       .       .       .       .       .       .       .       .       .
    aatccagggtgggctattttgggagcttcagcctatcacaaataagtgaacatcagcagg

         .       .       .       .       .       .       .       .       .       .       .       .
    ggctgggcgcggtggctcacccctataatcccagcactttgggaggcggaggcggtcgga

         .       .
    tcacgaggt
```

Exon 6 | Start: 138514 | End: 138633 | Length: 119

```
   .      .      .      .      .      .      .      .      .      .      .      .
cagcaggtattttttgttctttgtatgtgctttctgcattgcccaagatgcatctaattat


   .      .      .      .      .      .      .      .      .      .      .      .
ttagcaggtctcaaagtctagacttgatctcatgagttctcttaagtgattaaaaataaa


   .      .      .      .      .      .      .      .      .      .      .      .
tcaggagaaaaaagaggcaatcagaaaagggcatggtttgacttagtttgaatgtggtttt


   .      .      .      .      .      .      .      .      .      .      .      .
cgttggaagcaaatgtgtcttcacttttttcatgaaaaagtctgcaagtgctctgcgacat


   .      .      .      .      .      .      .      .      .      .      .      .
ccctgggaaatgatcctaccctcactcttcagctcacagggaacctttgctctttttcag


  |631       |641       |651       |661       |671       |681
TGACCAAAATCATCTGTGCCCAGCAGTGCTCCGGGCGCTGCCGTGGCAAGTCCCCCAGTG
  T   K   I   I   C   A   Q   Q   C   S   G   R   C   R   G   K   S   P   S   D
  |211                           |221


  |691       |701       |711       |721       |731       |741
ACTGCTGCCACAACCAGTGTGCTGCAGGCTGCACAGGCCCCCGGGAGAGCGACTGCCTGg
  C   C   H   N   Q   C   A   A   G   C   T   G   P   R   E   S   D   C   L
  |231                           |241


   .      .      .      .      .      .      .      .      .      .      .      .
taagatgcccctccagcagcctccctggagcaggctggggctgcacccgccccacccaca


   .      .      .      .      .      .      .      .      .      .      .      .
ccaggacagaagacttcctgtgggggagctgtcaattagcatttgtcataacagacagga


   .      .      .      .      .      .      .      .      .      .      .      .
tattgccctctgcctggtgacaaagtatctttagtatcctgcctccaccactcactgaga


   .      .      .      .      .      .      .      .      .      .      .      .
ccttgggaaaatgatgggactaccatgcctccatttccttacctgacaatgatgcataac


   .      .      .      .      .      .      .      .      .      .      .      .
aaagtctctcccagttgaatgcttaaatgatgagatgcctgtgatgtccgtcattagga
```

Exon 7 | Start: 139979 | End: 140121 | Length: 142

```
       .         .         .         .         .         .
caccgctataatgtgtgaactccatcatctatacgttagtaaacagacgtattttttatca

       .         .         .         .         .         .
taatccataaattatgataggtgggacagtgcacctaagaaaaaaatggactttttagag

       .         .         .         .         .         .
aagggtctttctgactctgcagagggcgccagctgggttttcccacactagtggaacact

       .         .         .         .         .         .
aggctgcaaagacagtaacttgggctttctgacgggagtcaacaccgtgctgcgcttcct

       .         .         .         .         .         .
ccgtgtgtggcgctgagtgtacttacctcacttgcccagcgtgtcctctctcctccatag

    |751       |761       |771       |781       |791       |801
GTCTGCCGCAAATTCCGAGACGAAGCCACGTGCAAGGACACCTGCCCCCCACTCATGCTC
 V   C   R   K   F   R   D   E   A   T   C   K   D   T   C   P   P   L   M   L
    |251                           |261

    |811       |821       |831       |841       |851       |861
TACAACCCCACCACGTACCAGATGGATGTGAACCCCGAGGGCAAATACAGCTTTGGTGCC
 Y   N   P   T   T   Y   Q   M   D   V   N   P   E   G   K   Y   S   F   G   A
    |271                           |281

    |871       |881       .         .         .         .         .
ACCTGCGTGAAGAAGTGTCCCCgtgagtcctcctctgtgggccctctaactggtcaggca
 T   C   V   K   K   C   P   R
    |291

       .         .         .         .         .         .
tccttgtcccgctctgtctcctgctgagccctggagtatcccatcttggagagtctttgg

       .         .         .         .         .         .
gtggatgtgtttgccttgcttggaggaggcgaccctgtgcccgtccaggcacacaggcga

       .         .         .         .         .         .
ggggaggggctggcttgctaccgaggagcgggcaggtggtggccatctccacccatgggg

       .         .         .         .         .         .
gctgctcagtgcacagggcagatctgggtggccaggccacctcacaggagaaacacctgc

       .         .         .         .         .
tgctcagccctcaccactcatc
```

8

Exon 8 | Start: 141798 | End: 141915 | Length: 117


```
            .         .         .         .         .         .         .
aggtggaggagagggctgaggtgcctgctgggacgcaaaacagctggcccctcaagggac

            .         .         .         .         .         .         .
ccagtgtttcctgccatgatgaaacacctgtattgtccacattgcggcctagaatgttat

            .         .         .         .         .         .         .
taaactcttgaacgggattccttctctatttgcaacctttcattctttgtccttaaagta

            .         .         .         .         .         .         .
aataaagccaaaggaggatggagcctttccatcacccctcaagaggacctggaccgcctg

            .         .         .         .         .         .         .
tgtgaggcccgagcacctggtgccaccgtcatcaccttcctttcatgctctcttccccag

  |891       |901       |911       |921       |931       |941
GTAATTATGTGGTGACAGATCACGGCTCGTGCGTCCGAGCCTGTGGGGCCGACAGCTATG
  N   Y   V   V   T   D   H   G   S   C   V   R   A   C   G   A   D   S   Y   E
            |301                                 |311

  |951       |961       |971       |981       |991       |1001
AGATGGAGGAAGACGGCGTCCGCAAGTGTAAGAAGTGCGAAGGGCCCTTGCCGCAAAGgta
  M   E   E   D   G   V   R   K   C   K   K   C   E   G   P   C   R   K   V
            |321                                 |331


            .         .         .         .         .         .         .
ggaagcccgccggtgtgcggacgaggcttgttctcggctgctgaggctgggctctcatgc

            .         .         .         .         .         .         .
cacctccaaaggaacacatcttcctcttctcattaaaaaacaactatacatatcgtttct

            .         .         .         .         .         .         .
ttaaaacagaagataaagctgtaaagctaggttaggcaatgggaaggcactgaaggttgt

            .         .         .         .         .         .         .
gacggggtgggggggctctgatgagaacagtcacagagccagccccgctcagcagctgcca

            .         .         .         .         .         .         .
ggtgcccagccctggggagaatccagggaaggcagagctggaagcagtgcagctcca
```

9

Exon 9 | Start: 142501 | End: 142628 | Length: 127
BE AWARE: This section overlaps with the following exon


```
        .         .         .         .         .         .         .         .         .         .         .         .
gcagtgcagctccaagcggcccatgggaaataatgaggagaacgcaaggtcagtgtgagg

        .         .         .         .         .         .         .         .         .         .         .         .
tgacagggatggcatctcctacaccgccgtagcccccaaagtgtactataggtcctggtgt

        .         .         .         .         .         .         .         .         .         .         .         .
ccccccttcccgcctgcactctccccagccccttcagtgtttgttgagtgaatgaaggat

        .         .         .         .         .         .         .         .         .         .         .         .
gatgtggcagtggcggttccggtgaccggaattccttcctgcttccctctgcctgtggat

        .         .         .         .         .         .         .         .         .         .         .         .
ccctagctattcttaatccaacaaatgtgaacggaatacacgtctctcttatctctgcag

     |1011      |1021      |1031      |1041      |1051      |1061
TGTGTAACGGAATAGGTATTGGTGAATTTAAAGACTCACTCTCCATAAATGCTACGAATA
  C   N   G   I   G   I   G   E   F   K   D   S   L   S   I   N   A   T   N   I
              |341                                 |351

     |1071      |1081      |1091      |1101      |1111      |1121
TTAAACACTTCAAAAACTGCACCTCCATCAGTGGCGATCTCCACATCCTGCCGGTGGCAT
  K   H   F   K   N   C   T   S   I   S   G   D   L   H   I   L   P   V   A   F
              |361                                 |371

     |1131     .         .         .         .         .         .         .         .         .         .
TTAGGGGgtgagtcacaggttcagttgcttgtataaagaaaaacaaaatctgccttttta
  R   G


        .         .         .         .         .         .         .         .         .         .         .         .
actggtagagattggtgatcaataatcaccctgttgtttgtttcagtgactccttcacac

        .         .         .         .         .         .         .         .         .         .         .         .
atactcctcctctggatccacaggaactggatattctgaaaaccgtaaaggaaatcacag

        .         .         .         .         .         .         .         .         .         .         .         .
gtttgagctgaattatcacatgaatataaatgggaaatcagtgtttttagagagagaactt
```

10

```
          .         .         .         .         .         .         .         .         .         .         .         .
        ttcgacatatttcctgttcccttggaataaaaacatttcttctgaaattttaccgttaat

          .         .
        ggctgat
```

Exon 10 | Start: 142727 | End: 142801 | Length: 74

```
          .         .         .         .         .         .         .         .         .         .         .         .
        ctctgcctgtggatccctagctattcttaatccaacaaatgtgaacggaatacacgtctc

          .         .         .         .         .         .         .         .         .         .         .         .
        tcttatctctgcagtgtgtaacggaataggtattggtgaatttaaagactcactctccat

          .         .         .         .         .         .         .         .         .         .         .         .
        aaatgctacgaatattaaacacttcaaaaactgcacctccatcagtggcgatctccacat

          .         .         .         .         .         .         .         .         .         .         .         .
        cctgccggtggcatttagggggtgagtcacaggttcagttgcttgtataaagaaaaacaa

          .         .         .         .         .         .         .         .         .         .         .         .
        aatctgcctttttaactggtagagattggtgatcaataatcaccctgttgtttgtttcag
                 |1141        |1151        |1161        |1171        |1181        |1191
        TGACTCCTTCACACATACTCCTCCTCTGGATCCACAGGAACTGGATATTCTGAAAACCGT
         D  S  F  T  H  T  P  P  L  D  P  Q  E  L  D  I  L  K  T  V
                 |381                                |391

                 |1201        .         .         .         .         .         .         .         .         .
        AAAGGAAATCACAGgtttgagctgaattatcacatgaatataaatgggaaatcagtgttt
         K  E  I  T  G
                 |401

          .         .         .         .         .         .         .         .         .         .         .         .
        tagagagagaacttttcgacatatttcctgttcccttggaataaaaacatttcttctgaa

          .         .         .         .         .         .         .         .         .         .         .         .
        attttaccgttaatggctgatgttttgatattttttcaaaagtgcagtttctcctgcaggc

          .         .         .         .         .         .         .         .         .         .         .         .
        aaaaggggacacgttaagtccaggcttgggtcattcactgcggtgtaaacacgctttctc
```

11

```
        .         .         .         .         .         .         .
    cctcccgcccggccccagccagctgccttggtggcccataacccctgagggtagagggag

       .         .         .
    gggacaggggtagg
```

Exon 11 | Start: 143631 | End: 143722 | Length: 91

```
        .         .         .         .         .         .         .
    gagcctcttcggggtaatcagatacgcggcgcagcaggggtctcagggccacagccaggg

        .         .         .         .         .         .         .
    gggcggcgggagacatgcggaatcgcagcggaaggcgggaggcagctgtgaactgtggct

        .         .         .         .         .         .         .
    cggcctgcgtccgccctgcgcatgtacactcagagaagatgataatgaaaaagaaagcaa

        .         .         .         .         .         .         .
    atccaattttcccacttactgttcatataatacagagtccctgagagtctagagtaatgt

        .         .         .         .         .         .         .
    ctcatacaaaaaagaaactcctacgtggtgtgtgtctgaagtctttcatctgccttacag

       |1211      |1221      |1231      |1241      |1251      |1261
    GGTTTTTGCTGATTCAGGCTTGGCCTGAAAACAGGACGGACCTCCATGCCTTTGAGAACC
      F   L   L   I   Q   A   W   P   E   N   R   T   D   L   H   A   F   E   N   L
                                 |411                                |421

       |1271      |1281      |1291      .         .         .         .         .
    TAGAAATCATACGCGGCAGGACCAAGCAACAgtaagttgaccacagccaaagcctggtag
      E   I   I   R   G   R   T   K   Q   H
                                 |431

        .         .         .         .         .         .         .
    attacatttgccttttagttggaaattaggcttaacaggagagttgctaagatagggca

        .         .         .         .         .         .         .
    cagagctcctgcatctctcgccggcattcccaaatgctatctcacatgagcaggcacagg

        .         .         .         .         .         .         .
    gagcaagactgcacgaccactggcacaggctgtccgctaaaccacagacttctcagcgct
```

12

```
        .         .         .         .         .         .         .
cgccagtgcttctgcttctgtgtccactccagatcccacattgcacttagttgtcaaatc

        .         .         .         .         .         .         .
ttttcagtccatttctaacctatattagctc



Exon 12 | Start: 146107 | End: 146307 | Length: 200



        .         .         .         .         .         .         .
ctcaatttccaggcaaaatgaaaatggagaaaatataatgacattaaggcattttattca

        .         .         .         .         .         .         .
tcctccccatctgccactgggttaaagatactaaataaacaaggaactatcttttgcctg

        .         .         .         .         .         .         .
gaggaactttaaaaacacctgcagttttcaaaaggtgcagtgtgtgcctcccacagcatg

        .         .         .         .         .         .         .
acctaccatcattggaaagcagtttgtagtcaatcaaaggtggtctggagaaacaaagtt

        .         .         .         .         .         .         .
ttcagggatacattgttttttataattttttcaccacatgattttttcttctctccaatgtag

   |1301      |1311      |1321      |1331      |1341      |1351
TGGTCAGTTTTCTCTTGCAGTCGTCAGCCTGAACATAACATCCTTGGGATTACGCTCCCT
 G  Q  F  S  L  A  V  V  S  L  N  I  T  S  L  G  L  R  S  L
                   |441                                |451

   |1361      |1371      |1381      |1391      |1401      |1411
CAAGGAGATAAGTGATGGAGATGTGATAATTTCAGGAAACAAAAATTTGTGCTATGCAAA
 K  E  I  S  D  G  D  V  I  I  S  G  N  K  N  L  C  Y  A  N
                   |461                                |471

   |1421      |1431      |1441      |1451      |1461      |1471
TACAATAAACTGGAAAAAAACTGTTTGGGACCTCCGGTCAGAAAACCAAAATTATAAGCAA
 T  I  N  W  K  K  L  F  G  T  S  G  Q  K  T  K  I  I  S  N
                   |481                                |491

   |1481      |1491      .         .         .         .         .
CAGAGGTGAAAACAGCTGCAgtaagtcaccgctttctgtttagtttatggagttggttct
 R  G  E  N  S  C  K
```

13

```
          .         .         .         .         .         .         .         .         .         .         .         .
       aatgggtcctttatttgtatttagaatattgaagggctattcccatttaaattacttttt

          .         .         .         .         .         .         .         .         .         .         .         .
       tcagttccttaagaagcaaattaaaatcttaagattcctaactgtgaaattaccatgtga

          .         .         .         .         .         .         .         .         .         .         .         .
       attccattaaaactttttccagatcattaccattcaatgggatgaatttaccctgaggtt

          .         .         .         .         .         .         .         .         .         .         .         .
       taggctaccaattatttgtaatgtaagtaactaaatttagtattagttatattacctttt

          .         .         .         .
       agttgtaggtcactctctgc
```

Exon 13 | Start: 147467 | End: 147600 | Length: 133

```
       .         .         .         .         .         .         .         .         .         .         .         .
    aggactcacggcaccccctctcgggtgccagggtgcctggctcccaccaggaggaagacc

       .         .         .         .         .         .         .         .         .         .         .         .
    tgtcctccactgtcaggcacatttcagtcttcccagcagccagcacaactactttgtcct

       .         .         .         .         .         .         .         .         .         .         .         .
    tccagtcacggtcggcctctgggaagcccagtctgtgtcctcctccttcaggggtagcca

       .         .         .         .         .         .         .         .         .         .         .         .
    gcatgtctgtgtcacccaaggtcatggagcacagggcccctcccgggaaggtgccgtctc

       .         .         .         .         .         .         .         .         .         .         .         .
    ctccggcccctcgggtccctgctctgtcactgactgctgtgacccactctgtctccgcag

      |1501      |1511      |1521      |1531      |1541      |1551
    AGGCCACAGGCCAGGTCTGCCATGCCTTGTGCTCCCCCGAGGGCTGCTGGGGCCCGGAGC
      A  T  G  Q  V  C  H  A  L  C  S  P  E  G  C  W  G  P  E  P
      |501                                |511

      |1561      |1571      |1581      |1591      |1601      |1611
    CCAGGGACTGCGTCTCTTGCCGGAATGTCAGCCGAGGCAGGGAATGCGTGGACAAGTGCA
      R  D  C  V  S  C  R  N  V  S  R  G  R  E  C  V  D  K  C  N
      |521                                |531
```

14

```
   |1621      |1631.    .    .    .    .    .    .     .     .
ACCTTCTGGAGGGgtaggaggttatttctttaatccccttgcgttgatcaaaaataaggc
 L   L   E   G
  |541


   .    .    .    .    .    .    .    .    .    .     .     .
tccaggttgttgttatagctttacaggcattctgtttgattttctcttccttttattctt

   .    .    .    .    .    .    .    .    .    .     .     .
tgcccttggcttttggaggttttgggttttctgtggggagacgggaagttgtttgattgc

   .    .    .    .    .    .    .    .    .    .     .     .
gttatttttggcaaatttaagcacaataggaaataagcaagtattattgcctaatataat

   .    .    .    .    .    .    .    .    .    .     .     .
ccaataatttatagaatctcttttcctggaagtatcttaaattttttctaagctacaaaaa

   .    .    .
gttcctaagacaa



Exon 14 | Start: 149701 | End: 149792 | Length: 91



   .    .    .    .    .    .    .    .    .    .     .     .
aacacctcctcaggactatcttttcttttatcatttggcttgcttacccaatatgcaaaa

   .    .    .    .    .    .    .    .    .    .     .     .
actatgctgtagaaaaagcagaaaagatatcttgattatgaatgaagctcctgtgtttac

   .    .    .    .    .    .    .    .    .    .     .     .
tcagagagaagatgacccaggattcagttaacaaaatcagctgattatattactatatag

   .    .    .    .    .    .    .    .    .    .     .     .
tcctggagtcccaactccttgaccattacctcaagttatttggaattttgaagaggtgat

   .    .    .    .    .    .    .    .    .    .     .     .
ttgtgttcctgcaataatgtctcaggggtgggctgacgggtttcctcttcctcctctcag

         |1641      |1651      |1661      |1671      |1681      |1691
TGAGCCAAGGGAGTTTGTGGAGAACTCTGAGTGCATACAGTGCCACCCAGAGTGCCTGCC
 E   P   R   E   F   V   E   N   S   E   C   I   Q   C   H   P   E   C   L   P
                 |551                              |561

                                  15
```

```
       |1701       |1711       |1721 .      .      .      .      .
TCAGGCCATGAACATCACCTGCACAGGACGGgtaagagccccttgctgctatccacgtcc
 Q   A   M   N   I   T   C   T   G   R
                              |571


  .      .      .      .      .      .      .      .      .      .      .      .
atttcatgggaagggccttcacagaagccgaacagtgatgatggcccagggcatcctgtg


  .      .      .      .      .      .      .      .      .      .      .      .
tgggcaggacggccatcagagccacttcccagaggagacggcaggcgctgacagcgctgt


  .      .      .      .      .      .      .      .      .      .      .      .
ccgggcagggtgtcggtgacattagcacacacattagcctgcgatgaacattcactcttt


  .      .      .      .      .      .      .      .      .      .      .      .
ctgctgacacccccaaccttatctaagcttatcaaatcctcacatttaacggaggctgtt


  .      .      .      .      .      .      .
ttcacctggtttcccccatccctgacctagt



Exon 15 | Start: 151248 | End: 151406 | Length: 158



  .      .      .      .      .      .      .      .      .      .      .      .
gttttgccaaggaaagatgcccacaatggttaagcagaatgcaataatgtagagaatatc


  .      .      .      .      .      .      .      .      .      .      .      .
atttctttcatgctggtgtatatcatatgcattcaaaaacagggagaacttctaagcaac


  .      .      .      .      .      .      .      .      .      .      .      .
taacagtgaccatatcaagcaggtgcaatcacagaataactggttttctcctttaagaat


  .      .      .      .      .      .      .      .      .      .      .      .
ttttctatcatttggctttcccccactcacacacactaaatattttaagtaaaaagttact


  .      .      .      .      .      .      .      .      .      .      .      .
tccattttgaaagagaaaagaaagagacatgcatgaacattttttctccaccttggtgcag


        |1731       |1741       |1751       |1761       |1771       |1781
GGACCAGACAACTGTATCCAGTGTGCCCACTACATTGACGGCCCCCACTGCGTCAAGACC
 G   P   D   N   C   I   Q   C   A   H   Y   I   D   G   P   H   C   V   K   T
                  |581                               |591
```

16

```
         |1791      |1801      |1811      |1821      |1831      |1841
TGCCCGGCAGGAGTCATGGGAGAAAACAACACCCTGGTCTGGAAGTACGCAGACGCCGGC
 C   P   A   G   V   M   G   E   N   N   T   L   V   W   K   Y   A   D   A   G
         |601                                           |611

         |1851      |1861      |1871      .    .    .    .
CATGTGTGCCACCTGTGCCATCCAAACTGCACCTACGGgtgagtggaaagtgaaggagaa
 H   V   C   H   L   C   H   P   N   C   T   Y   G
                   |621


     .    .    .    .    .    .    .    .    .    .    .    .
cagaacatttcctctcttgcaaattcagagatcaaaaatgtctcccaagttttccggcaa

     .    .    .    .    .    .    .    .    .    .    .    .
caaattgccgaggtttgtatttgagtcagttacttaaggtgttttggtccccacagccat

     .    .    .    .    .    .    .    .    .    .    .    .
gccagtagcaacttgcttgtgagcaggcctcagtgcagtgggaatgactctgccatgcac

     .    .    .    .    .    .    .    .    .    .    .    .
cgtgtccccggccgggcctgtgttgtgcaatgctgcacatcacaacaggagggtaggggg

     .    .    .    .    .    .    .    .
acaaaagagcacaggtcctggcagctgccacagtctcc



Exon 16 | Start: 157143 | End: 157182 | Length: 39


     .    .    .    .    .    .    .    .    .    .    .    .
aattatctgtgtcaaaagccagatgtgaaaacatctcaataacaaactggctgctttgtt

     .    .    .    .    .    .    .    .    .    .    .    .
caatgctagaacaacgcctgtcacagagtagaaactcaaaaatatttgctgagtgaatga

     .    .    .    .    .    .    .    .    .    .    .    .
acaaatgaataaatgcataataaataattaaccaccaatccaacatccagacacatagtg

     .    .    .    .    .    .    .    .    .    .    .    .
attttaattatttaagagtagtttagcatatattgctttatgatttaattaaaaatctcc

     .    .    .    .    .    .    .    .    .    .    .    .
aaaatatatgccaaagaagtagaatgagaaaaatgtatatttctctttcacttcctacag
```

17

```
|1881      |1891      |1901      |1911      .      .      .      .
ATGCACTGGGCCAGGTCTTGAAGGCTGTCCAACGAATGGgtaagtgttcacagctctgtg
 C   T   G   P   G   L   E   G   C   P   T   N   G
            |631


        .      .      .      .      .      .      .      .      .      .      .      .
tcacatggacctcgtcaagaatgaccacactgctgtgggtgaagatgctttcctgcattt


        .      .      .      .      .      .      .      .      .      .      .      .
ctgactgtcctctgtcctgatcaagtttctatggctctgggccagcctaccctcagccag


        .      .      .      .      .      .      .      .      .      .      .      .
ggtttctgcagagactgcccagctggttccacgtggctccacgtgccaactttgtcctca


        .      .      .      .      .      .      .      .      .      .      .      .
gtggagggaaagttggacacacagtgctggggctgctccctgctccgccgttgctcgatg


        .      .      .      .      .      .      .      .      .
catggcctgcctctgaattccttggttccactggtttttg




Exon 17 | Start: 158951 | End: 159093 | Length: 142



        .      .      .      .      .      .      .      .      .      .      .      .
tcatattttgttaatcaacaaattgaaaaatactcattatatggagaggtccagataaag


        .      .      .      .      .      .      .      .      .      .      .      .
cctcaattttaaaaaatgaggaaaagtgtgcctggtaggggactggggagagcttgagaa


        .      .      .      .      .      .      .      .      .      .      .      .
agttggaaacgttgccttagaagcctgttttttctccttttagaagctacatagtgtctc


        .      .      .      .      .      .      .      .      .      .      .      .
actttccaagatcattctacaagatgtcagtgcactgaaacatgcaggggcgtgttgagt


        .      .      .      .      .      .      .      .      .      .      .      .
gccaaggccatggaatctgtcagcaacctcacccttccttgttcctccacctcattccag

 |1921      |1931      |1941      |1951      |1961      |1971
GCCTAAGATCCCGTCCATCGCCACTGGGATGGTGGGGGCCCTCCTCTTGCTGCTGGTGGT
 P   K   I   P   S   I   A   T   G   M   V   G   A   L   L   L   L   V   V
 |641                              |651
```

18

```
 |1981      |1991      |2001      |2011      |2021      |2031
GGCCCTGGGGATCGGCCTCTTCATGCGAAGGCGCCACATCGTTCGGAAGCGCACGCTGCG
 A  L  G  I  G  L  F  M  R  R  R  H  I  V  R  K  R  T  L  R
 |661                           |671

 |2041      |2051      |2061.     .      .      .      .      .
GAGGCTGCTGCAGGAGAGGGAGgtgagtgccagtcctgggtgggctcaggagccctcgca
 R  L  L  Q  E  R  E
 |681


      .      .      .      .      .      .      .      .      .      .
ccccgacaggaacaagggccagccccgagaacgggccattagcagttgtgtatgttagat

      .      .      .      .      .      .      .      .      .      .
acataattgtattatgatgcagaaagaatctctgaatgtgcagttatacccagttggtga

      .      .      .      .      .      .      .      .      .      .
catgttggtacatccatccgaggaaatggcaatgtttctaggctgcacccttcaatgtcc

      .      .      .      .      .      .      .      .      .      .
acaaagctgtgtggcatctgcttaggacccggtgcctgtgtgtgcataggagggaggcca

      .      .      .      .      .
ggaagcctggctgttgatccca



Exon 18 | Start: 159889 | End: 160012 | Length: 123



      .      .      .      .      .      .      .      .      .      .
ccctaccggagttttcaatccagttaataggcgtggaaacagacatagaaattgtgtttg

      .      .      .      .      .      .      .      .      .      .
ttgaaaggtagctgttcagttaaagaacacctgtatcagagcctgtgtttctaccaactt

      .      .      .      .      .      .      .      .      .      .
ctgtcaagctctgtagagaaggcgtacatttgtccttccaaatgagctggcaagtgccgt

      .      .      .      .      .      .      .      .      .      .
gtcctggcacccaagcccatgccgtggctgctggtccccctgctgggccatgtctggcac

      .      .      .      .      .      .      .      .      .      .
tgctttccagcatggtgagggctgaggtgacccttgtctctgtgttcttgtcccccccag
```

```
          |2071       |2081       |2091       |2101       |2111       |2121
CTTGTGGAGCCTCTTACACCCAGTGGAGAAGCTCCCAACCAAGCTCTCTTGAGGATCTTG
 L   V   E   P   L   T   P   S   G   E   A   P   N   Q   A   L   L   R   I   L
          |691                                |701

          |2131       |2141       |2151       |2161       |2171       |2181
AAGGAAACTGAATTCAAAAAGATCAAAGTGCTGGGCTCCGGTGCGTTCGGCACGGTGTAT
 K   E   T   E   F   K   K   I   K   V   L   G   S   G   A   F   G   T   V   Y
          |711                                |721


          .         .         .         .         .         .         .
AAGgtaaggtccctggcacaggcctctgggctgggccgcagggcctctcatggtctggtg
 K


          .         .         .         .         .         .         .
gggagcccagagtccttgcaagctgtatatttccatcatctactttactctttgtttcac

          .         .         .         .         .         .         .
tgagtgtttgggaaactccagtgttttcccaagttattgagaggaaatcttttataacc

          .         .         .         .         .         .         .
acagtaatcagtggtcctgtgagaccaattcacagaccaaaggcatttttatgaaagggg

          .         .         .         .         .         .         .
ccattgaccttgccatggggtgcagcacagggcgggaggagggccgcctctcaccgcacg

          .
gca



Exon 19 | Start: 160690 | End: 160789 | Length: 99



.         .         .         .         .         .         .
ttaggcctagacgcagcatcattaaattctggatgaaatgatccacacggactttataac

.         .         .         .         .         .         .
aggctttacaagcttgagattcttttatctaaataatcagtgtgattcgtggagcccaac

.         .         .         .         .         .         .
agctgcagggctgcgggggcgtcacagcccccagcaatatcagccttaggtgcggctcca
```

20

```
      .         .         .         .         .         .
      cagccccagtgtccctccccttcgggggtgcatcgctggtaacatccacccagatcactgg

      .         .         .         .         .         .
      gcagcatgtggcaccatctcacaattgccagttaacgtcttccttctctctctgtcatag

            |2191      |2201      |2211      |2221      |2231      |2241
      GGACTCTGGATCCCAGAAGGTGAGAAAGTTAAAATTCCCGTCGCTATCAAGGAATTAAGA
       G  L  W  I  P  E  G  E  K  V  K  I  P  V  A  I  K  E  L  R
            |731                          |741

            |2251      |2261      |2271      |2281    .         .         .
      GAAGCAACATCTCCGAAAGCCAACAAGGAAATCCTCGATgtgagtttctgctttgctgtg
       E  A  T  S  P  K  A  N  K  E  I  L  D
            |751                          |761


          .         .         .         .         .         .
      tggggggtccatggctctgaacctcaggcccacctttttctcatgtctggcagctgctctgc

          .         .         .         .         .         .
      tctagaccctgctcatctccacatcctaaatgttcactttctatgtctttcccttttctag

          .         .         .         .         .         .
      ctctagtgggtataactccctccccttagagacagcactggcctctcccatgctggtatc

          .         .         .         .         .         .
      caccccaaaaggctggaaacaggcaattactggcatctacccagcactagtttcttgaca

          .         .         .         .         .         .
      cgcatgatgagtgagtgctcttggtgagcctggagcatg



      Exon 20 | Start: 167261 | End: 167447 | Length: 186



          .         .         .         .         .         .
      aggtgactccgactcctcctttatccaatgtgctcctcatggccactgttgcctgggcct

          .         .         .         .         .         .
      ctctgtcatggggaatccccagatgcacccaggaggggccctctcccactgcatctgtca

          .         .         .         .         .         .
      cttcacagccctgcgtaaacgtccctgtgctaggtcttttgcaggcacagcttttcctcc
```

21

```
        .     .     .     .     .     .     .     .     .     .
    atgagtacgtattttgaaactcaagatcgcattcatgcgtcttcacctggaaggggtcca

        .     .     .     .     .     .     .     .     .     .
    tgtgcccctccttctggccaccatgcgaagccacactgacgtgcctctccctccctccag

            |2291      |2301      |2311      |2321      |2331      |2341
    GAAGCCTACGTGATGGCCAGCGTGGACAACCCCCACGTGTGCCGCCTGCTGGGCATCTGC
    E   A   Y   V   M   A   S   V   D   N   P   H   V   C   R   L   L   G   I   C
                                    |771                             |781

            |2351      |2361      |2371      |2381      |2391      |2401
    CTCACCTCCACCGTGCAGCTCATCACGCAGCTCATGCCCTTCGGCTGCCTCCTGGACTAT
    L   T   S   T   V   Q   L   I   T   Q   L   M   P   F   G   C   L   L   D   Y
                                    |791                             |801

            |2411      |2421      |2431      |2441      |2451      |2461
    GTCCGGGAACACAAAGACAATATTGGCTCCCAGTACCTGCTCAACTGGTGTGTGCAGATC
    V   R   E   H   K   D   N   I   G   S   Q   Y   L   L   N   W   C   V   Q   I
                                    |811                             |821

                .     .     .     .     .     .     .     .     .     .
    GCAAAGgtaatcagggaagggagatacggggaggggagataaggagccaggatcctcaca
    A   K

                .     .     .     .     .     .     .     .     .     .
    tgcggtctgcgctcctgggatagcaagagtttgccatggggatatgtgtgtgcgtgcatg

        .     .     .     .     .     .     .     .     .     .
    cagcacacacacattcctttattttggattcaatcaagttgatcttcttgtgcacaaatc

        .     .     .     .     .     .     .     .     .     .
    agtgcctgtcccatctgcatgtggaaactctcatcaatcagctacctttgaagaattttc

        .     .     .     .     .     .     .     .     .     .
    tctttattgagtgctcagtgtggtctgatgtctctgttcttatttctctggaattctttg

    .     .
    tgaata


    Exon 21 | Start: 177687 | End: 177843 | Length: 156
```

```
             .         .         .         .         .         .         .         .         .         .         .         .
        aagttcaagcccaggtctcaactgggcagcagagctcctgctcttctttgtcctcatata

             .         .         .         .         .         .         .         .         .         .         .         .
        cgagcacctctggacttaaaacttgaggaactggatggagaaaagttaatggtcagcagc

             .         .         .         .         .         .         .         .         .         .         .         .
        gggttacatcttctttcatgcgcctttccattctttggatcagtagtcactaacgttcgc

             .         .         .         .         .         .         .         .         .         .         .         .
        cagccataagtcctcgacgtggagaggctcagagcctggcatgaacatgaccctgaattc

             .         .         .         .         .         .         .         .         .         .         .         .
        ggatgcagagcttcttcccatgatgatctgtccctcacagcagggtcttctctgtttcag

         |2471      |2481      |2491      |2501      |2511      |2521
        GGCATGAACTACTTGGAGGACCGTCGCTTGGTGCACCGCGACCTGGCAGCCAGGAACGTA
        G   M   N   Y   L   E   D   R   R   L   V   H   R   D   L   A   A   R   N   V
                                |831                                     |841

         |2531      |2541      |2551      |2561      |2571      |2581
        CTGGTGAAAACACCGCAGCATGTCAAGATCACAGATTTTGGGCTGGCCAAACTGCTGGGT
        L   V   K   T   P   Q   H   V   K   I   T   D   F   G   L   A   K   L   L   G
                                |851                                     |861

         |2591      |2601      |2611      |2621      .         .         .         .
        GCGGAAGAGAAAGAATACCATGCAGAAGGAGGCAAAgtaaggaggtggctttaggtcagc
        A   E   E   K   E   Y   H   A   E   G   G   K
                                        |871

             .         .         .         .         .         .         .         .         .         .         .         .
        cagcattttcctgacaccagggaccaggctgccttcccactagctgtattgtttaacaca

             .         .         .         .         .         .         .         .         .         .         .         .
        tgcaggggaggatgctctccagacattctgggtgagctcgcagcagctgctgctggcagc

             .         .         .         .         .         .         .         .         .         .         .         .
        tgggtccagccagggtctcctggtagtgtgagccagagctgctttgggaacagtacttgc

             .         .         .         .         .         .         .         .         .         .         .         .
        tgggacagtgaatgaggatgttatccccaggtgatcattagcaaatgttaggtttcagtc

             .         .         .         .         .         .         .         .
        tctccctgcaggatatataagtcccttcaatagcg
```

23

Exon 22 | Start: 178734 | End: 178810 | Length: 76


```
          .         .         .         .         .         .         .         .         .         .         .         .
tgggccctgaaaacacacgcagacctggatgagtgaggccactgggcacaaccagggctc

          .         .         .         .         .         .         .         .         .         .         .         .
ccagctcaccagagcagcctgggacacagagggtgctcagaaacctaccagagcagccct

          .         .         .         .         .         .         .         .         .         .         .         .
gaactccgtcagactgaaatcccctgttgccgggaggaggcgccgggcctgggggacggg

          .         .         .         .         .         .         .         .         .         .         .         .
tcctggggtgatctggctcgtctgtgtgtgtcactcgtaattaggtccagagtgagttaa

          .         .         .         .         .         .         .         .         .         .         .         .
cttttttccaacagagggaaactaatagttgtctcactgcctcatctctcaccatcccaag

     |2631      |2641      |2651      |2661      |2671      |2681
GTGCCTATCAAGTGGATGGCATTGGAATCAATTTTACACAGAATCTATACCCACCAGAGT
V   P   I   K   W   M   A   L   E   S   I   L   H   R   I   Y   T   H   Q   S
               |881                                     |891

     |2691      |2701.        .         .         .         .         .         .
GATGTCTGGAGCTACGgtgagtcataatcctgatgctaatgagtttgtactgaggccaag
D   V   W   S   Y   G
               |901


          .         .         .         .         .         .         .         .         .         .         .         .
ctggcttttattgttagttaatttacattatatcctctgacatgcaagtattttctttcg

          .         .         .         .         .         .         .         .         .         .         .         .
agataatgactaatgataatgtaatcattgctgtctatctattgtactgagaaaacacgg

          .         .         .         .         .         .         .         .         .         .         .         .
cagaggaaatcgagtccagctgccgtccaaaagtcactggagattgcaatgagctcgtct

          .         .         .         .         .         .         .         .         .         .         .         .
ggcagggtggggggtatgggagggaaagagcttaggaaacggctctccctgcaaagtcca

          .         .         .         .
accaaactttaacgtt
```

24

Exon 23 | Start: 184685 | End: 184832 | Length: 147


```
        .         .         .         .         .         .         .
gttaattaccaaagtttaccacttatcagtcacttactacttgctgggcattgcactaag

        .         .         .         .         .         .         .
catttcagttgtattatcttgttgggtccttacagcaatcctgtgaaacagatactgcta

        .         .         .         .         .         .         .
ttaccccactttatagagaggtagactgaggcttccagcattgaagcaaattgcccaaga

        .         .         .         .         .         .         .
ctacagaaatgtaggtttctaaacatcaagaaacagtaaccagtaatgatgactaaagca

        .         .         .         .         .         .         .
agggattgtgattgttcattcatgatcccactgccttcttttcttgcttcatcctctcag
           |2711      |2721      |2731      |2741      |2751      |2761
GGGTGACCGTTTGGGAGTTGATGACCTTTGGATCCAAGCCATATGACGGAATCCCTGCCA
   V  T  V  W  E  L  M  T  F  G  S  K  P  Y  D  G  I  P  A  S
                                 |911                          |921

           |2771      |2781      |2791      |2801      |2811      |2821
GCGAGATCTCCTCCATCCTGGAGAAAGGAGAACGCCTCCCTCAGCCACCCATATGTACCA
   E  I  S  S  I  L  E  K  G  E  R  L  P  Q  P  P  I  C  T  I
                                 |931                          |941

           |2831      |2841        .         .         .         .
TCGATGTCTACATGATCATGGTCAAGtgtgagtgactggtgggtctgtccacactgccta
   D  V  Y  M  I  M  V  K  C


        .         .         .         .         .         .         .
gctgagccttggtggctgctcttagccaaacagctgaggcctttgcatccctggagaaat

        .         .         .         .         .         .         .
gtcatcacattacttaaggcaggcacacaaatccagaaacatctgtaaatacccccttcaa

        .         .         .         .         .         .         .
gcattcttttaaagacacttcttgactcattgggcagtatgacctgacatttgcccatgt

        .         .         .         .         .         .         .
```

```
ttgcaagcaaataaataaaactaaagtcttccgcaagccattacaccaaaatattctatt

 .    .    .    .    .    .
cgctgagttactcaatgaaataccgag
```

Exon 24 | Start: 186284 | End: 186382 | Length: 98

```
 .    .    .    .    .    .    .    .    .    .    .    .
cagacccacactgctccatcccctcaggcgtaacacaggatgctgaccccaggaagagtg

 .    .    .    .    .    .    .    .    .    .    .    .
ggcgtagaaaaactagagggcattattgttattctgattcaaatgtacagtgctggcatg

 .    .    .    .    .    .    .    .    .    .    .    .
gtctttaaacagtaaccagtactagctggccaagacagaaaagtctaccacaaagacttg

 .    .    .    .    .    .    .    .    .    .    .    .
gttctttcatcacttatttgactggaagtgtcgcatcaccaatgccttctttaagcaatg

 .    .    .    .    .    .    .    .    .    .    .    .
ccatctttatcatttcttccagtgttctaattgcactgttttttctcattccttccccag

    |2851      |2861      |2871      |2881      |2891      |2901
GCTGGATGATAGACGCAGATAGTCGCCCAAAGTTCCGTGAGTTGATCATCGAATTCTCCA
  W   M   I   D   A   D   S   R   P   K   F   R   E   L   I   I   E   F   S   K
   |951                               |961

    |2911      |2921      |2931      |2941      .    .    .    .
AAATGGCCCGAGACCCCCAGCGCTACCTTGTCATTCAGgtacaaattgcagtctgtgctt
  M   A   R   D   P   Q   R   Y   L   V   I   Q
   |971                               |981

    .    .    .    .    .    .    .    .    .    .    .    .
ccattgggaagagtccctctaatgagcatctcatgtcactgtgttctgtcacatgccagc

    .    .    .    .    .    .    .    .    .    .    .    .
ctggcctccctgtgtcccagatcgcattattaaaccctccagcgcattagagcaagcctc

    .    .    .    .    .    .    .    .    .    .    .    .
agtaaggcgcaggccacatcgtgaactaagcagcatccgtgagtggggcccacccaactc

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

catctcccccctccccgtctgaactctcctctggtgctcgtcctcactgtccggctagcca

  .   .   .   .

aagcctcagctgggtctaagagagaagcatggtctatt

Exon 25 | Start: 187156 | End: 187324 | Length: 168

.   .   .   .

cacagcaaggtgcacactcgatgaatgctgcagcttcttccctttctgtttcctcagaag

.   .   .   .

ctatttgaatctcatgtaggggctttcaagcatcaaaggatggttcatgttttattttaa

.   .   .   .

ggcacccacatcatgtcatgaggggaggcagctataatttagagaaccaagggggatttc

.   .   .   .

attataacaaaattggcaaacacacaggcacctgctggcaatagacccctgctcctatag

.   .   .   .

ccaagaagtggaatagcatctctacgggccattctaatagcctcaaaatctctgcaccag

```
   |2951    |2961    |2971    |2981    |2991    |3001
GGGGATGAAAGAATGCATTTGCCAAGTCCTACAGACTCCAACTTCTACCGTGCCCTGATG
G  D  E  R  M  H  L  P  S  P  T  D  S  N  F  Y  R  A  L  M
                     |991                              |1001

   |3011    |3021    |3031    |3041    |3051    |3061
GATGAAGAAGACATGGACGACGTGGTGGATGCCGACGAGTACCTCATCCCACAGCAGGGC
D  E  E  D  M  D  D  V  V  D  A  D  E  Y  L  I  P  Q  Q  G
                     |1011                             |1021

   |3071    |3081    |3091    |3101    |3111    .    .
TTCTTCAGCAGCCCCTCCACGTCACGGACTCCCCTCCTGAGCTCTCTGgtatgaaatctc
F  F  S  S  P  S  T  S  R  T  P  L  L  S  S  L
                     |1031
```

.   .   .   .

tgtctctctctctctctcaagctgtgtctactcatttgaacaaattgaattttagggaaa

  .   .   .   .

ataaccatctagtgaaactcacatggatatgaagtcaattttaaccaaatggtaaaatca

27

```
        .         .         .         .         .         .         .         .         .         .         .         .
aaatcaaaataaattaagtgtattaattattttgttgcattgcaacaacttgattgtaag

        .         .         .         .         .         .         .         .         .         .         .         .
ccttttaggtccactatggaatgtaattaaatcaaaactaaacctagttgctctaaaact

        .         .         .         .         .         .         .         .         .         .
aacgattaagacaaaaattaaacaccttcacaatataccctccatgag
```

Exon 26 | Start: 187703 | End: 187751 | Length: 48

```
    .         .         .         .         .         .         .         .         .         .         .         .
tctagtgaaactcacatggatatgaagtcaattttaaccaaatggtaaaatcaaaatcaa

    .         .         .         .         .         .         .         .         .         .         .         .
aataaattaagtgtattaattattttgttgcattgcaacaacttgattgtaagcccttta

    .         .         .         .         .         .         .         .         .         .         .         .
ggtccactatggaatgtaattaaatcaaaactaaacctagttgctctaaaactaacgatt

    .         .         .         .         .         .         .         .         .         .         .         .
aagacaaaaattaaacaccttcacaatataccctccatgaggcacaccacctgcattcag

    .         .         .         .         .         .         .         .         .         .         .         .
gaaaagtggatgagatgtggtacaagcattccatgggcaacttctctgtttcttttttcag

      |3121      |3131      |3141      |3151      |3161 .       .
AGTGCAACCAGCAACAATTCCACCGTGGCTTGCATTGATAGAAATGGGgtatgtatgaac
S   A   T   S   N   N   S   T   V   A   C   I   D   R   N   G
      |1041                              |1051

        .         .         .         .         .         .         .         .         .         .         .         .
accttataagccagaatttacagctctccactatggctctattttacatggaaaatgcct

        .         .         .         .         .         .         .         .         .         .         .         .
taacctaaataattttaacccagataatcttgagttttcttcctgtgtgtgggttttttccct

        .         .         .         .         .         .         .         .         .         .         .         .
gcacggctgtcacgcctcacagtgccgttcaaagcgtgactcctggaccagtagtagcat

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

28

```
cgcctggccttgttagaaacgccattttttcaggccactgccccagtttgaccaaatcagg

   .        .        .        .        .        .        .        .        .        .

acctctgggggtggcacccagtagtctatgtttgagccactttccagg
```

Exon 27 | Start: 188485 | End: 188594 | Length: 109

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

ctcacacatgtgaagtgtccagtagccacacgtggctagtggtgaccgtattgaagagca

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

ccgctcatagcacacctccctcactgcggaaagttctgctgtacagcacccagcacagcc

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

ctgctgcccaccctgcagcctgtggcccagtagcaccagcacccaccagggtgcagactc

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

tcaggcctgcccaacctactaatcagaaccagcatctcaaggagatctcgggtgattttt

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

gcaaacactgaagttggggcagccctgaccggagtaaccttccctcatttcctcctgcag
        |3171       |3181       |3191       |3201       |3211       |3221
CTGCAAAGCTGTCCCATCAAGGAAGACAGCTTCTTGCAGCGATACAGCTCAGACCCCACA
L    Q    S    C    P    I    K    E    D    S    F    L    Q    R    Y    S    S    D    P    T
                   |1061                                              |1071

        |3231       |3241       |3251       |3261       |3271.        .
GGCGCCTTGACTGAGGACAGCATAGACGACACCTTCCTCCCAGTGCCTGgtgagtggctt
G    A    L    T    E    D    S    I    D    D    T    F    L    P    V    P    E
                   |1081                                              |1091

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

gtctggaaacagtcctgctcctcaacctcctcgacccactcagcagcagccagtctccag

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

tgtccaagccaggtgctccctccagcatctccagagggggaaacagtggcagatttgcag

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

acacagtgaagggcgtaaggagcagataaacacatgaccgagcctgcacaagctctttgt

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

tgtgtctggttgtttgctgtacctctgttgtaagaatgaatctgcaaaatttctagctta

.   .   .   .

tgaagcaaatcacggacatacacatctgtgtgtgtgagtgttcatgatg

Exon 28 | Start: 191224 | End: 193307 | Length: 2083

.   .   .   .

acacatcacacatatatgtatacatgcatacacatacacacacacatacacacactctcc

.   .   .   .

tcaaggcagtttatcctctgagaactttaaatttacaaaagacacatatgtccattactt

.   .   .   .

tgagaaggacaggaaagaacccactttcttttgcagcaacagcaagagggccctcccgag

.   .   .   .

gctcctgctccctgtcataagtctccttgttgaggacattcacagggttcagaacccagg

.   .   .   .

gatcctgcatgggatggtgctttgctgattacttcacctctgatttctttccactttcag

```
        |3281      |3291      |3301      |3311      |3321      |3331
AATACATAAACCAGTCCGTTCCCAAAAGGCCCGCTGGCTCTGTGCAGAATCCTGTCTATC
  Y   I   N   Q   S   V   P   K   R   P   A   G   S   V   Q   N   P   V   Y   H
                                      |1101                              |1111

        |3341      |3351      |3361      |3371      |3381      |3391
ACAATCAGCCTCTGAACCCCGCGCCCAGCAGAGACCCACACTACCAGGACCCCCACAGCA
  N   Q   P   L   N   P   A   P   S   R   D   P   H   Y   Q   D   P   H   S   T
                                      |1121                              |1131

        |3401      |3411      |3421      |3431      |3441      |3451
CTGCAGTGGGCAACCCCGAGTATCTCAACACTGTCCAGCCCACCTGTGTCAACAGCACAT
  A   V   G   N   P   E   Y   L   N   T   V   Q   P   T   C   V   N   S   T   F
                                      |1141                              |1151

        |3461      |3471      |3481      |3491      |3501      |3511
TCGACAGCCCTGCCCACTGGGCCCAGAAAGGCAGCCACCAAATTAGCCTGGACAACCCTG
  D   S   P   A   H   W   A   Q   K   G   S   H   Q   I   S   L   D   N   P   D
                                      |1161                              |1171
```

30

```
        |3521      |3531      |3541      |3551      |3561      |3571
ACTACCAGCAGGACTTCTTTCCCAAGGAAGCCAAGCCAAATGGCATCTTTAAGGGCTCCA
  Y  Q  Q  D  F  F  P  K  E  A  K  P  N  G  I  F  K  G  S  T
                              |1181                            |1191

        |3581      |3591      |3601      |3611      |3621      |3631
CAGCTGAAAATGCAGAATACCTAAGGGTCGCGCCACAAAGCAGTGAATTTATTGGAGCAT
  A  E  N  A  E  Y  L  R  V  A  P  Q  S  S  E  F  I  G  A  *
                              |1201                            |1211

   |+1        |+11       |+21       |+31       |+41       |+51
GACCACGGAGGATAGTATGAGCCCTAAAAATCCAGACTCTTTCGATACCCAGGACCAAGC


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

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

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

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

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

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

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

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

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

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

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

```
TTTGTAAAAATGTCCCCACGGTACTTACTCCCCACTGATGGACCAGTGGTTTCCAGTCAT

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

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

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

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

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

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

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

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

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

   |+1261     |+1271     |+1281     |+1291     |+1301     |+1311
CAGTAGCATTATGAGTAGTGTGGAATTCAGGTAGTAAATATGAAACTAGGGTTTGAAATT

   |+1321     |+1331     |+1341     |+1351     |+1361     |+1371
GATAATGCTTTCACAACATTTGCAGATGTTTTAGAAGGAAAAAAGTTCCTTCCTAAAATA

   |+1381     |+1391     |+1401     |+1411     |+1421     |+1431
ATTTCTCTACAATTGGAAGATTGGAAGATTCAGCTAGTTAGGAGCCCACCTTTTTTCCTA

   |+1441     |+1451     |+1461     |+1471     |+1481     |+1491
ATCTGTGTGTGCCCTGTAACCTGACTGGTTAACAGCAGTCCTTTGTAAACAGTGTTTTAA

   |+1501     |+1511     |+1521     |+1531     |+1541     |+1551
ACTCTCCTAGTCAATATCCACCCCATCCAATTTATCAAGGAAGAAATGGTTCAGAAAATA

   |+1561     |+1571     |+1581     |+1591     |+1601     |+1611
TTTTCAGCCTACAGTTATGTTCAGTCACACACACATACAAAATGTTCCTTTTGCTTTTAA
```

```
   |+1621    |+1631    |+1641    |+1651    |+1661    |+1671
AGTAATTTTTGACTCCCAGATCAGTCAGAGCCCCTACAGCATTGTTAAGAAAGTATTTGA

   |+1681    |+1691    |+1701    |+1711    |+1721     .       .
TTTTTGTCTCAATGAAAATAAAACTATATTCATTTCCACTCTAttatgctctcaaatacc

    .    .    .    .    .    .    .    .    .    .    .    .
cctaagcatctatactagcctggtatgggtatgaaagatacaaagataaataaaacatag

    .    .    .    .    .    .    .    .    .    .    .    .
tccctgattctaagaaattcacaatttagcaaaggaaatggactcatagatgctaacctt

    .    .    .    .    .    .    .    .    .    .    .    .
aaaacaacgtgacaaatgccagacaggacccatcagccaggcactgtgagagcacagagc

    .    .    .    .    .    .    .    .    .    .    .    .
agggaggttgggtcctgcctgaggagacctggaagggaggcctcacaggaggatgaccag

    .    .    .    .    .    .    .    .    .    .
gtctcagtcagcggggaggtggaaagtgcaggtgcatcagggg


GBK 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
```