

## COMPOSITIONS AND METHODS FOR MUSCLE DISORDERS

### Field of the Invention

The invention related to miRNA molecules.

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### Background

Genetic disorders are a major source of disease burden, and many of them have few or no medical or curative treatments. Along with other genetically linked muscle wasting disorders, Facioscapulohumeral Muscular Dystrophy ("FSHD") is a genetic disorder that causes progressively increasing weakness and atrophy of the muscles. FSHD is so named because the muscles in the face, shoulder, and upper arm are the most affected, but it also affects other muscles in the body, including the legs, eyes, heart, hip, or abdominal muscles. FSHD causes progressively worsening symptoms that may result in asymmetric weakness

FSHD is a genetic disorder caused by a genetic mutation that leads to inappropriate expression of the DUX4 gene on chromosome 4. DUX4 is the double homeobox protein 4 gene. FSHD can be inherited by just one parent because it is an autosomal dominant genetic disorder. FSHD often affects patients before the age of 20 and has an estimated prevalence in the United States of 4 cases per 100,000 individuals. There is currently no medical treatment to arrest or reverse the muscular effects of FSHD.

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### Summary

The present invention provides novel nucleic acid molecules and methods that result in changes to expression of DUX4 that result in treatment of FSHD. Nucleic acid molecules of the invention comprise an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript. By targeting DUX4 transcripts, the nucleic acid molecules of the invention result in an appropriate expression profile for the DUX4 gene.

In aspects of the invention, the nucleic acid molecule may comprise an miRNA guide sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 1250-2769 or 6687-6770. The nucleic acid molecule may comprise one or more substitutions, for example conservative substitutions, that allow the guide sequence to continue to target DUX4. Accordingly, the miRNA guide sequence may have at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to a sequence selected from SEQ ID NOs: 1250-2597 or 6687-

6770. In aspects of the invention, the nucleic acid molecule comprises a miRNA guide sequence selected from SEQ ID NOs: 1250-2769 or 6687-6770.

The nucleic acid molecule may comprise an miRNA having at least 95% sequence identity to a sequence selected from the group of SEQ ID NOs: 2770-3597 or 6670-6812, each of which incorporates a guide sequence targeting DUX4. The nucleic acid molecule may target a DUX4 transcript at the position shown in Table 6.

The miRNA scaffold may be derived selected from any pri-miRNA scaffold. For example, the miRNA scaffold is derived from the pri-miRNA selected from the group consisting of pri-miR-21, pri-miR-22, pri-miR-26a, pri-miR-30a, pri-miR-33, pri-miR-122, pri-miR-375, pri-miR-199, pri-miR-99, pri-miR-194, pri-miR-155, and pri-miR-451. The miRNA scaffold may be derived from pri-miR-33.

The nucleic acid may comprise 5-6 thymidines at the 5' end. The nucleic acid of claim 1, further comprising a promoter sequence. The promoter sequence may be a U6 promoter sequence, MHCK7 promoter sequence, CK6 promoter sequence, tMCK promoter sequence, CK5 promoter sequence, MCK promoter sequence, HAS promoter sequence, MPZ promoter sequence, desmin promoter sequence, APOA2 promoter sequence, hAAT promoter sequence, INS promoter sequence, IRS2 promoter sequence, MYH6 promoter sequence, MYL2 promoter sequence, TNNI3 promoter sequence, SYN1 promoter sequence, GFAP promoter sequence, NES promoter sequence, MBP promoter sequence, or TH promoter sequence.

Nucleic acid molecules of the invention may be delivered to cells by any known method, for example, nucleic acid molecules of the invention may be delivered by lipid nanoparticles (LNP) or viral vectors. The viral vector may be any viral vector, for example an adeno-associated virus (AAV) vector.

Accordingly, aspects of the invention provide an AAV vector comprising a promoter sequence, a nucleic acid molecule of the invention (comprising a miR scaffold and a miR guide sequence that targets a DUX4 transcript), and a capsid protein.

The viral vector may comprise at least one modification that results in reduced liver-tropism of the AAV vector and/or preferential targeting of the AAV vector to muscle tissue. The capsid protein may comprise at least one modification that is an insertion between any two contiguous amino acids between amino acids 262-269, 327-332, 382-386, 452-460, 488-505, 527-539, 545-558, 581-593, 704-714, or any combination thereof in an AAV9 capsid



polypeptide or in an analogous position in an AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV rh.74, AAV rh.10 capsid polypeptide. The capsid protein may be selected from the sequences in Tables 1-5. The vector may further comprise a nuclear export sequence enabling nuclear spreading.

5 Aspects of the invention also provide methods for inhibiting expression of a gene or gene product in a cell, the method comprising administering to a subject a composition that results in expression within the cell of a nucleic acid molecules of the invention (comprising a miR scaffold and a miR guide sequence that targets a DUX4 transcript).

10 In methods of the invention, nucleic acid molecules of the invention may be delivered to cells by any known method. In preferred aspects, the nucleic acid molecules may be delivered by AAV vectors. Advantageously, the AAV vectors may comprise at least one modification results in reduced liver-tropism of the AAV vector and/or preferential targeting of the AAV vector to muscle tissue. The AAV vectors may comprise a capsid protein selected from the sequences in Tables 1-5.

15 The methods of the invention may result in treatment of muscular dystrophy. The muscular dystrophy is Facioscapulohumeral Muscular Dystrophy 1. The treatment may comprise arresting the muscular effects of muscular dystrophy. The treatment may comprise reversing the muscular effects of the muscular dystrophy.

20 Aspects of the nucleic acid molecules (e.g. cargo) and capsid proteins are described in further detail below.

For sequences disclosed throughout this application, it is understood that nucleic acid molecules and peptides may comprise one or more substitutions, for example conservative substitutions, that allow sequences to continue to function. Accordingly, sequences may have at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, or 99% sequence identity to the sequence disclosed.

25 A conservative substitution refers to amino acid substitutions that do not significantly affect or alter binding characteristics of a particular protein. Generally, conservative substitutions are ones in which a substituted amino acid residue is replaced with an amino acid residue having a similar side chain. For example, conservative substitutions may include a substitution found in one of the following groups: Group 1: Alanine (Ala or A), Glycine (Gly or G), Serine (Ser or S), Threonine (Thr or T); Group 2: Aspartic acid (Asp or D), Glutamic acid (Glu or Z); Group 3:

Asparagine (Asn or N), Glutamine (Gln or Q); Group 4: Arginine (Arg or R), Lysine (Lys or K), Histidine (His or H); Group 5: Isoleucine (Ile or I), Leucine (Leu or L), Methionine (Met or M), Valine (Val or V); and Group 6: Phenylalanine (Phe or F), Tyrosine (Tyr or Y), Tryptophan (Trp or W). Additionally, or alternatively, amino acids can be grouped into conservative substitution groups by similar function, chemical structure, or composition (e.g., acidic, basic, aliphatic, aromatic, or sulfur-containing). For example, an aliphatic grouping may include, for purposes of substitution, Gly, Ala, Val, Leu, and Ile. Other conservative substitutions groups include sulfur-containing: Met and Cysteine (Cys or C); acidic: Asp, Glu, Asn, and Gln; small aliphatic, nonpolar, or slightly polar residues: Ala, Ser, Thr, Pro, and Gly; polar, negatively charged residues and their amides: Asp, Asn, Glu, and Gln; polar, positively charged residues: His, Arg, and Lys; large aliphatic, nonpolar residues: Met, Leu, Ile, Val, and Cys; and large aromatic residues: Phe, Tyr, and Trp.

#### Engineered capsid proteins

The present invention provides capsid protein variants for viral vectors that detarget liver tissue and target skeletal muscle and heart tissue at the same time that may be used to deliver nucleic acid molecules of the invention that comprise an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript.

Aspects of the invention provide adeno-associated virus (AAV) vectors comprising a capsid protein comprising an amino acid insert. For example, the capsid protein may comprise an insert selected from Table 1-5.

Aspects of the present invention provide an AAV vector comprising a capsid protein comprising the amino acid sequence RGDR. In the capsid protein, RGDR may be inserted after amino acid 455 in reference to an AAV9 capsid or equivalent position in another AAV capsid. AAV vectors may comprise the amino acid sequence  $X_1NX_2X_3X_4RGDRX_5X_6L$ , wherein  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ ,  $X_5$ , and  $X_6$  may be any amino acid.

In aspects of the invention,  $X_1$  may be an amino acid selected from the group consisting of: A, I, F, G, H, L, M, Q, S, T, V. In preferred aspects of the invention,  $X_1$  may be an amino acid selected from the group consisting of: A, I, L, M, S, V.

In aspects of the invention,  $X_2$  may be an amino acid selected from the group consisting of A, G, S, T, Y.

In aspects of the invention, X<sub>3</sub> may be an amino acid selected from the group consisting of S, N, G, P. In preferred aspects of the invention, X<sub>3</sub> may be S.

In aspects of the invention, X<sub>4</sub> may be an amino acid selected from the group consisting of A, G, H, I, M, S, T, V.

5 In aspects of the invention, X<sub>5</sub> may be an amino acid selected from the group consisting of A, G, Q.

In aspects of the invention, X<sub>6</sub> may be an amino acid selected from the group consisting of A, I, L, M, N, Y. In preferred aspects of the invention, X<sub>6</sub> may be selected from the group consisting of A, S, and Y.

10 X<sub>1</sub> may be located at amino acid 451, X<sub>2</sub> located at amino acid 453, X<sub>3</sub> located at amino acid 454, X<sub>4</sub> is located amino acid 455, and RGDRX<sub>5</sub>X<sub>6</sub>L inserted after amino acid 455 in reference to an AAV9 capsid or equivalent position in another AAV capsid.

In aspects of the invention, two amino acids from X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, and X<sub>4</sub> are wild type amino acids in reference to an AAV9 capsid or equivalent position in another AAV capsid and two  
15 amino acids from X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, and X<sub>4</sub> are not wild type amino acids.

For example, capsid proteins variants of the invention may comprise a sequence as set forth in Table 5a. Notably, capsid protein variants on the invention comprise deletions, substitutions, and/or insertions relative to wild-type viral vector capsids.

In aspects of the invention, the capsid protein comprises an amino acid sequence selected  
20 from Table 5a and the amino acid sequence is in hypervariable region IV (HVR IV) relative to wild-type AAV9. The capsid protein variant may comprise substitutions at amino acids 451-455 relative to a wild-type AAV9 vector capsid. For example, the substitutions at amino acids 451-455 relative to a wild-type AAV9 vector capsid may be an amino acid sequence selected from column 1 of Table 5b. In aspects of the invention, the capsid protein variant may further  
25 comprise an insert. For example, the capsid protein may comprise a 7-mer insert selected from column 2 of Table 5b. The insert may be in the location after amino acid 455 relative to a wild-type AAV9 vector.

Advantageously, viral vectors comprising an amino acid sequence of the invention exhibit muscle tropism as compared to a wild-type AAV vector.

In aspects of the invention, the capsid protein further comprises a deletion of G267 in reference to an AAV9 capsid or equivalent position in another AAV capsid. Advantageously, the vector may exhibit reduced liver tropism as compared to a wild-type AAV vector.

As described, for the HVR IV variants, the 5 amino acids upstream are at positions 451-  
5 455, shown in column 1 of Table 5b. The 7-mer insert for HVR IV variants starts with "RGD" and is inserted after amino acid 455, shown in column 2 of Table 5b.

Exemplary guides and capsids

The present invention provides novel nucleic acid molecules and methods that result in  
10 changes to expression of DUX4 that result in treatment of FSHD. Nucleic acid molecules of the invention comprise an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript. By targeting DUX4 transcripts, the nucleic acid molecules of the invention result in an appropriate expression profile for the DUX4 gene.

15 Preferential exemplary guides are described in Table 7 below.

In exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860-6865. For example, SEQ ID NOs: 6860, 6861, 6862, 6863, 6864, or 6865.

The nucleic acid molecule may comprise an miRNA having at least 95% sequence  
20 identity to a sequence selected from the group of SEQ ID NOs: 2770-3597 or 6670-6812, each of which incorporates a guide sequence targeting DUX4. The nucleic acid molecule may target a DUX4 transcript at a position shown in Table 6 (with exemplary guide sequences described in Table 7).

In preferred aspects of the invention, the miRNA guide sequence comprises a sequence  
25 having at least 95% sequence identity to a sequence selected from SEQ ID NO: 1250-2769, SEQ ID NOs: 6855-6963, SEQ ID NOs: 6855-6955, SEQ ID NOs: 6855-6945, SEQ ID NOs: 6855-6935, SEQ ID NOs: 6855-6925, SEQ ID NOs: 6855-6915, SEQ ID NOs: 6855-6905, SEQ ID NOs: 6855-6895, SEQ ID NOs: 6855-6885, SEQ ID NOs: 6855-6875, SEQ ID NOs: 6855-6870, SEQ ID NOs: 6855-6865, or SEQ ID NOs: 6860-6865. For example, SEQ ID NO: 6861, 6862,  
30 6863, 6864, or 6865, for example, SEQ ID NOs: 6860, 6861, 6862, 6863, 6864, or 6865.

In preferred aspects of the invention, the guide sequence may be encapsidated in an AAV vector comprising an engineered AAV vector capsid. The vector capsid may be engineered from an AAV9 capsid protein. The AAV vector capsid may comprise an amino acid sequence as shown as described in Tables 1-5 below, with Table 5a/b describing preferred engineered capsid sequences.

In exemplary aspects of the invention, the capsid may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

In aspects of the invention, the capsid protein may comprise a sequence selected from among sequences 4470-4490, 4500-4520, 4540-4560, 4660-4680, 4830-4850, 5630-5650.

The capsid may comprise a sequence selected from among sequences 4475-4480, 4480-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5030-5040.

The capsid may comprise a sequence selected from among sequences 4475-4480, 4485-4490, 4500-4505, 4540-4545, 4665-4670, 4830-4835, 5035-5040, for example SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

Altogether, exemplary guide miRNAs (for example as part of a construct) may be encapsidated by exemplary capsids described herein. For example:

In exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860, 6861, 6862, 6863, 6864, or 6865. The guide sequence may be encapsidated by an AAV capsid comprising a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

For example, exemplary miRNA guide sequences may be encapsidated by exemplary engineered capsids as shown below:

| miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: | miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: | miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: |
|------------------------------|------------------------------------|------------------------------|------------------------------------|------------------------------|------------------------------------|
| 6860                         | 4479                               | 6860                         | 4832                               | 6861                         | 4503                               |
| 6860                         | 4486                               | 6860                         | 4838                               | 6861                         | 4544                               |
| 6860                         | 4487                               | 6860                         | 5036                               | 6816                         | 4667                               |
| 6860                         | 4503                               | 6861                         | 4479                               | 6861                         | 4832                               |
| 6860                         | 4544                               | 6861                         | 4486                               | 6861                         | 4838                               |
| 6860                         | 4667                               | 6861                         | 4487                               | 6861                         | 5036                               |

| miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: |
|------------------------------|------------------------------------|
| 6862                         | 4479                               |
| 6862                         | 4486                               |
| 6862                         | 4487                               |
| 6862                         | 4503                               |
| 6862                         | 4544                               |
| 6862                         | 4667                               |
| 6862                         | 4832                               |
| 6862                         | 4838                               |
| 6862                         | 5036                               |
| 6863                         | 4479                               |
| 6863                         | 4486                               |
| 6863                         | 4487                               |
| 6863                         | 4503                               |
| 6863                         | 4544                               |

| miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: |
|------------------------------|------------------------------------|
| 6863                         | 4667                               |
| 6863                         | 4832                               |
| 6863                         | 4838                               |
| 6863                         | 5036                               |
| 6864                         | 4479                               |
| 6864                         | 4486                               |
| 6864                         | 4487                               |
| 6864                         | 4503                               |
| 6864                         | 4544                               |
| 6864                         | 4667                               |
| 6864                         | 4832                               |
| 6864                         | 4838                               |
| 6864                         | 5036                               |
| 6865                         | 4479                               |

| miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: |
|------------------------------|------------------------------------|
| 6865                         | 4486                               |
| 6865                         | 4487                               |
| 6865                         | 4503                               |
| 6865                         | 4544                               |
| 6865                         | 4667                               |
| 6865                         | 4832                               |
| 6865                         | 4838                               |
| 6865                         | 5036                               |

5 Accordingly, in preferred aspects of the invention, the miRNA guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NO: 1250-2769 and the AAV vector capsid encapsidating the miRNA guide may comprise a sequence selected from Tables 1-5.

10 For example, in embodiments of the invention the miRNA guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6963 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4470-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5630-5640.

15 In further exemplary aspects of the invention the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6955 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4470-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5630-5640. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6945 and the capsid protein encapsidating the  
20 miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence

having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6935 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040.

In further exemplary aspects of the invention, the guide sequence may comprise a  
5 sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6925 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6915 and the capsid protein encapsidating the  
10 miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6895 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The  
15 guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6885 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040.

In further exemplary aspects of the invention, the guide sequence may comprise a  
20 sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6875 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040.

The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6865 and the capsid protein encapsidating the  
25 miRNA guide may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

In preferred aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860-6865, for example, SEQ ID NOs: 6861, 6862, 6863, 6864, or 6865, and the capsid protein encapsidating  
30 the miRNA guide may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

*Table 1: MyoAAV (eMyoAAV) Capsid Variants*

| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE              | SEQ ID NO.: |
|------|-------------|-------------|--------------------------------|-------------|
| 1    | AEGRGDQYTR  | 177         | GCTGAGGGTAGAGGAGACCAGTATACTCGT | 181         |
| 2    | GPGRGDQTTL  | 178         | GGGCCGGGTAGAGGAGACCAGACTACGTTG | 182         |
| 3    | AEGRGDQYTR  | 177         | GCGGAAGGCAGAGGAGACCAATACACAAGG | 183         |
| 4    | ATGRGDLGQA  | 179         | GCGACTGGTAGAGGAGACCTGGGTCAGGCT | 184         |
| 5    | AVARGDQGLI  | 180         | GCGGTGGCGAGAGGAGACCAGGGTCTTATT | 185         |
| 6    | NISRGDQGYQ  | 6           | AACATCTCCAGAGGAGACCAAGGTTACCAA | 186         |
| 7    | APARGDQGSQ  | 7           | GCGCCGGCTAGAGGAGACCAGGGGAGTCAG | 187         |
| 8    | AVSRGDRMEF  | 8           | GCCGTTAGCAGAGGAGACCGGATGGAATTC | 188         |
| 9    | QMGRGDMGIK  | 10          | CAGATGGGTAGAGGAGACATGGGGATTAAG | 189         |
| 10   | EYRRGDKADI  | 11          | GAGTATCGGAGAGGAGACAAGGCGGATATT | 190         |
| 11   | ESRRGDKEPL  | 12          | GAGAGTCGGAGAGGAGACAAGGAGCCGCTG | 191         |
| 12   | AHMRGDLGGT  | 13          | GCACACATGAGAGGAGACCTAGGCGGCACG | 192         |
| 13   | VWQRGDKMDM  | 14          | GTGTGGCAAAGAGGAGACAAAATGGACATG | 193         |
| 14   | SIGRGDTGHM  | 15          | TCTATTGGGAGAGGAGACACGGGTCATATG | 194         |
| 15   | NIARGDAGQY  | 16          | AATATTGCTAGAGGAGACGCTGGTCAGTAT | 195         |
| 16   | AVARGDQGLI  | 180         | GCAGTAGCAAGAGGAGACCAAGGCTTAATC | 196         |
| 17   | SVSRGDQGLH  | 17          | TCGGTCTCGAGAGGAGACCAAGGATTGCAC | 197         |
| 18   | EYRRGDKADI  | 11          | GAATACAGGAGAGGAGACAAAGCAGACATC | 198         |
| 19   | AHMRGDLGGT  | 13          | GCGCATATGAGAGGAGACTTGGGGGGGACT | 199         |
| 20   | QIGRGDITHG  | 18          | CAGATTGGTAGAGGAGACATTACTCATGGG | 200         |
| 21   | EVRGDLHGT   | 19          | GAAGTCAGAAGAGGAGACTTGCACGGGACA | 201         |
| 22   | SVSRGDVHTM  | 20          | AGTGTCTCAAGAGGAGACGTGCACACGATG | 202         |
| 23   | MVTRGDLGTR  | 21          | ATGGTGACTAGAGGAGACCTTGGTACGCGG | 203         |
| 24   | NGGRGDTTHF  | 22          | AACGGCGGGAGAGGAGACACGACGCACTTC | 204         |
| 25   | TMGRGDMNSL  | 23          | ACGATGGGGAGAGGAGACATGAATTCGCTT | 205         |
| 26   | AISRGDQGLS  | 24          | GCGATTAGTAGAGGAGACCAGGGTCTTTCT | 206         |
| 27   | NDARGDKSTY  | 25          | AACGACGCAAGAGGAGACAAATCCACATAC | 207         |
| 28   | VGLRGDLTGS  | 26          | GTGGGGCTGAGAGGAGACTTGACGGGTTCG | 208         |
| 29   | EMRRGDLGTS  | 27          | GAGATGAGGAGAGGAGACCTGGGGACGAGT | 209         |
| 30   | AMSRGDMGMA  | 28          | GCGATGAGTAGAGGAGACATGGGGATGGCG | 210         |
| 31   | ATGRGDLGQA  | 179         | GCAACGGGCAGAGGAGACTTAGGCCAAGCA | 211         |
| 32   | NVARGDQVNY  | 29          | AACGTAGCAAGAGGAGACCAAGTTAACTAC | 212         |
| 33   | SIGRGDTGHM  | 15          | AGCATCGGAAGAGGAGACACCGGCCACATG | 213         |
| 34   | ASVRGDLSGS  | 30          | GCATCCGTAAGAGGAGACCTATCAGGCTCA | 214         |



| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|-------------|-------------|---------------------------------|-------------|
| 35   | SAARGDTERL  | 31          | AGCGCCGCGAGAGGAGACACTGAACGGCTA  | 215         |
| 36   | AMSRGDMGMA  | 28          | GCCATGTCAAGAGGAGACATGGGTATGGCT  | 216         |
| 37   | SPSRGDQGR   | 9           | AGTCCATCGAGAGGAGACCAAGGACGCACT  | 217         |
| 38   | VPGRGDLNTM  | 32          | GTGCCTGGGAGAGGAGACCTTAATACTATG  | 218         |
| 39   | GPGRGDQTTL  | 178         | GGTCCTGGGAGAGGAGACCAAACGACCCTT  | 219         |
| 40   | TSVRGDHGT   | 33          | ACATCGGTCAGAGGAGACCACGGAACATTG  | 220         |
| 41   | TPSRGDLGQT  | 34          | ACGCCTTCGAGAGGAGACCTTGCGCAGACT  | 221         |
| 42   | AGHRGDTGVI  | 35          | GCTGGACACAGAGGAGACACAGGAGTCATC  | 222         |
| 43   | APARGDQGS   | 36          | GCGCCGGCGAGAGGAGACCAGGGTAGTATG  | 223         |
| 44   | MSLRGDLNGS  | 37          | ATGTCGTTGAGAGGAGACTTGAATGGGTCG  | 224         |
| 45   | EAKRGDVHSI  | 38          | GAGGCTAAGAGAGGAGACGTGCATTCTATT  | 225         |
| 46   | SAQRGDVQAV  | 39          | AGTGCTCAGAGAGGAGACGTGCAGGCGGTG  | 226         |
| 47   | STARGDQGR   | 40          | AGTACGGCGAGAGGAGACCAGGGGGATAGG  | 227         |
| 48   | QISRGDLGIN  | 41          | CAGATTAGTAGAGGAGACCTGGGGATTAAT  | 228         |
| 49   | TFTRGDMTMN  | 42          | ACGTTTACAAGAGGAGACATGACGATGAAC  | 229         |
| 50   | QEGRGDLNMR  | 43          | CAAGAAGGAAGAGGAGACCTGAACATGAGG  | 230         |
| 51   | AHARGDTSSL  | 44          | GCACACGCAAGAGGAGACACCAGCTCCCTG  | 231         |
| 52   | TNRRGDAGTL  | 45          | ACGAATGGGAGAGGAGACGCTGGGACTCTG  | 232         |
| 53   | AFRRGDQQL   | 46          | GCTTTCGGCAGAGGAGACCAAGGGCAACTA  | 233         |
| 54   | ADRRGDRSSL  | 47          | GCTGATGGGAGAGGAGACCGTTCGTCTCTG  | 234         |
| 55   | DGRRGDGHS   | 48          | GACGGACGCAGAGGAGACGGACACAGCCTT  | 235         |
| 56   | EKLRRDLHST  | 49          | GAGAAGTTGAGAGGAGACCTTCATTTCGACT | 236         |
| 57   | EARRGDASAM  | 50          | GAGGCGCGTAGAGGAGACGCTTCGGCGATG  | 237         |
| 58   | MGTRGDKMDF  | 51          | ATGGGAACGAGAGGAGACAAAATGGACTTC  | 238         |
| 59   | STSRGDRESY  | 52          | TCGACTTCGAGAGGAGACCGGGAGTCGTAT  | 239         |
| 60   | CQPRGDTTRC  | 53          | TGTCAGCCGAGAGGAGACACGACTCGGTGT  | 240         |
| 61   | MHTRGDKMDF  | 54          | ATGCACACGAGAGGAGACAAAATGGACTTC  | 241         |
| 62   | YSARGDTSGL  | 55          | TACAGTGCCAGAGGAGACACAAGTGGCCTG  | 242         |
| 63   | STMRRGDHEKL | 56          | TCGACGATGAGAGGAGACCATGAGAAGTTG  | 243         |
| 64   | TQMRGDGVTL  | 57          | ACCCAAATGAGAGGAGACGGGGTCACACTA  | 244         |
| 65   | TTRRGDMGDN  | 58          | ACTACTCGTAGAGGAGACATGGGGGATAAT  | 245         |
| 66   | ANRRGDRLEL  | 59          | GCGAATGGTAGAGGAGACAGGCTGGAGTTG  | 246         |
| 67   | AVSRGDRMEF  | 8           | GCTGTGTCTAGAGGAGACAGGATGGAGTTT  | 247         |
| 68   | ENRRGDLGR   | 60          | GAGAATCAGAGAGGAGACTTGTCTGGGTCGG | 248         |
| 69   | STRRGDLGQA  | 61          | TCGACTGGTAGAGGAGACCTGGGGCAGGCT  | 249         |
| 70   | MHTRGDKMDF  | 54          | ATGCATACTAGAGGAGACAAGATGGATTTT  | 250         |

| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|-------------|-------------|---------------------------------|-------------|
| 71   | SSARGDYSEV  | 62          | AGTAGTGCGAGAGGAGACTATAGTGAGGTG  | 251         |
| 72   | AFGRGDQQL   | 46          | GCGTTTGGGAGAGGAGACCAGGGTCAGCTT  | 252         |
| 73   | STARGDAATY  | 63          | AGTACGGCGAGAGGAGACGCGGCGACTTAT  | 253         |
| 74   | VNTRGDTQKL  | 64          | GTCAACACAAGAGGAGACACTCAAAAACCTT | 254         |
| 75   | AMSRGDHASL  | 65          | GCGATGAGTAGAGGAGACCATGCGTCGCTT  | 255         |
| 76   | QAARGDVNKL  | 66          | CAGGCTGCTAGAGGAGACGTTAATAAGCTG  | 256         |
| 77   | RGTRGDTVEL  | 67          | AGGGGTACGAGAGGAGACACGGTTGAGTTG  | 257         |
| 78   | TTRRGDMGDN  | 58          | ACCACCCGGAGAGGAGACATGGGAGACAAC  | 258         |
| 79   | ASTRGDYAGV  | 68          | GCTAGTACGAGAGGAGACTATGCGGGTGTT  | 259         |
| 80   | DDRRGDKLPL  | 69          | GACGACAGGAGAGGAGACAAACTGCCCTT   | 260         |
| 81   | SGSRGDLNAV  | 70          | TCGGGGTCGAGAGGAGACCTGAATGCGGTG  | 261         |
| 82   | EYRRGDQIQ   | 71          | GAGTATAGGAGAGGAGACCAGCAGATTCAG  | 262         |
| 83   | TYVRGDRAEV  | 72          | ACGTACGTCAGAGGAGACAGAGCAGAAGTG  | 263         |
| 84   | QSLRGDLNGS  | 73          | CAATCACTAAGAGGAGACTTGAACGGATCC  | 264         |
| 85   | EGRRGDTTSL  | 74          | GAGGGTCGGAGAGGAGACACGACGTCGTTG  | 265         |
| 86   | AENRGDRSSL  | 75          | GCGGAGAATAGAGGAGACCGGTTCGAGTTG  | 266         |
| 87   | VAGRGDRSEL  | 76          | GTGGCTGGGAGAGGAGACCGTAGTGAGCTG  | 267         |
| 88   | DPARGDIGAR  | 77          | GATCCGGCGAGAGGAGACATTGGTGCGCGT  | 268         |
| 89   | EMRRGDLGTS  | 27          | GAAATGCGCAGAGGAGACTTGGGAACCTCA  | 269         |
| 90   | VWQRGDKMDM  | 14          | GTTTGGCAGAGAGGAGACAAGATGGATATG  | 270         |
| 91   | VIGRGDKALQ  | 78          | GTGATTGGGAGAGGAGACAAGGCGCTTCAG  | 271         |
| 92   | SFERGDKNSL  | 79          | AGCTTCGAAAGAGGAGACAAAACTCTCTT   | 272         |
| 93   | QIARGDIASV  | 80          | CAGATTGCTAGAGGAGACATTGCTAGTGTG  | 273         |
| 94   | TISRGDLGGA  | 81          | ACGATTAGTAGAGGAGACCTGGGTGGGGCT  | 274         |
| 95   | AMIRGDMTHS  | 82          | GCGATGATTAGAGGAGACATGACGCATAGT  | 275         |
| 96   | TSVRGDHGT   | 33          | ACGAGTGTGAGAGGAGACCATGGGACGCTG  | 276         |
| 97   | TMRRGDLNDS  | 83          | ACGATGCGGAGAGGAGACCTGAATGATAGT  | 277         |
| 98   | AYSRGDLGNH  | 84          | GCCTACTCCAGAGGAGACCTAGGCAACCAC  | 278         |
| 99   | EERRGDTHRL  | 85          | GAGGAGCGGAGAGGAGACACTCATCGGCTG  | 279         |
| 100  | SQLRGDAGTI  | 86          | TCACAATAAGAGGAGACGCGGGGACAATC   | 280         |
| 101  | AMVRGDAHQL  | 87          | GCGATGGTGAGAGGAGACGCGCATCAGCTG  | 281         |
| 102  | TTSRGDLNSV  | 88          | ACGACTAGTAGAGGAGACTTGAATTCGGTT  | 282         |
| 103  | WEQRGDMIGK  | 89          | TGGGAGCAGAGAGGAGACATGATTGGGAAG  | 283         |
| 104  | YTTRGDLQSN  | 90          | TACACCACCAGAGGAGACCTCCAATCAAAC  | 284         |
| 105  | MSQRGDLSHQ  | 91          | ATGTCGCAGAGAGGAGACCTTTCGCATCAG  | 285         |
| 106  | ASTRGDTTHM  | 92          | GCGAGTACTAGAGGAGACACGACGCATATG  | 286         |

| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|-------------|-------------|---------------------------------|-------------|
| 107  | SDTRGDTHRL  | 93          | TCAGACACCAGAGGAGACACCCACAGACTG  | 287         |
| 108  | TLGRGDQYTS  | 94          | ACGCTGGGTAGAGGAGACCAGTATACGAGT  | 288         |
| 109  | SYARGDVREV  | 95          | TCGTATGCGAGAGGAGACGTTAGGGAGGTT  | 289         |
| 110  | ETRRGDL SQN | 96          | GAGACTCGTAGAGGAGACCTGAGTCAGAAT  | 290         |
| 111  | TIGRGDLMKD  | 97          | ACAATCGGGAGAGGAGACCTGATGGACAAA  | 291         |
| 112  | SYTRGDL SQN | 98          | AGTTACACCAGAGGAGACCTTAGCCAAAAC  | 292         |
| 113  | SKLRGDASEI  | 99          | TCGAAGCTGAGAGGAGACGCTAGTGAGATT  | 293         |
| 114  | SMARGDKAEI  | 100         | TCGATGGCGAGAGGAGACAAGGCGGAGATT  | 294         |
| 115  | GAVRGDHSSL  | 101         | GGAGCCGTCAGAGGAGACCACTCATCGTTA  | 295         |
| 116  | METRGDMSNR  | 102         | ATGGAGACGAGAGGAGACATGAGTAATCGT  | 296         |
| 117  | AYTRGDKDAL  | 103         | GCGTACACAAGAGGAGACAAAGACGCACTA  | 297         |
| 118  | ENRRGDITQS  | 104         | GAGAATCGGAGAGGAGACATTACGCAGTCG  | 298         |
| 119  | STGRGDLGQA  | 61          | TCCACGGGCAGAGGAGACCTTGGACAAGCA  | 299         |
| 120  | GAVRGDHSSL  | 101         | GGTGCTGTTAGAGGAGACCATAGTAGTCTT  | 300         |
| 121  | SQLRGDAGTI  | 86          | TCTCAGCTTAGAGGAGACGCTGGTACGATT  | 301         |
| 122  | MLLRGDKNDF  | 105         | ATGCTCCTAAGAGGAGACAAAAACGACTTC  | 302         |
| 123  | KVQRGDASDW  | 106         | AAGGTGCAGAGAGGAGACGCGAGTGATTGG  | 303         |
| 124  | AFTRGDMQTA  | 107         | GCGTTTACGAGAGGAGACATGCAGACTGCT  | 304         |
| 125  | QPKRGDVQAQ  | 108         | CAGCCTAAGAGAGGAGACGTTCAAGGCTCAG | 305         |
| 126  | ASLRGDMGVS  | 109         | GCTAGTCTGAGAGGAGACATGGGGGTGAGT  | 306         |
| 127  | AYSRGDKESF  | 110         | GCCTACTCCAGAGGAGACAAAGAATCGTTC  | 307         |
| 128  | RFQRGDLTDA  | 111         | CGGTTCCAAAGAGGAGACTTGACCGACGCT  | 308         |
| 129  | SDARGDTMKL  | 112         | TCTGATGCTAGAGGAGACACGATGAAGCTG  | 309         |
| 130  | SGARGDTVSL  | 113         | AGCGGGGCCAGAGGAGACACAGTAAGTCTC  | 310         |
| 131  | DEKRGDQKHL  | 114         | GATGAGAAGAGAGGAGACCAGAAGCATCTT  | 311         |
| 132  | NGVRGDVQNF  | 115         | AACGGAGTAAGAGGAGACGTCCAAAACCTTC | 312         |
| 133  | MTLRGDLGGS  | 116         | ATGACGTTGAGAGGAGACCTGGGTGGGTCG  | 313         |
| 134  | EARRGDASAM  | 50          | GAGGCTAGGAGAGGAGACGCTAGTGCGATG  | 314         |
| 135  | GQERGDLGTR  | 117         | GGGCAGGAGAGAGGAGACCTGGGGACTCGG  | 315         |
| 136  | RGARGDLVDA  | 118         | AGAGGCGCCAGAGGAGACCTAGTCGACGCT  | 316         |
| 137  | QYSRGDHTDL  | 119         | CAATACTCCAGAGGAGACCACACCGACCTT  | 317         |
| 138  | MNTRGDRVHAM | 120         | ATGAACACCAGAGGAGACGTGCACGCTATG  | 318         |
| 139  | TVRRGDLATE  | 121         | ACGGTACGGAGAGGAGACCTAGCAACCGAA  | 319         |
| 140  | NIARGDAGQY  | 16          | AATATTGCGAGAGGAGACGCTGGTCAGTAT  | 320         |
| 141  | SVGRGDKADI  | 122         | TCTGTTGGGAGAGGAGACAAGGCTGATATT  | 321         |
| 142  | SHNRGDTGTM  | 123         | TCACACAACAGAGGAGACACCGGAACCATG  | 322         |

| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE                | SEQ ID NO.: |
|------|-------------|-------------|----------------------------------|-------------|
| 143  | TNTRGDKESV  | 124         | ACGAACACCAGAGGAGACAAAGAATCAGTA   | 323         |
| 144  | SIGRGDQYTI  | 125         | TCGATTGGTAGAGGAGACCAGTATACGATT   | 324         |
| 145  | QTSRGDAGSW  | 126         | CAGACGAGTAGAGGAGACGCGGGGTCTTGG   | 325         |
| 146  | AENRGDRSSL  | 75          | GCTGAAAACAGAGGAGACCGAAGCAGCCTA   | 326         |
| 147  | AISRGDVQSL  | 127         | GCGATTTTCGAGAGGAGACGTTTCAGTCGTTG | 327         |
| 148  | NAQRGDHGQL  | 128         | AACGCACAAAGAGGAGACCACGGGCAACTG   | 328         |
| 149  | LNSRGDQASV  | 129         | CTCAACTCGAGAGGAGACCAAGCCTCCGTC   | 329         |
| 150  | SGNRGDIGTF  | 130         | TCGGGAAAACAGAGGAGACATAGGTACATTC  | 330         |
| 151  | NVGRGDQATM  | 131         | AACGTGGGAAGAGGAGACCAAGCCACAATG   | 331         |
| 152  | SYSRGDTGRL  | 132         | TCGTATTCTAGAGGAGACACTGGTCGGCTT   | 332         |
| 153  | SHLRGDQALA  | 133         | AGCCACTTAAGAGGAGACCAAGCGTTGGCC   | 333         |
| 154  | YFARGDMTMN  | 134         | TACTTCGCCAGAGGAGACATGACTATGAAC   | 334         |
| 155  | QSQRGDLNPM  | 135         | CAGTCGCAGAGAGGAGACCTTAATCCTATG   | 335         |
| 156  | EQRRGDKTEL  | 136         | GAGCAGAGGAGAGGAGACAAGACGGAGCTG   | 336         |
| 157  | VSARGDAGQL  | 137         | GTGTCTGCGAGAGGAGACGCGGGTCAGTTG   | 337         |
| 158  | SPSRGDQGR   | 9           | TCTCCGTCTAGAGGAGACCAGGGGCGGACG   | 338         |
| 159  | EASRGDKGTH  | 138         | GAGGCTAGTAGAGGAGACAAGGGTACGCAT   | 339         |
| 160  | LSTRGDMGMQ  | 139         | CTGTCTACTAGAGGAGACATGGGTATGCAG   | 340         |
| 161  | ANMRGDQLHT  | 140         | GCGAATATGAGAGGAGACCAGCTGCATACT   | 341         |
| 162  | ENTRGDLTHA  | 141         | GAGAATACGAGAGGAGACCTTACTCATGCG   | 342         |
| 163  | IERRGDSAGL  | 142         | ATTGAGCGTAGAGGAGACTCGGCGGGGCTG   | 343         |
| 164  | SAMRGDGVSL  | 143         | AGTGCGATGAGAGGAGACGGAGTGAGCTTG   | 344         |
| 165  | TVSRGDQGLS  | 144         | ACGGTTTCGAGAGGAGACCAGGGGTTGTCT   | 345         |
| 166  | SIVRGDLNST  | 145         | TCGATCGTCAGAGGAGACCTGAACTCCACG   | 346         |
| 167  | DVARGDKTNF  | 146         | GACGTAGCGAGAGGAGACAAAACAACTTC    | 347         |
| 168  | WSQRGDLSGT  | 147         | TGGAGCCAAAGAGGAGACCTGAGTGGAACC   | 348         |
| 169  | LNQRGDVSNM  | 148         | CTGAACCAAAGAGGAGACGTTTCCAACATG   | 349         |
| 170  | AALRGDLSGS  | 149         | GCCGCCCTAAGAGGAGACCTATCCGGCTCA   | 350         |
| 171  | RVARGDITDI  | 150         | AGGGTTGCGAGAGGAGACATTACGGATATT   | 351         |
| 172  | STNRGDLNQV  | 151         | TCGACGAACAGAGGAGACCTCAACCAAGTT   | 352         |
| 173  | DSRRGDSVSL  | 152         | GATTCGCGGAGAGGAGACTCTGTGAGTCTT   | 353         |
| 174  | SVGRGDQSQM  | 153         | AGTGTTGGGAGAGGAGACCAGTCTCAGATG   | 354         |
| 175  | SNTRGDTNSL  | 154         | TCCAACACGAGAGGAGACACAACTCCCTA    | 355         |
| 176  | DNRRGDGTTM  | 155         | GATAATCGGAGAGGAGACGGTACGACTATG   | 356         |
| 177  | TPSRGDQGRL  | 156         | ACGCCTTCGAGAGGAGACCAAGGAAGACTA   | 357         |
| 178  | NYSRGDSMTL  | 157         | AACTACAGCAGAGGAGACTCAATGACGCTT   | 358         |

| RANK | N-MER MOTIF | SEQ ID NO.: | ENCODING SEQUENCE              | SEQ ID NO.: |
|------|-------------|-------------|--------------------------------|-------------|
| 179  | MQARGDAGTL  | 158         | ATGCAGGCTAGAGGAGACGCTGGGACTCTG | 359         |
| 180  | TQSRGDLSGA  | 159         | ACGCAGTCGAGAGGAGACTTGTCTGGTGCG | 360         |
| 181  | FAQRGDLTGV  | 160         | TTTGCGCAGAGAGGAGACTTGACTGGGGTT | 361         |
| 182  | APVRGDLIGT  | 161         | GCGCCGGTGAGAGGAGACCTGATTGGTACG | 362         |
| 183  | SNTRGDTNSL  | 154         | TCGAATACTAGAGGAGACACGAATAGTTTG | 363         |
| 184  | EPKRGDLSNT  | 162         | GAGCCGAAGAGAGGAGACTTGAGTAATACG | 364         |
| 185  | SVGRGDTYPL  | 163         | TCGGTTGGGAGAGGAGACACTTATCCTCTG | 365         |
| 186  | QTARGDMTGH  | 164         | CAAACAGCCAGAGGAGACATGACTGGCCAC | 366         |
| 187  | AGARGDLENR  | 165         | GCTGGTGCGAGAGGAGACTTGAGAAATCGG | 367         |
| 188  | MSTRGDLNNV  | 166         | ATGAGCACTAGAGGAGACCTAAACAACGTC | 368         |
| 189  | EKQRGDLNSM  | 167         | GAAAAACAAAGAGGAGACCTCAACAGCATG | 369         |
| 190  | IKTRGDLGHE  | 168         | ATTAAGACGAGAGGAGACCTTGGTCATGAG | 370         |
| 191  | IGRRGDMELS  | 169         | ATTGGGAGGAGAGGAGACATGGAGTTGTCT | 371         |
| 192  | TTGRGDLKEV  | 170         | ACTACGGGTAGAGGAGACTTGAAGGAGGTT | 372         |
| 193  | TDKRGDQNTV  | 171         | ACGGATAAGAGAGGAGACCAGAATACTGTG | 373         |
| 194  | SNVRGDREAV  | 172         | TCGAATGTTAGAGGAGACCGGGAGGCGGTT | 374         |
| 195  | SVGRGDQSQM  | 153         | TCAGTCGGCAGAGGAGACCAAAGTCAAATG | 375         |
| 196  | YANRGDLSHQ  | 173         | TACGCCAACAGAGGAGACCTGAGTCACCAA | 376         |
| 197  | QISRGDLGIN  | 41          | CAAATATCGAGAGGAGACCTAGGTATCAAC | 377         |
| 198  | SMMRGDAGQL  | 174         | TCGATGATGAGAGGAGACGCTGGGCAGTTG | 378         |
| 199  | EARRGDSQGL  | 175         | GAGGCGCGGAGAGGAGACAGTCAGGGGCTG | 379         |
| 200  | MPTRGDQTKF  | 176         | ATGCCACAAAGAGGAGACCAAACCAAATTC | 380         |

*Table 2: Enhanced MyoAAV (eMyoAAV) Capsid Variants*

| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE                | SEQ ID NO.: |
|------|--------------|-------------|----------------------------------|-------------|
| 1    | SNSRGDYNLS   | 381         | TCAAACCTCCAGAGGAGACTACAACCTCCTTG | 557         |
| 2    | SSARGDRDYL   | 397         | TCGTCGGCTAGAGGAGACCGTGATTATCTG   | 558         |
| 3    | STVRGDYTSV   | 398         | AGCACGGTCAGAGGAGACTACACGTCCGTG   | 559         |
| 4    | QERRGDYTSM   | 382         | CAGGAGCGGAGAGGAGACTATACGAGTATG   | 560         |
| 5    | NGGRGDTTHF   | 386         | AACGGCGGGAGAGGAGACACGACGCACTTC   | 561         |
| 6    | ASTRGDHGVL   | 383         | GCGAGTACTAGAGGAGACCATGGTGTGTTG   | 562         |
| 7    | SYQRGDQHNH   | 399         | TCGTACCAAAGAGGAGACCAACACAACATG   | 563         |
| 8    | NDTRGDERSYM  | 400         | AACGACACAAGAGGAGACCGATCTTACATG   | 564         |
| 9    | ENRRGDFNNT   | 384         | GAAAACAGGAGAGGAGACTTCAACAACACT   | 565         |
| 10   | SGSRGDLSTH   | 401         | TCCGGCTCGAGAGGAGACTTGTCTAGGACAC  | 566         |
| 11   | ENRRGDITQS   | 393         | GAGAATCGGAGAGGAGACATTACGCAGTCG   | 567         |
| 12   | DKPRGDRQLL   | 402         | GATAAGCCGAGAGGAGACCGGCAGTTGTTG   | 568         |
| 13   | EERRGDTHRL   | 392         | GAGGAGCGGAGAGGAGACACTCATCGGCTG   | 569         |
| 14   | AMIRGDMTHS   | 391         | GCGATGATTAGAGGAGACATGACGCATAGT   | 570         |
| 15   | SNNRGDYTTM   | 403         | TCAAACAACAGAGGAGACTACACGACAATG   | 571         |
| 16   | QGGRGDLSTL   | 404         | CAGGGTGGGAGAGGAGACTTGTCTGACGTTG  | 572         |
| 17   | SKDRGDYQTL   | 405         | TCGAAGGATAGAGGAGACTATCAGACTCTT   | 573         |
| 18   | ATARGDQMKL   | 406         | GCTACGGCGAGAGGAGACCAGATGAAGCTG   | 574         |
| 19   | QHMRGDLTGA   | 407         | CAGCATATGAGAGGAGACTTGACTGGTGCG   | 575         |
| 20   | DGTRGDLGRY   | 408         | GACGGCACGAGAGGAGACCTTGAAGGTAC    | 576         |
| 21   | DSRRGDYANL   | 409         | GACTCTCGGAGAGGAGACTACGCAAACCTC   | 577         |
| 22   | SAMRGDYTST   | 410         | TCGGCGATGAGAGGAGACTATACTAGTACT   | 578         |
| 23   | ENRRGDAQLL   | 411         | GAGAATCGGAGAGGAGACGCGCAGCTGCTG   | 579         |
| 24   | TTLRGDHSQL   | 412         | ACGACGCTGAGAGGAGACCATAGTCAGCTT   | 580         |
| 25   | DAGRGDMLRM   | 413         | GACGCAGGGAGAGGAGACATGCACCGTATG   | 581         |
| 26   | QHTRGDLSTT   | 414         | CAGCATACGAGAGGAGACTTGAGTTCTACT   | 582         |
| 27   | QVYRGDRESV   | 415         | CAAGTTTACAGAGGAGACAGGGAATCCGTG   | 583         |
| 28   | SSQRGDLAGT   | 416         | TCGAGTCAGAGAGGAGACTTGGCTGGTACT   | 584         |
| 29   | TDVRGDRGTF   | 417         | ACGGATGTTAGAGGAGACAGGGGGACGTTT   | 585         |
| 30   | SSVRGDREVT   | 418         | TCGTCTGTGAGAGGAGACCGGGAGGTGACG   | 586         |
| 31   | ENRRGDLTNA   | 419         | GAGAATAGGAGAGGAGACCTGACTAATGCG   | 587         |
| 32   | SYARGDVHSI   | 420         | TCGTATGCGAGAGGAGACGTTTATTCTATT   | 588         |
| 33   | DSSRGDLNLR   | 421         | GACAGCTCAAGAGGAGACCTCAACCTCCGG   | 589         |
| 34   | SNARGDYSNM   | 422         | TCGAACGCGAGAGGAGACTACTCAAACATG   | 590         |

| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|--------------|-------------|---------------------------------|-------------|
| 35   | SSVRGDHSLV   | 423         | TCGTCTGTGAGAGGAGACCATTCGGTGCTT  | 591         |
| 36   | SAFRGDLHAT   | 424         | TCGGCTTTTAGAGGAGACCTGCATGCTACT  | 592         |
| 37   | SAMRGDYTST   | 410         | TCCGCCATGAGAGGAGACTACACAAGCACG  | 593         |
| 38   | NAQRGDHGQL   | 394         | AACGCACAAAGAGGAGACCACGGGCAACTG  | 594         |
| 39   | SDRRGDQLLY   | 425         | TCGGATCGGAGAGGAGACCAGCTGTTGTAT  | 595         |
| 40   | SGVRGDRLAV   | 426         | AGCGGCGTAAGAGGAGACCGCCTAGCCGTA  | 596         |
| 41   | ASLRGDLST    | 427         | GCCAGCCTAAGAGGAGACCTCAGCTCAACG  | 597         |
| 42   | TNRRGDLHGM   | 428         | ACGAACGGAAGAGGAGACCTTCACGGAATG  | 598         |
| 43   | TNTRGDHGML   | 429         | ACGAATACGAGAGGAGACCATGGGATGCTG  | 599         |
| 44   | SSARGDRDYL   | 397         | AGTTCCGCCAGAGGAGACCGGGACTACCTC  | 600         |
| 45   | EDRRGDLLRT   | 430         | GAGGATCGGAGAGGAGACCTTTTGAGGACT  | 601         |
| 46   | SSLRGDLLHS   | 431         | TCGTGCTGAGAGGAGACCTGTTGCATTCT   | 602         |
| 47   | ENRRGDLTNA   | 419         | GAAAACCGTAGAGGAGACCTCACGAACGCT  | 603         |
| 48   | DGRRGDRESI   | 432         | GACGGCAGGAGAGGAGACCGGGAATCGATC  | 604         |
| 49   | TGTRGDTMTW   | 433         | ACTGGAACCAGAGGAGACACAATGACATGG  | 605         |
| 50   | STVRGDYTSV   | 398         | TCGACTGTTAGAGGAGACTATACTTCTGTT  | 606         |
| 51   | SATRGDHNVL   | 434         | TCGGCAACGAGAGGAGACCACAACGTACTG  | 607         |
| 52   | TDRRGDSGTL   | 435         | ACGGATCGGAGAGGAGACAGTGGTACTCTG  | 608         |
| 53   | TSARGDLIHT   | 436         | ACGAGTGCTAGAGGAGACCTGATTCATACG  | 609         |
| 54   | SGVRGDRLAV   | 426         | AGTGGGGTGAGAGGAGACCGGCTGGCGGTG  | 610         |
| 55   | AVERGDRLML   | 437         | GCGGTTGAGAGAGGAGACCGTCTTATGCTG  | 611         |
| 56   | DRSRGDTHVL   | 438         | GACAGGTCGAGAGGAGACACGCACGTACTC  | 612         |
| 57   | ESTRGDLRVV   | 439         | GAGTCGACGAGAGGAGACCTTCGTGTTGTG  | 613         |
| 58   | TTIRGDYREL   | 440         | ACGACGATTAGAGGAGACTATCGTGAGTTG  | 614         |
| 59   | TFIRGDLAGA   | 441         | ACGTTTCATCAGAGGAGACCTGGCAGGTGCG | 615         |
| 60   | MTSRGDLTTY   | 442         | ATGACGAGCAGAGGAGACTTGACAACATAC  | 616         |
| 61   | ADRRGDQLYS   | 443         | GCGGATCGTAGAGGAGACCAGCTTTATTCG  | 617         |
| 62   | AHMRGDLGGT   | 385         | GCACACATGAGAGGAGACCTAGGCGGCACG  | 618         |
| 63   | GYVRGDLGQH   | 444         | GGGTACGTCAGAGGAGACCTGGGGCAACAC  | 619         |
| 64   | DASRGDRSL    | 445         | GATGCGAGTAGAGGAGACAGGACTAGTTTG  | 620         |
| 65   | TEVRGDRSQV   | 446         | ACGGAGGTGAGAGGAGACAGGTCGCAGGTT  | 621         |
| 66   | SHLRGDQALA   | 395         | TCGCATCTGAGAGGAGACCAGGCTCTTGCG  | 622         |
| 67   | SEVRGDRSLI   | 447         | TCGGAGGTGAGAGGAGACCGGTTGAGTATT  | 623         |
| 68   | SAARGDTERL   | 387         | AGCGCCGCGAGAGGAGACACTGAACGGCTA  | 624         |
| 69   | SDRRGDLSGA   | 448         | TCAGACCGTAGAGGAGACCTGTCGGGCGCT  | 625         |
| 70   | SVTRGDRVVI   | 449         | AGCGTCACAAGAGGAGACAGAGTAGTCATC  | 626         |

| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|--------------|-------------|---------------------------------|-------------|
| 71   | SEGRGDRMAL   | 450         | TCGGAGGGGAGAGGAGACAGGATGGCTCTT  | 627         |
| 72   | SSTRGDHLSL   | 451         | TCGTCTACTAGAGGAGACCATCTTTTCGCTG | 628         |
| 73   | AMIRGDMTHS   | 391         | GCTATGATCAGAGGAGACATGACCCACTCC  | 629         |
| 74   | SSTRGDQIYV   | 452         | TCGTCGACGAGAGGAGACCAGATTTATGTG  | 630         |
| 75   | EERRGDTHRL   | 392         | GAGGAGCGGAGAGGAGACACTCATCGGTTG  | 631         |
| 76   | SNSRGDYNLS   | 381         | TCGAATTCGAGAGGAGACTATAATAGTCTT  | 632         |
| 77   | SAQRDRMGSP   | 453         | TCCGCACAAAGGGATCGTATGGGTTCTCCG  | 633         |
| 78   | TGTRGDIATF   | 454         | ACGGGTACGAGAGGAGACATTGCGACTTTT  | 634         |
| 79   | SMQRGDLLST   | 455         | TCGATGCAGAGAGGAGACCTGCTTTCTACT  | 635         |
| 80   | EDVRGDRSKL   | 456         | GAGGATGTGAGAGGAGACAGGAGTAAGCTT  | 636         |
| 81   | AHMRGDLGGT   | 385         | GCGCATATGAGAGGAGACTTGGGGGGGACT  | 637         |
| 82   | TSVRGDQSQY   | 457         | ACGAGTGTGAGAGGAGACCAGAGTCAGTAT  | 638         |
| 83   | ADRRGDTGLF   | 458         | GCGGATCGGAGAGGAGACACGGGGTTGTTT  | 639         |
| 84   | NTYRGDRDSL   | 459         | AACACTTACAGAGGAGACCGAGACAGCCTG  | 640         |
| 85   | TDVRGDRGTF   | 417         | ACGGATGTTAGAGGAGACCGGGGGACGTTT  | 641         |
| 86   | SRRGDLNDL    | 460         | TCTCGTGGGAGAGGAGACCTGAATGATTTG  | 642         |
| 87   | SNVRGDREAV   | 396         | AGCAACGTAAGAGGAGACAGGGAAGCCGTC  | 643         |
| 88   | MDRRGDASIL   | 461         | ATGGACAGGAGAGGAGACGCCTCCATACTG  | 644         |
| 89   | SIWRGDRTEV   | 462         | TCGATATGGAGAGGAGACCGTACAGAAGTC  | 645         |
| 90   | NSQRGDYSGM   | 463         | AACTCACAAAGAGGAGACTACAGTGGAATG  | 646         |
| 91   | SSVRGDIGGI   | 464         | TCTAGCGTAAGAGGAGACATCGGGGGGATC  | 647         |
| 92   | ENQRGDLSGR   | 390         | GAGAATCAGAGAGGAGACTTGTCGGGTCGG  | 648         |
| 93   | EIRRGDLLAQ   | 465         | GAGATTCGGAGAGGAGACCTTCTGGCTCAG  | 649         |
| 94   | SNIRGDHAVM   | 466         | TCGAACATCAGAGGAGACCACGCAGTCATG  | 650         |
| 95   | LDTRGDRSQV   | 467         | CTGGATACGAGAGGAGACCGGAGTCAGGTT  | 651         |
| 96   | ANTRGDHQN    | 468         | GCGAATACGAGAGGAGACCATCAGAATTTT  | 652         |
| 97   | QVYRGDRESV   | 415         | CAGGTGTATAGAGGAGACCGTGAGTCTGTT  | 653         |
| 98   | TSVRGDLSMN   | 469         | ACGTCGGTGAGAGGAGACCTTTTCGATGAAT | 654         |
| 99   | ASTRGDHGVL   | 383         | GCCTCAACGAGAGGAGACCACGGAGTTCTC  | 655         |
| 100  | TTTRGDYLNT   | 470         | ACGACGACGAGAGGAGACTATCTTAATACG  | 656         |
| 101  | AERRGDIKEY   | 471         | GCGGAGAGGAGAGGAGACATTAAGGAGTAT  | 657         |
| 102  | SHARGDLGST   | 472         | TCGCATGCTAGAGGAGACTTGGGTTTCGACT | 658         |
| 103  | TSQRGDYVSL   | 473         | ACGTCTCAGAGAGGAGACTATGTTTCTCTT  | 659         |
| 104  | GPGRGDQTTL   | 556         | GGGCCGGGTAGAGGAGACCAGACTACGTTG  | 660         |
| 105  | VNVRGDRGEV   | 474         | GTGAATGTGAGAGGAGACCGTGGTGAGGTG  | 661         |
| 106  | SYRRGDHDQL   | 475         | TCGTATCGTAGAGGAGACCATGATCAGCTT  | 662         |



| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|--------------|-------------|---------------------------------|-------------|
| 107  | SGTRGDRVDL   | 476         | AGCGGCACAAGAGGAGACAGGGTAGACCTC  | 663         |
| 108  | SHFRGDLHTS   | 477         | TCCCACTTCAGAGGAGACTTGCACACGTCC  | 664         |
| 109  | SDRRGDLSPV   | 478         | TCGGATCGTAGAGGAGACCTTTCGGTGCCT  | 665         |
| 110  | SGTRGDTLIL   | 479         | AGCGGCACCAGAGGAGACACCCTTATACTC  | 666         |
| 111  | ENTRGDLHGK   | 480         | GAAAACACCAGAGGAGACCTCCACGGCAAA  | 667         |
| 112  | DRARGDTHVL   | 481         | GATCGGGCGAGAGGAGACACGCATGTGCTG  | 668         |
| 113  | ASGRGDIAGL   | 482         | GCGTCTGGTAGAGGAGACATTGCGGGGCTT  | 669         |
| 114  | EGRRGDLFQA   | 483         | GAGGGTCGTAGAGGAGACCTGTTTCAGGCG  | 670         |
| 115  | RSERGDRLEI   | 484         | AGATCCGAAAGAGGAGACAGGCTAGAAATC  | 671         |
| 116  | AAAYRGDAHVL  | 485         | GCGGCCTACAGAGGAGACGCACACGTGCTC  | 672         |
| 117  | NDSRGDQHRL   | 486         | AACGACTCGAGAGGAGACCAACACCGATTG  | 673         |
| 118  | SSARGDHSQL   | 487         | TCATCGGCAAGAGGAGACCACTCTCAACTG  | 674         |
| 119  | TNERGDRLSI   | 488         | ACGAATGAGAGAGGAGACCGTCTTTCGATT  | 675         |
| 120  | SNSRGDYTSV   | 489         | AGCAACTCCAGAGGAGACTACACCAGTGTC  | 676         |
| 121  | NVTRGDHTVM   | 490         | AACGTCACAAGAGGAGACCACACCGTTATG  | 677         |
| 122  | TMVRGDVKGL   | 491         | ACGATGGTGAGAGGAGACGTTAAGGGGCTT  | 678         |
| 123  | TGTRGDIATF   | 454         | ACCGGGACAAGAGGAGACATAGCCACGTTC  | 679         |
| 124  | VQLRGDLAST   | 492         | GTGCAGCTGAGAGGAGACTTGGCTTCTACT  | 680         |
| 125  | MNRRGDYSEQ   | 493         | ATGAACCGGAGAGGAGACTACTCGGAACAA  | 681         |
| 126  | ANTRGDLSPV   | 494         | GCGAATACTAGAGGAGACCTGAGTCCGGTT  | 682         |
| 127  | TGMRGDAGSL   | 495         | ACGGGTATGAGAGGAGACGCTGGGAGTCTT  | 683         |
| 128  | LDRRGDFSSA   | 496         | CTAGACCGCAGAGGAGACTTCAGCTCCGCG  | 684         |
| 129  | MYHRGDMTSV   | 497         | ATGTACCACAGAGGAGACATGACTTCGGTG  | 685         |
| 130  | GSMRGDLHST   | 498         | GGGTCGATGAGAGGAGACTTGCATTTCGACG | 686         |
| 131  | SSSRGDFSSV   | 499         | TCGTCGTCCAGAGGAGACTTCAGCTCTGTT  | 687         |
| 132  | TGTRGDLHTY   | 500         | ACGGGTACGAGAGGAGACTTGCATACTTAT  | 688         |
| 133  | YTQRGDLATV   | 501         | TACACCCAAAGAGGAGACCTTGCCACCGTC  | 689         |
| 134  | TDVRGDRLMYV  | 502         | ACGGATGTTAGAGGAGACCGGATGTATGTG  | 690         |
| 135  | TSVRGDHGTL   | 388         | ACATCGGTCAGAGGAGACCACGGAACATTG  | 691         |
| 136  | SNSRGDLNVN   | 503         | TCGAATCCAGAGGAGACCTATCGGTAAAC   | 692         |
| 137  | QSGRGDQMTL   | 504         | CAGTCTGGGAGAGGAGACCAGATGACGTTG  | 693         |
| 138  | MNTRGDLQQS   | 505         | ATGAACACCAGAGGAGACTTGCAACAATCG  | 694         |
| 139  | AGSRGDLQTV   | 506         | GCGGGATCAAGAGGAGACCTACAAACGGTG  | 695         |
| 140  | SNMRGDQTYV   | 507         | TCGAACATGAGAGGAGACCAAACCTTACGTC | 696         |
| 141  | TPSRGDMSNV   | 508         | ACGCCAAGTAGAGGAGACATGTCCAACGTC  | 697         |
| 142  | NSTRGDLHMA   | 509         | AACAGCACAAGAGGAGACCTACACATGGCA  | 698         |

| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|--------------|-------------|---------------------------------|-------------|
| 143  | ANTRGDLSVS   | 510         | GCTAACACCAGAGGAGACCTCTCAGTCAGT  | 699         |
| 144  | TDRRGDTGLL   | 511         | ACCGACCGAAGAGGAGACACCGGCTTACTG  | 700         |
| 145  | DGVRGDRATW   | 512         | GACGGCGTAAGAGGAGACCGTGCAACATGG  | 701         |
| 146  | ENRRGDFNNT   | 384         | GAGAATCGTAGAGGAGACTTTAATAATACG  | 702         |
| 147  | EPSRGDRMVL   | 513         | GAGCCTAGTAGAGGAGACAGGATGGTGTTG  | 703         |
| 148  | SGVRGDRIII   | 514         | AGCGGCGTTAGAGGAGACCGGATCATAATC  | 704         |
| 149  | TSMRGDYTHV   | 515         | ACGTCGATGAGAGGAGACTATACGCATGTT  | 705         |
| 150  | ASSRGDLTVI   | 516         | GCGTCGAGTAGAGGAGACTTGACTGTTATT  | 706         |
| 151  | ETRRGDLQL    | 517         | GAGACGCGTAGAGGAGACCTGTCGCTTCAG  | 707         |
| 152  | NNARGDQSMH   | 518         | AACAACGCAAGAGGAGACCAATCAATGCAC  | 708         |
| 153  | TDRRGDSSAL   | 519         | ACGGATAGGAGAGGAGACTCTAGTGCGCTT  | 709         |
| 154  | SSQRGDLTGV   | 520         | TCAAGCCAAAGAGGAGACTTGACAGGTGTG  | 710         |
| 155  | QTARGDVMVH   | 521         | CAGACGGCTAGAGGAGACGTTATGGTTTCAT | 711         |
| 156  | VSQRGDLNAV   | 522         | GTGTCGCAGAGAGGAGACCTGAATGCTGTT  | 712         |
| 157  | TMTRGDLAAN   | 523         | ACGATGACCAGAGGAGACCTCGCTGCTAAC  | 713         |
| 158  | NASRGDHSSL   | 524         | AATGCTTCGAGAGGAGACCATTCGTCGTTG  | 714         |
| 159  | SNTRGDMGLT   | 525         | TCAAACACCAGAGGAGACATGGGCCTCACG  | 715         |
| 160  | MYSRGDTHSL   | 526         | ATGTATTTCGAGAGGAGACACTCATAGTCTG | 716         |
| 161  | ADQRGDRAPL   | 527         | GCGGATCAGAGAGGAGACAGGGCTCCGCTT  | 717         |
| 162  | QERRGDYISM   | 382         | CAAGAAAGGAGAGGAGACTACACCTCTATG  | 718         |
| 163  | SQNRGDLANT   | 528         | TCCCAAAACAGAGGAGACCTAGCCAACACG  | 719         |
| 164  | EKLRGDLHST   | 389         | GAGAAGTTGAGAGGAGACCTTCATTGACT   | 720         |
| 165  | QGGRGDLSTL   | 404         | CAAGGCGGAAGAGGAGACCTGAGTACACTG  | 721         |
| 166  | SNRRGDTEMQ   | 529         | TCGAATAGGAGAGGAGACACTGAGATGCAG  | 722         |
| 167  | SGSRGDVSAL   | 530         | TCGGGTAGTAGAGGAGACGTGAGTGCTTTG  | 723         |
| 168  | ESTRGDRGTL   | 531         | GAGTCGACGAGAGGAGACCGTGGTACGCTG  | 724         |
| 169  | SAVRGDAALH   | 532         | TCGGCGGTGAGAGGAGACGCGGCGCTTCAT  | 725         |
| 170  | LSSRGDVNRL   | 533         | CTGAGCAGCAGAGGAGACGTTAACCGCCTT  | 726         |
| 171  | EQRRGDIQTI   | 534         | GAGCAGAGGAGAGGAGACATTGAGACTATT  | 727         |
| 172  | AAVRGDAHVL   | 485         | GCTGCGTATAGAGGAGACGCGCATGTTCTT  | 728         |
| 173  | SPVRGDH GAL  | 535         | TCGCCGGTGAGAGGAGACCATGGGGCTTTG  | 729         |
| 174  | DSRRGDYANL   | 409         | GATTCGAGGAGAGGAGACTATGCGAATCTG  | 730         |
| 175  | LSRRGDYQEL   | 536         | TTGAGTCGGAGAGGAGACTATCAGGAGTTG  | 731         |
| 176  | SYARGDVHSI   | 420         | TCCTACGCAAGAGGAGACGTCCACTCCATC  | 732         |
| 177  | DSRRGDASYH   | 537         | GACTCACGCAGAGGAGACGCGTCGTACCAC  | 733         |
| 178  | NHQRGDLSSS   | 538         | AACCACCAAAGAGGAGACCTGAGCTCGAGT  | 734         |

| RANK | N-MER INSERT | SEQ ID NO.: | ENCODING SEQUENCE               | SEQ ID NO.: |
|------|--------------|-------------|---------------------------------|-------------|
| 179  | SSTRGDHLSL   | 451         | TCCTCAACGAGAGGAGACCACCTGTCTTTG  | 735         |
| 180  | SWNRGDISGL   | 539         | TCGTGGAACAGAGGAGACATATCTGGCCTT  | 736         |
| 181  | TGTRGDLGTM   | 540         | ACGGGTACTAGAGGAGACCTGGGGACGATG  | 737         |
| 182  | QQLRGDTHTL   | 541         | CAGCAGCTTAGAGGAGACACGCATACTCTT  | 738         |
| 183  | AGLRGDRDSL   | 542         | GCGGGGTTGAGAGGAGACCGTGATTTCGCTT | 739         |
| 184  | QVYRGDRDQL   | 543         | CAGGTTTATAGAGGAGACCGGGATCAGTTG  | 740         |
| 185  | AGVRGDRVTI   | 544         | GCAGGAGTAAGAGGAGACAGAGTGACCATC  | 741         |
| 186  | NSARGDLLHS   | 545         | AACTCAGCCAGAGGAGACCTTCTGCACTCC  | 742         |
| 187  | NHSRGDLTGV   | 546         | AACCACAGTAGAGGAGACCTGACAGGCGTT  | 743         |
| 188  | NAYRGDTSF    | 547         | AACGCTTACAGAGGAGACACATCCGCGTTC  | 744         |
| 189  | SANRGDIMHT   | 548         | TCGGCTAACAGAGGAGACATAATGCACACG  | 745         |
| 190  | QSARGDLVSY   | 549         | CAATCCGCCAGAGGAGACCTCGTCAGTTAC  | 746         |
| 191  | DSRRGDASYH   | 537         | GATAGTAGGAGAGGAGACGCTAGTTATCAT  | 747         |
| 192  | SFVRGDRVRTL  | 550         | TCGTTTGTGAGAGGAGACGTTTCGTACGCTG | 748         |
| 193  | SDMRGDRSVY   | 551         | AGCGACATGAGAGGAGACCGATCTGTGTAC  | 749         |
| 194  | SGIRGDRYPI   | 552         | TCCGGAATCAGAGGAGACCGCTACCCAATA  | 750         |
| 195  | SNVRGDMAHS   | 553         | TCCAACGTCAGAGGAGACATGGCTCACAGC  | 751         |
| 196  | TEVRGDRSQV   | 446         | ACTGAGGTTAGAGGAGACCGTTCGCAGGTT  | 752         |
| 197  | ASSRGDLQQT   | 554         | GCGAGCAGCAGAGGAGACCTGCAACAAACG  | 753         |
| 198  | QSARGDLVSY   | 549         | CAGTCTGCTAGAGGAGACCTTGTGTCTTAT  | 754         |
| 199  | DASRGDRDSL   | 445         | GACGCATCTAGAGGAGACCGAACATCCCTC  | 755         |
| 200  | NSVRGDLNQT   | 555         | AACAGTGTCAGAGGAGACCTCAACCAAAC   | 756         |

*Table 3: Top Ranking  
Skeletal Muscle Specific n-  
mer inserts and/or RGD  
Motifs*

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| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| TTGRGDQARL  | 757               |
| TTLRGDHSQ   | 758               |
| TNLRGDYQLT  | 759               |
| STSRGDYVTH  | 760               |
| MPARGDLVQT  | 761               |
| SGVRGDR LAV | 762               |
| SNERGDQHRL  | 763               |
| STLRGDYAVS  | 764               |
| SNARGDIMTT  | 765               |
| EASRGDLQMR  | 766               |
| TYARGDLSGH  | 767               |
| DSSRGDRSSV  | 768               |
| SQSRGDLVPL  | 769               |
| SATRGDYSIL  | 770               |
| QATRGDLQHT  | 771               |
| HDDRGRDRML  | 772               |
| SSHRGDL LAT | 773               |
| SYQRGDQHNM  | 774               |
| SHQRGDYNTL  | 775               |
| MDQRGDMSVV  | 776               |
| QIARGDLHVP  | 777               |
| TYTRGDQHMM  | 778               |
| DASRGDR TSL | 779               |
| SDRRGDLHPQ  | 780               |
| SATRGDHSTL  | 781               |
| AYQRGDFTSV  | 782               |
| TGNRGDLQSV  | 783               |
| AWRRGDLENA  | 784               |
| NAARGDHGLL  | 785               |
| SYSRGDHQAL  | 786               |
| DGVRGDR TVV | 787               |
| SSERGDKMST  | 788               |
| TSMRGDYTHV  | 789               |
| SGVRGDR III | 790               |
| ENRRGDAQLL  | 791               |

| Variant      | SEQ<br>ID<br>NO.: |
|--------------|-------------------|
| TVYRGDREQH   | 792               |
| LDRRGDLLNS   | 793               |
| ESVRGDLRST   | 794               |
| DKYRGDQRGL   | 795               |
| TDRRGDAHIL   | 796               |
| SQTRGDTSLM   | 797               |
| DATRGDTRML   | 798               |
| SMQRGDLTHA   | 799               |
| SGTRGDTLIL   | 800               |
| ANTRGDHQNF   | 801               |
| TSQRGDHTQL   | 802               |
| SHWRGDTSSL   | 803               |
| ISGRGDRQEL   | 804               |
| SVLRGDIGTI   | 805               |
| QDSRGDLSGK   | 806               |
| KPIRGDGAEL   | 807               |
| TYMRGDLQHT   | 808               |
| TELRGDLSST   | 809               |
| SAMRGDHA VL  | 810               |
| SWVRGDASTL   | 811               |
| QYARGDPHAL   | 812               |
| STNRGDIVVH   | 813               |
| VNIRGDLHQT   | 814               |
| REYRGDSSIL   | 815               |
| STLRGDGSMM   | 816               |
| SSQRGDITAH   | 817               |
| TEFRGDRSTV   | 818               |
| TSTRGDYVTV   | 819               |
| NHLRGDVSAI   | 820               |
| LERRGDLVST   | 821               |
| NEYRGDHSHP   | 822               |
| NWQRGDTSTL   | 823               |
| TDSRGDR TVL  | 824               |
| YAVRGDQHTI   | 825               |
| FGVRGDR TDL  | 826               |
| SSARGDTGML   | 827               |
| SAMRGDQM GQ  | 828               |
| SHTRGDLVTT   | 829               |
| VTTRGDTAIL   | 830               |
| EPTRGDRHSI   | 831               |
| GSQRGDR LV L | 832               |

| Variant      | SEQ<br>ID<br>NO.: |
|--------------|-------------------|
| QHYRGDLSTT   | 833               |
| METRGRDRQQL  | 834               |
| EALRGDKVVL   | 835               |
| NAVRGDQSYV   | 836               |
| SPLRGDNRAL   | 837               |
| ENRRGDTHAL   | 838               |
| NSQRGDLTGT   | 839               |
| QYAPSQGT V   | 840               |
| DNSRGDHSRL   | 841               |
| NTHRGDYASI   | 842               |
| HTTRGDQQPL   | 843               |
| EWRRGDQTAL   | 844               |
| TAVRGDQTTV   | 845               |
| EYLRGDRISQ   | 846               |
| SRYRGDQETI   | 847               |
| ASLRGDTVTL   | 848               |
| VGVRGD SHVL  | 849               |
| TNSRGDHTSL   | 850               |
| VDQRGDQRAL   | 851               |
| ASVRGDR LDV  | 852               |
| TSYRGDLSSN   | 853               |
| TSDRGDSSNR   | 854               |
| SYMRGDLDMR   | 855               |
| TDVRGDRSMI   | 856               |
| SYVRGDSSTV   | 857               |
| QVYRGDR ES V | 858               |
| TDRRGDAVSF   | 859               |
| TNSRGDLHTT   | 860               |
| EAIRGDFKTL   | 861               |
| TGIRGDTAGL   | 862               |
| TSSRGDVQSL   | 863               |
| SSRRGDTNEL   | 864               |
| SNARGDHTPL   | 865               |
| SELRGDRSPY   | 866               |
| VHARGDTSIM   | 867               |
| SALRGDHGTL   | 868               |
| QTGRGDIAGM   | 869               |
| TVARGDQIRL   | 870               |
| TNSRGDSVAL   | 871               |
| QNARGDSAVI   | 872               |
| HYLRGDTTTL   | 873               |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| ANARGDLQNT  | 874               |
| QNIRGDIRTV  | 875               |
| AALRGDHGQM  | 876               |
| TTDRGDL SAR | 877               |
| LNVRGDLVHT  | 878               |
| YSTRGDHTVL  | 879               |
| TNARGDLTVS  | 880               |
| TNARGDYTAL  | 881               |
| AEGRGDTRGS  | 882               |
| TNIRGDQSSV  | 883               |
| VDRRGDTMTM  | 884               |
| QIGRGDVTPL  | 885               |
| MQARGDLLGV  | 886               |
| NTQRGDYASV  | 887               |
| SDTRGDRITQ  | 888               |
| SAIRGDYRDV  | 889               |
| VGVRGDVHPL  | 890               |
| TVLRGDAERL  | 891               |
| ASTRGDLSGQ  | 892               |
| DSRRGDGQNL  | 893               |
| IDKRGDIQGL  | 894               |
| TVTRGDLLVN  | 895               |
| DSTRGDRLGL  | 896               |
| AANRGDYASL  | 897               |
| RDYRGDTSSL  | 898               |
| SNIRGDASLH  | 899               |
| NLQRGDR TDF | 900               |
| NASRGDHSSM  | 901               |
| TSMRGDYTHV  | 902               |
| TSRRGDLNDV  | 903               |
| QSHRGDVQSL  | 904               |
| STTRGDYQSV  | 905               |
| YSTRGDHAML  | 906               |
| TSARGDLIHT  | 907               |
| ATARGDRESF  | 908               |
| ASTRGDYSTM  | 909               |
| SNNRGDVQRL  | 910               |
| ERLRGDQHII  | 911               |
| SSIRGDHATL  | 912               |
| NPTRGD IATV | 913               |
| MSTRGDL SVN | 914               |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| MDRRGDITYA  | 915               |
| NATRGDLMSA  | 916               |
| SDHRGDR TYQ | 917               |
| NWVRGDLSTA  | 918               |
| SSHRGDL SAT | 919               |
| NATRGDYREI  | 920               |
| DTLRGDLQTA  | 921               |
| IAVRGDLTPV  | 922               |
| TLLRGDLAHS  | 923               |
| MNTRGDHTVL  | 924               |
| TGHRGDI AVY | 925               |
| TSNRGDQMSN  | 926               |
| SATRGDHTAI  | 927               |
| SSVRGDREHA  | 928               |
| TNSRGDLV VH | 929               |
| ETRRGDLSSQ  | 930               |
| TYARGDITLT  | 931               |
| SASRGDTLHL  | 932               |
| DNQRGDLSSR  | 933               |
| TQSRGDLRDA  | 934               |
| ENRRGDLTNA  | 935               |
| TSIRGDISSV  | 936               |
| ISARGDTMTL  | 937               |
| SRVRGDQDHW  | 938               |
| SGNRGDIASY  | 939               |
| NEQRGDRYNH  | 940               |
| EALRGDV RAL | 941               |
| VDRRGDYTQM  | 942               |
| NNVRGDYTSV  | 943               |
| QTYRGDASVL  | 944               |
| SNYRGD HGSL | 945               |
| TSSRGDLREV  | 946               |
| QYTRGDVSNL  | 947               |
| SDLRGDV RER | 948               |
| QNARGD TTAL | 949               |
| NSLRGDRDTM  | 950               |
| SNSRGDQAQV  | 951               |
| EATRGDR STL | 952               |
| VPQRGDITNL  | 953               |
| DKIRGDLRSI  | 954               |
| SAARGDY SIV | 955               |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| VGLRGDLIGQ  | 956               |
| QAGRGDLTVI  | 957               |
| SKTRGDFQEA  | 958               |
| GTARGDY SML | 959               |
| ISTRGDLVTI  | 960               |
| TGTRGDREYM  | 961               |
| MTTRGDL SIT | 962               |
| STSRGDMTSV  | 963               |
| GPARGDFTSS  | 964               |
| VDRRGDLGHV  | 965               |
| NSGRGDMSQL  | 966               |
| SQGRGDLERY  | 967               |
| VFGRGDQYTL  | 968               |
| IVGRGDLHLQ  | 969               |
| SYSRGDTSRL  | 970               |
| MSSRGDRATI  | 971               |
| MSSRGDLTRV  | 972               |
| QHTRGDFGNL  | 973               |
| ETRRGDLSSQ  | 974               |
| TGTRGDLRAI  | 975               |
| QMARGDLSTA  | 976               |
| LVERGDRIMN  | 977               |
| GLVRGDLNAR  | 978               |
| NNPRGDLSSV  | 979               |
| HEKRGDLSNS  | 980               |
| SQARGDLHQT  | 981               |
| FTGRGDLRTA  | 982               |
| QSIRGDTGHL  | 983               |
| SAGRGDMSVL  | 984               |
| SERRGDEHKW  | 985               |
| TTGRGDLVSL  | 986               |
| LGLRGDQIGQ  | 987               |
| VALRGDLTHQ  | 988               |
| MIGRGDQAPL  | 989               |
| FQARGDH STL | 990               |
| NSVRGDHSSL  | 991               |
| WPNRGDLQST  | 992               |
| SASRGDYQTL  | 993               |
| TMQRGDLHTI  | 994               |
| TALRGDL AGT | 995               |
| VNARGDFSQT  | 996               |

| Variant    | SEQ<br>ID<br>NO.: |
|------------|-------------------|
| GWIRGDRTSM | 997               |
| TFSRGDHTVL | 998               |
| SGARGDLVGV | 999               |
| NNVRGDYTSV | 1000              |
| QTARGDHVVL | 1001              |
| TLIRGDLTRS | 1002              |
| VTTRGDRLEL | 1003              |

*Table 4: Top Ranking  
Skeletal Muscle Specific n-  
mer inserts and/or RGD  
Motifs*

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| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| EASRGDLQMR  | 1004              |
| TYARGDLSGH  | 1005              |
| DSSRGDRSSV  | 1006              |
| SQSRGDLVPL  | 1007              |
| MPARGDLVQT  | 1008              |
| SGVRGDLRAV  | 1009              |
| SNERGDQHRL  | 1010              |
| STLRGDYAVS  | 1011              |
| SNARGDIMTT  | 1012              |
| TTGRGDQARL  | 1013              |
| TTLRGDHSQL  | 1014              |
| TNLRGDYQLT  | 1015              |
| STSRGDYVTH  | 1016              |
| SATRGDYSIL  | 1017              |
| QATRGDLQHT  | 1018              |
| HDDRGRDRML  | 1019              |
| SSHRGDL LAT | 1020              |
| SYQRGDQHNM  | 1021              |
| SHQRGDYNTL  | 1022              |
| MDQRGDMSVV  | 1023              |
| QIARGDLHVP  | 1024              |
| TYTRGDQHMM  | 1025              |
| DASRGDR TSL | 1026              |
| SDRRGDLHPQ  | 1027              |
| SATRGDHSTL  | 1028              |
| AYQRGDFTSV  | 1029              |
| TGNRGDLQSV  | 1030              |
| AWRRGDLENA  | 1031              |
| NAARGDHGLL  | 1032              |
| SYSRGDHQAL  | 1033              |
| DGVRGDR TVV | 1034              |
| SSERGDKMST  | 1035              |
| TSMRGDYTHV  | 1036              |

| Variant      | SEQ<br>ID<br>NO.: |
|--------------|-------------------|
| SGVRGDR III  | 1037              |
| ENRRGDAQLL   | 1038              |
| TVYRGDREQH   | 1039              |
| LDRRGDLLNS   | 1040              |
| ESVRGDLRST   | 1041              |
| DKYRGDQRGL   | 1042              |
| TDRRGDAHIL   | 1043              |
| SQTRGDTSLM   | 1044              |
| DATRGDTRML   | 1045              |
| SMQRGDLTHA   | 1046              |
| SGTRGDTLIL   | 1047              |
| ANTRGDH QNF  | 1048              |
| TSQRGDHTQL   | 1049              |
| SHWRGDTSSL   | 1050              |
| ISGRGDRQEL   | 1051              |
| SVLRGDIGTI   | 1052              |
| QDSRGDL S GK | 1053              |
| KPIRGDGAEL   | 1054              |
| TYMRGDLQHT   | 1055              |
| TELRGDL SST  | 1056              |
| SAMRGDHA VL  | 1057              |
| SWVRGDASTL   | 1058              |
| QYARGDPHAL   | 1059              |
| STNRGDIVVH   | 1060              |
| VNIRGDLHQT   | 1061              |
| REYRGDSSIL   | 1062              |
| STLRGDGSM    | 1063              |
| SSQRGDITAH   | 1064              |
| TEFRGDRSTV   | 1065              |
| TSTRGDYVTV   | 1066              |
| NHLRGDVSAI   | 1067              |
| LERRGDLVST   | 1068              |
| NEYRGDHSHP   | 1069              |
| NWQRGDTSTL   | 1070              |
| TDSRGDR TVL  | 1071              |
| YAVRGDQHTI   | 1072              |
| FGVRGDR TDL  | 1073              |
| SSARGDTGML   | 1074              |
| SAMRGDQM GQ  | 1075              |
| SHTRGDLVTT   | 1076              |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| VTTRGDTAIL  | 1077              |
| EPTRGDRHSI  | 1078              |
| GSQRGDLVL   | 1079              |
| QHYRGDLSTT  | 1080              |
| METRGDRQQL  | 1081              |
| EALRGDKVVL  | 1082              |
| NAVRGDQSYV  | 1083              |
| SPLRGDNRAL  | 1084              |
| ENRRGDTHAL  | 1085              |
| NSQRGDLTGT  | 1086              |
| DNSRGDHSRL  | 1087              |
| NTHRGDYASI  | 1088              |
| HTTRGDQQPL  | 1089              |
| EWRRGDQTAL  | 1090              |
| TAVRGDQTTV  | 1091              |
| EYLRGDRISQ  | 1092              |
| SRYRGDQETI  | 1093              |
| ASLRGDTVTL  | 1094              |
| VGVRGD SHVL | 1095              |
| TNSRGDHTSL  | 1096              |
| VDQRGDQ RAL | 1097              |
| ASVRGDRLDV  | 1098              |
| TSYRGDLSSN  | 1099              |
| TSDRGDSSNR  | 1100              |
| SYMRGDLDMR  | 1101              |
| TDVRGDRSMI  | 1102              |
| SYVRGDSSTV  | 1103              |
| QVYRGDRESV  | 1104              |
| TDRRGDAVSF  | 1105              |
| TNSRGDLHTT  | 1106              |
| EAIRGDFKTL  | 1107              |
| TGIRGDTAGL  | 1108              |
| TSSRGDVQSL  | 1109              |
| SSRRGDTNEL  | 1110              |
| SNARGDHTPL  | 1111              |
| SELRGDRSPY  | 1112              |
| VHARGDTSIM  | 1113              |
| SALRGDHGTL  | 1114              |
| QTGRGDIAGM  | 1115              |
| TVARGDQIRL  | 1116              |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| TNSRGDSVAL  | 1117              |
| QNARGDSAVI  | 1118              |
| HYLRGDTTTL  | 1119              |
| ANARGDLQNT  | 1120              |
| QNIRGDIRTV  | 1121              |
| AALRGDHGQM  | 1122              |
| TTDRGDL SAR | 1123              |
| LNVRGDLVHT  | 1124              |
| YSTRGDHTVL  | 1125              |
| TNARGDLTVS  | 1126              |
| TNARGDYTAL  | 1127              |
| AEGRGDTRGS  | 1128              |
| TNIRGDQSSV  | 1129              |
| VDRRGDTMTM  | 1130              |
| QIGRGDVTPL  | 1131              |
| MQARGDLLGV  | 1132              |
| NTQRGDYASV  | 1133              |
| SDTRGDRTIQ  | 1134              |
| SAIRGDYRDV  | 1135              |
| VGVRGDVHPL  | 1136              |
| TVLRGDAERL  | 1137              |
| ASTRGDLSGQ  | 1138              |
| DSRRGDGQNL  | 1139              |
| IDKRGDIQGL  | 1140              |
| TVTRGDLLVN  | 1141              |
| DSTRGDRLGL  | 1142              |
| AANRGDYASL  | 1143              |
| RDYRGDTSSL  | 1144              |
| SNIRGDASLH  | 1145              |
| NLQRGDR TDF | 1146              |
| NASRGDHSSM  | 1147              |
| TSMRGDYTHV  | 1148              |
| TSRRGDLNDV  | 1149              |
| QSHRGDVQSL  | 1150              |
| STTRGDYQSV  | 1151              |
| YSTRGDHAML  | 1152              |
| TSARGDLIHT  | 1153              |
| ATARGDRESF  | 1154              |
| ASTRGDYSTM  | 1155              |
| SNNRGDVQRL  | 1156              |

| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| ERLRGDQHII  | 1157              |
| SSIRGDHATL  | 1158              |
| NPTRGDIATV  | 1159              |
| MSTRGDL SVN | 1160              |
| MDRRGDITYA  | 1161              |
| NATRGDLMSA  | 1162              |
| SDHRGDR TYQ | 1163              |
| NWVRGDLSTA  | 1164              |
| SSHRGDL SAT | 1165              |
| NATRGD YREI | 1166              |
| DTLRGDLQTA  | 1167              |
| IAVRGDLTPV  | 1168              |
| TLLRGDLAHS  | 1169              |
| MNTRGDHTVL  | 1170              |
| TGHRGDI AVY | 1171              |
| TSNRGDQMSN  | 1172              |
| SATRGDHTAI  | 1173              |
| SSVRGDREHA  | 1174              |
| TNSRGDLV VH | 1175              |
| ETRRGDLSSQ  | 1176              |
| TYARGDITLT  | 1177              |
| SASRGDTLHL  | 1178              |
| DNQRGDLSSR  | 1179              |
| TQSRGDLRDA  | 1180              |
| ENRRGDLTNA  | 1181              |
| TSIRGDISSV  | 1182              |
| ISARGDTMTL  | 1183              |
| SRVRGDQDHW  | 1184              |
| SGNRGDIASY  | 1185              |
| NEQRGDRYNH  | 1186              |
| EALRGDVRL   | 1187              |
| VDRRGDYTQM  | 1188              |
| NNVRGDYTSV  | 1189              |
| QTYRGDASVL  | 1190              |
| SNYRGDHGSL  | 1191              |
| TSSRGDLREV  | 1192              |
| QYTRGDVSNL  | 1193              |
| SDLRGDVRER  | 1194              |
| QNARGD TTAL | 1195              |
| NSLRGDRDTM  | 1196              |

| Variant    | SEQ<br>ID<br>NO.: |
|------------|-------------------|
| SNSRGDQAQV | 1197              |
| EATRGDRSTL | 1198              |
| VPQRGDITNL | 1199              |
| DKIRGDLRSI | 1200              |
| SAARGDYSIV | 1201              |
| VGLRGDLIGQ | 1202              |
| QAGRGDLTVI | 1203              |
| SKTRGDFQEA | 1204              |
| GTARGDYSML | 1205              |
| ISTRGDLVTI | 1206              |
| TGTRGDREYM | 1207              |
| MTTRGDLSIT | 1208              |
| STSRGDMTSV | 1209              |
| GPARGDFTSS | 1210              |
| VDRRGDLGHV | 1211              |
| NSGRGDMSQL | 1212              |
| SQGRGDLERY | 1213              |
| VFGRGDQYTL | 1214              |
| IVGRGDLHLQ | 1215              |
| SYSRGDTSRL | 1216              |
| MSSRGDRATI | 1217              |
| MSSRGDLTRV | 1218              |
| QHTRGDFGNL | 1219              |
| ETRRGDLSSQ | 1220              |
| TGTRGDLRAI | 1221              |
| QMARGDLSTA | 1222              |
| LVERGDRIMN | 1223              |
| GLVRGDLNAR | 1224              |
| NNPRGDLSSV | 1225              |
| HEKRGDLSNS | 1226              |
| SQARGDLHQT | 1227              |
| FTGRGDLRTA | 1228              |
| QSIRGDTGHL | 1229              |
| SAGRGDMSVL | 1230              |
| SERRGDEHKW | 1231              |
| TTGRGDLVSL | 1232              |
| LGLRGDQIGQ | 1233              |
| VALRGDLTHQ | 1234              |
| MIGRGDQAPL | 1235              |
| FQARGDHSTL | 1236              |



| Variant     | SEQ<br>ID<br>NO.: |
|-------------|-------------------|
| NSVRGDHSSL  | 1237              |
| WPNRGDLQST  | 1238              |
| SASRGDYQTL  | 1239              |
| TMQRGDLHTI  | 1240              |
| TALRGDLAGT  | 1241              |
| VNARGDFSQT  | 1242              |
| GWIRGDRISM  | 1243              |
| TFSRGDHTVL  | 1244              |
| SGARGDLVGV  | 1245              |
| NNVRGDYTSV  | 1246              |
| QTARGDHSVVL | 1247              |
| TLIRGDLTRS  | 1248              |
| VTTRGDRLEL  | 1249              |

Table 5a: HVR IV Capsid

Variants

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| ANASARGDRAAL        | 4290       |
| ANASARGDRGSL        | 4291       |
| ANASARGDRGYL        | 4292       |
| ANASARGDRQAL        | 4293       |
| ANASARGDRQSL        | 4294       |
| ANASARGDRQYL        | 4295       |
| ANASGRGDRAAL        | 4296       |
| ANASGRGDRASL        | 4297       |
| ANASGRGDRAYL        | 4298       |
| ANASGRGDRGAL        | 4299       |
| ANASGRGDRGSL        | 4300       |
| ANASGRGDRGYL        | 4301       |
| ANASGRGDRQAL        | 4302       |
| ANASGRGDRQSL        | 4303       |
| ANASGRGDRQYL        | 4304       |
| ANASMRGDRAAL        | 4305       |
| ANASMRGDRASL        | 4306       |
| ANASMRGDRAYL        | 4307       |
| ANASMRGDRQAL        | 4308       |
| ANASMRGDRQSL        | 4309       |
| ANASSRGDRGSL        | 4310       |
| ANASSRGDRGYL        | 4311       |
| ANASSRGDRQAL        | 4312       |
| ANASSRGDRQSL        | 4313       |
| ANASSRGDRQYL        | 4314       |
| ANASTRGDRASL        | 4315       |
| ANASTRGDRAYL        | 4316       |
| ANASTRGDRGAL        | 4317       |
| ANASTRGDRGSL        | 4318       |
| ANASTRGDRGYL        | 4319       |
| ANASTRGDRQAL        | 4320       |
| ANASTRGDRQSL        | 4321       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| ANASTRGDRQYL        | 4322       |
| ANASVRGDRASL        | 4323       |
| ANASVRGDRGYL        | 4324       |
| ANASVRGDRQAL        | 4325       |
| ANASVRGDRQSL        | 4326       |
| ANASVRGDRQYL        | 4327       |
| ANGNFRGDRQNL        | 4328       |
| ANGNVRGDRGML        | 4329       |
| ANGSARGDRAYL        | 4330       |
| ANGSARGDRGSL        | 4331       |
| ANGSARGDRGYL        | 4332       |
| ANGSARGDRQAL        | 4333       |
| ANGSARGDRQYL        | 4334       |
| ANGSGRGDRAAL        | 4335       |
| ANGSGRGDRAYL        | 4336       |
| ANGSGRGDRGAL        | 4337       |
| ANGSGRGDRGSL        | 4338       |
| ANGSGRGDRGYL        | 4339       |
| ANGSGRGDRQAL        | 4340       |
| ANGSGRGDRQSL        | 4341       |
| ANGSGRGDRQYL        | 4342       |
| ANGSMRGDRGYL        | 4343       |
| ANGSMRGDRQAL        | 4344       |
| ANGSMRGDRQSL        | 4345       |
| ANGSMRGDRQYL        | 4346       |
| ANGSSRGDRAYL        | 4347       |
| ANGSSRGDRGSL        | 4348       |
| ANGSSRGDRGYL        | 4349       |
| ANGSSRGDRQAL        | 4350       |
| ANGSSRGDRQSL        | 4351       |
| ANGSSRGDRQYL        | 4352       |
| ANGSTRGDRAAL        | 4353       |
| ANGSTRGDRAYL        | 4354       |
| ANGSTRGDRGAL        | 4355       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| ANGSTRGDRGYL        | 4356       |
| ANGSTRGDRQAL        | 4357       |
| ANGSTRGDRQSL        | 4358       |
| ANGSTRGDRQYL        | 4359       |
| ANGSVRGDRAYL        | 4360       |
| ANGSVRGDRGYL        | 4361       |
| ANGSVRGDRQAL        | 4362       |
| ANGSVRGDRQYL        | 4363       |
| ANSGMRGDRGAL        | 4364       |
| ANSSARGDRGAL        | 4365       |
| ANSSARGDRGSL        | 4366       |
| ANSSARGDRGYL        | 4367       |
| ANSSARGDRQAL        | 4368       |
| ANSSARGDRQSL        | 4369       |
| ANSSARGDRQYL        | 4370       |
| ANSSGRGDRAAL        | 4371       |
| ANSSGRGDRASL        | 4372       |
| ANSSGRGDRAYL        | 4373       |
| ANSSGRGDRGAL        | 4374       |
| ANSSGRGDRGSL        | 4375       |
| ANSSGRGDRGYL        | 4376       |
| ANSSGRGDRQAL        | 4377       |
| ANSSGRGDRQSL        | 4378       |
| ANSSGRGDRQYL        | 4379       |
| ANSSMRGDRAYL        | 4380       |
| ANSSMRGDRQAL        | 4381       |
| ANSSMRGDRQSL        | 4382       |
| ANSSMRGDRQYL        | 4383       |
| ANSSSRGDRGSL        | 4384       |
| ANSSSRGDRGYL        | 4385       |
| ANSSSRGDRQAL        | 4386       |
| ANSSSRGDRQSL        | 4387       |
| ANSSSRGDRQYL        | 4388       |
| ANSSTRGDRAAL        | 4389       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| ANSSTRGDRGSL        | 4390       |
| ANSSTRGDRQAL        | 4391       |
| ANSSTRGDRQSL        | 4392       |
| ANSSTRGDRQYL        | 4393       |
| ANSSVRGDRAYL        | 4394       |
| ANSSVRGDRGYL        | 4395       |
| ANSSVRGDRQAL        | 4396       |
| ANSSVRGDRQSL        | 4397       |
| ANSSVRGDRQYL        | 4398       |
| ANTSARGDRAYL        | 4399       |
| ANTSARGDRGAL        | 4400       |
| ANTSARGDRGSL        | 4401       |
| ANTSARGDRGYL        | 4402       |
| ANTSARGDRQAL        | 4403       |
| ANTSARGDRQYL        | 4404       |
| ANTSGRGDRASL        | 4405       |
| ANTSGRGDRGAL        | 4406       |
| ANTSGRGDRGSL        | 4407       |
| ANTSGRGDRGYL        | 4408       |
| ANTSGRGDRQAL        | 4409       |
| ANTSGRGDRQSL        | 4410       |
| ANTSGRGDRQYL        | 4411       |
| ANTSMRGDRAYL        | 4412       |
| ANTSMRGDRQAL        | 4413       |
| ANTSMRGDRQSL        | 4414       |
| ANTSMRGDRQYL        | 4415       |
| ANTSSRGDRGSL        | 4416       |
| ANTSSRGDRQAL        | 4417       |
| ANTSSRGDRQYL        | 4418       |
| ANTSTRGDRAAL        | 4419       |
| ANTSTRGDRQAL        | 4420       |
| ANTSTRGDRQSL        | 4421       |
| ANTSTRGDRQYL        | 4422       |
| ANTSVRGDRAYL        | 4423       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| ANTSVRGDRGSL        | 4424       |
| ANTSVRGDRQAL        | 4425       |
| ANTSVRGDRQSL        | 4426       |
| ANTSVRGDRQYL        | 4427       |
| ANYPHRGDRGAL        | 4428       |
| ANYSARGDRAAL        | 4429       |
| ANYSARGDRASL        | 4430       |
| ANYSARGDRGAL        | 4431       |
| ANYSARGDRGSL        | 4432       |
| ANYSARGDRQAL        | 4433       |
| ANYSARGDRQSL        | 4434       |
| ANYSRGDRAAL         | 4435       |
| ANYSRGDRASL         | 4436       |
| ANYSRGDRGAL         | 4437       |
| ANYSRGDRGSL         | 4438       |
| ANYSRGDRQAL         | 4439       |
| ANYSRGDRQSL         | 4440       |
| ANYSRGDRQYL         | 4441       |
| ANYSMRGDRAAL        | 4442       |
| ANYSMRGDRASL        | 4443       |
| ANYSMRGDRAYL        | 4444       |
| ANYSMRGDRQAL        | 4445       |
| ANYSMRGDRQSL        | 4446       |
| ANYSSRGDRGAL        | 4447       |
| ANYSSRGDRGSL        | 4448       |
| ANYSSRGDRQAL        | 4449       |
| ANYSSRGDRQSL        | 4450       |
| ANYSSRGDRQYL        | 4451       |
| ANYSTRGDRQAL        | 4452       |
| ANYSTRGDRQSL        | 4453       |
| ANYSTRGDRQYL        | 4454       |
| ANYSVRGDRQAL        | 4455       |
| ANYSVRGDRQSL        | 4456       |
| ANYSVRGDRQYL        | 4457       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| FNSGMRGDRGAL        | 4458       |
| GNSGMRGDRGAL        | 4459       |
| HNSGMRGDRGAL        | 4460       |
| LNASARGDRAAL        | 4461       |
| LNASARGDRASL        | 4462       |
| LNASARGDRAYL        | 4463       |
| LNASARGDRGAL        | 4464       |
| LNASARGDRGSL        | 4465       |
| LNASARGDRGYL        | 4466       |
| LNASARGDRQAL        | 4467       |
| LNASARGDRQSL        | 4468       |
| LNASARGDRQYL        | 4469       |
| LNASRGDRAAL         | 4470       |
| LNASRGDRASL         | 4471       |
| LNASRGDRAYL         | 4472       |
| LNASRGDRGAL         | 4473       |
| LNASRGDRGSL         | 4474       |
| LNASRGDRGYL         | 4475       |
| LNASRGDRQAL         | 4476       |
| LNASRGDRQSL         | 4477       |
| LNASRGDRQYL         | 4478       |
| LNASIRGDRQLL        | 4479       |
| LNASMRGDRAAL        | 4480       |
| LNASMRGDRASL        | 4481       |
| LNASMRGDRAYL        | 4482       |
| LNASMRGDRGAL        | 4483       |
| LNASMRGDRGSL        | 4484       |
| LNASMRGDRGYL        | 4485       |
| LNASMRGDRQAL        | 4486       |
| LNASMRGDRQSL        | 4487       |
| LNASMRGDRQYL        | 4488       |
| LNASSRGDRAAL        | 4489       |
| LNASSRGDRASL        | 4490       |
| LNASSRGDRGAL        | 4491       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNASSRGDRGSL        | 4492       |
| LNASSRGDRQAL        | 4493       |
| LNASSRGDRQSL        | 4494       |
| LNASSRGDRQYL        | 4495       |
| LNASTRGDRAAL        | 4496       |
| LNASTRGDRASL        | 4497       |
| LNASTRGDRGAL        | 4498       |
| LNASTRGDRGSL        | 4499       |
| LNASTRGDRGYL        | 4500       |
| LNASTRGDRQAL        | 4501       |
| LNASTRGDRQSL        | 4502       |
| LNASTRGDRQYL        | 4503       |
| LNASVRGDRAAL        | 4504       |
| LNASVRGDRASL        | 4505       |
| LNASVRGDRGAL        | 4506       |
| LNASVRGDRGSL        | 4507       |
| LNASVRGDRQAL        | 4508       |
| LNASVRGDRQSL        | 4509       |
| LNASVRGDRQYL        | 4510       |
| LNGNFRGDRQNL        | 4511       |
| LNGNVRGDRGML        | 4512       |
| LNGSARGDRAAL        | 4513       |
| LNGSARGDRAYL        | 4514       |
| LNGSARGDRGSL        | 4515       |
| LNGSARGDRGYL        | 4516       |
| LNGSARGDRQAL        | 4517       |
| LNGSARGDRQSL        | 4518       |
| LNGSARGDRQYL        | 4519       |
| LNGSGRGDRAAL        | 4520       |
| LNGSGRGDRAYL        | 4521       |
| LNGSGRGDRGAL        | 4522       |
| LNGSGRGDRGSL        | 4523       |
| LNGSGRGDRGYL        | 4524       |
| LNGSGRGDRQAL        | 4525       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNGSGRGDRQYL        | 4526       |
| LNGSMRGDRASL        | 4527       |
| LNGSMRGDRGYL        | 4528       |
| LNGSMRGDRQAL        | 4529       |
| LNGSMRGDRQSL        | 4530       |
| LNGSMRGDRQYL        | 4531       |
| LNGSSRGDRAAL        | 4532       |
| LNGSSRGDRAYL        | 4533       |
| LNGSSRGDRGAL        | 4534       |
| LNGSSRGDRQYL        | 4535       |
| LNGSTRGDRAAL        | 4536       |
| LNGSTRGDRASL        | 4537       |
| LNGSTRGDRAYL        | 4538       |
| LNGSTRGDRGAL        | 4539       |
| LNGSTRGDRGSL        | 4540       |
| LNGSTRGDRGYL        | 4541       |
| LNGSTRGDRQAL        | 4542       |
| LNGSTRGDRQSL        | 4543       |
| LNGSTRGDRQYL        | 4544       |
| LNGSVRGDRASL        | 4545       |
| LNGSVRGDRAYL        | 4546       |
| LNGSVRGDRGYL        | 4547       |
| LNGSVRGDRQAL        | 4548       |
| LNGSVRGDRQSL        | 4549       |
| LNGSVRGDRQYL        | 4550       |
| LNSSMRGDRGAL        | 4551       |
| LNSSARGDRASL        | 4552       |
| LNSSARGDRAYL        | 4553       |
| LNSSARGDRGAL        | 4554       |
| LNSSARGDRGIL        | 4555       |
| LNSSARGDRGSL        | 4556       |
| LNSSARGDRGYL        | 4557       |
| LNSSARGDRQAL        | 4558       |
| LNSSARGDRQSL        | 4559       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNSSARGDRQYL        | 4560       |
| LNSSSGRGDRAAL       | 4561       |
| LNSSSGRGDRASL       | 4562       |
| LNSSSGRGDRAYL       | 4563       |
| LNSSSGRGDRGAL       | 4564       |
| LNSSSGRGDRGSL       | 4565       |
| LNSSSGRGDRGYL       | 4566       |
| LNSSSGRGDRQAL       | 4567       |
| LNSSSGRGDRQSL       | 4568       |
| LNSSSGRGDRQYL       | 4569       |
| LNSSMRGDRAAL        | 4570       |
| LNSSMRGDRASL        | 4571       |
| LNSSMRGDRAYL        | 4572       |
| LNSSMRGDRGAL        | 4573       |
| LNSSMRGDRGSL        | 4574       |
| LNSSMRGDRQAL        | 4575       |
| LNSSMRGDRQSL        | 4576       |
| LNSSMRGDRQYL        | 4577       |
| LNSSSRGDRAAL        | 4578       |
| LNSSSRGDRGAL        | 4579       |
| LNSSSRGDRGSL        | 4580       |
| LNSSSRGDRQAL        | 4581       |
| LNSSSRGDRQSL        | 4582       |
| LNSSSRGDRQYL        | 4583       |
| LNSSTRGDRAAL        | 4584       |
| LNSSTRGDRASL        | 4585       |
| LNSSTRGDRGAL        | 4586       |
| LNSSTRGDRGSL        | 4587       |
| LNSSTRGDRQAL        | 4588       |
| LNSSTRGDRQSL        | 4589       |
| LNSSTRGDRQYL        | 4590       |
| LNSSVRGDRAAL        | 4591       |
| LNSSVRGDRASL        | 4592       |
| LNSSVRGDRGAL        | 4593       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNSSVRGDRGSL        | 4594       |
| LNSSVRGDRGYL        | 4595       |
| LNSSVRGDRQAL        | 4596       |
| LNSSVRGDRQSL        | 4597       |
| LNSSVRGDRQYL        | 4598       |
| LNTSARGDRAAL        | 4599       |
| LNTSARGDRASL        | 4600       |
| LNTSARGDRAYL        | 4601       |
| LNTSARGDRGAL        | 4602       |
| LNTSARGDRGSL        | 4603       |
| LNTSARGDRGYL        | 4604       |
| LNTSARGDRQAL        | 4605       |
| LNTSARGDRQSL        | 4606       |
| LNTSARGDRQYL        | 4607       |
| LNTSGRGDRAAL        | 4608       |
| LNTSGRGDRASL        | 4609       |
| LNTSGRGDRAYL        | 4610       |
| LNTSGRGDRGAL        | 4611       |
| LNTSGRGDRGSL        | 4612       |
| LNTSGRGDRGYL        | 4613       |
| LNTSGRGDRQAL        | 4614       |
| LNTSGRGDRQSL        | 4615       |
| LNTSGRGDRQYL        | 4616       |
| LNTSMRGDRAAL        | 4617       |
| LNTSMRGDRASL        | 4618       |
| LNTSMRGDRAYL        | 4619       |
| LNTSMRGDRGAL        | 4620       |
| LNTSMRGDRGSL        | 4621       |
| LNTSMRGDRQAL        | 4622       |
| LNTSMRGDRQSL        | 4623       |
| LNTSMRGDRQYL        | 4624       |
| LNTSSRGDRAAL        | 4625       |
| LNTSSRGDRGSL        | 4626       |
| LNTSSRGDRQAL        | 4627       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNTSSRGDRQSL        | 4628       |
| LNTSSRGDRQYL        | 4629       |
| LNTSTRGDRAAL        | 4630       |
| LNTSTRGDRASL        | 4631       |
| LNTSTRGDRGAL        | 4632       |
| LNTSTRGDRGSL        | 4633       |
| LNTSTRGDRQAL        | 4634       |
| LNTSTRGDRQSL        | 4635       |
| LNTSTRGDRQYL        | 4636       |
| LNTSVRGDRAAL        | 4637       |
| LNTSVRGDRASL        | 4638       |
| LNTSVRGDRAYL        | 4639       |
| LNTSVRGDRGAL        | 4640       |
| LNTSVRGDRGSL        | 4641       |
| LNTSVRGDRQAL        | 4642       |
| LNTSVRGDRQSL        | 4643       |
| LNYPHRGDRGAL        | 4644       |
| LNYSARGDRGAL        | 4645       |
| LNYSARGDRGSL        | 4646       |
| LNYSARGDRQAL        | 4647       |
| LNYSARGDRQSL        | 4648       |
| LNYSARGDRQYL        | 4649       |
| LNYSRGDRAAL         | 4650       |
| LNYSRGDRASL         | 4651       |
| LNYSRGDRGAL         | 4652       |
| LNYSRGDRGSL         | 4653       |
| LNYSRGDRQAL         | 4654       |
| LNYSRGDRQSL         | 4655       |
| LNYSRGDRQYL         | 4656       |
| LNYSMRGDRQAL        | 4657       |
| LNYSMRGDRQSL        | 4658       |
| LNYSRGDRGAL         | 4659       |
| LNYSRGDRGSL         | 4660       |
| LNYSRGDRQAL         | 4661       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| LNYSRGDRQSL         | 4662       |
| LNYSRGDRQYL         | 4663       |
| LNYSRGDRASL         | 4664       |
| LNYSRGDRGAL         | 4665       |
| LNYSRGDRGSL         | 4666       |
| LNYSRGDRQAL         | 4667       |
| LNYSRGDRQSL         | 4668       |
| LNYSRGDRQYL         | 4669       |
| LNYSVRGDRQAL        | 4670       |
| LNYSVRGDRQSL        | 4671       |
| MNASARGDRAAL        | 4672       |
| MNASARGDRAYL        | 4673       |
| MNASARGDRGSL        | 4674       |
| MNASARGDRGYL        | 4675       |
| MNASARGDRQAL        | 4676       |
| MNASARGDRQSL        | 4677       |
| MNASARGDRQYL        | 4678       |
| MNASRGDRAAL         | 4679       |
| MNASRGDRASL         | 4680       |
| MNASRGDRAYL         | 4681       |
| MNASRGDRGSL         | 4682       |
| MNASRGDRQAL         | 4683       |
| MNASRGDRQSL         | 4684       |
| MNASRGDRQYL         | 4685       |
| MNASIRGDRQLL        | 4686       |
| MNASMRGDRAAL        | 4687       |
| MNASMRGDRAYL        | 4688       |
| MNASMRGDRGAL        | 4689       |
| MNASMRGDRQAL        | 4690       |
| MNASMRGDRQSL        | 4691       |
| MNASSRGDRAAL        | 4692       |
| MNASTRGDRAAL        | 4693       |
| MNASTRGDRASL        | 4694       |
| MNASTRGDRAYL        | 4695       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| MNASTRGDRGAL        | 4696       |
| MNASTRGDRGSL        | 4697       |
| MNASTRGDRQAL        | 4698       |
| MNASTRGDRQSL        | 4699       |
| MNASTRGDRQYL        | 4700       |
| MNASVRGDRAAL        | 4701       |
| MNASVRGDRASL        | 4702       |
| MNASVRGDRAAYL       | 4703       |
| MNASVRGDRQAL        | 4704       |
| MNASVRGDRQSL        | 4705       |
| MNASVRGDRQYL        | 4706       |
| MNGNFRGDRQNL        | 4707       |
| MNGSARGDRAAYL       | 4708       |
| MNGSARGDRGYL        | 4709       |
| MNGSARGDRQAL        | 4710       |
| MNGSARGDRQSL        | 4711       |
| MNGSARGDRQYL        | 4712       |
| MNGSGRGDRAAL        | 4713       |
| MNGSGRGDRAAYL       | 4714       |
| MNGSGRGDRGAL        | 4715       |
| MNGSGRGDRGSL        | 4716       |
| MNGSGRGDRGYL        | 4717       |
| MNGSGRGDRQAL        | 4718       |
| MNGSGRGDRQSL        | 4719       |
| MNGSGRGDRQYL        | 4720       |
| MNGSMRGDRQAL        | 4721       |
| MNGSMRGDRQSL        | 4722       |
| MNGSMRGDRQYL        | 4723       |
| MNGSSRGDRQYL        | 4724       |
| MNGSTRGDRAAYL       | 4725       |
| MNGSTRGDRGAL        | 4726       |
| MNGSTRGDRGYL        | 4727       |
| MNGSTRGDRQAL        | 4728       |
| MNGSTRGDRQSL        | 4729       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| MNGSTRGDRQYL        | 4730       |
| MNGSVRGDRGYL        | 4731       |
| MNGSVRGDRQAL        | 4732       |
| MNGSVRGDRQYL        | 4733       |
| MNSGMRGDRGAL        | 4734       |
| MNSSARGDRAAL        | 4735       |
| MNSSARGDRAAYL       | 4736       |
| MNSSARGDRGSL        | 4737       |
| MNSSARGDRGYL        | 4738       |
| MNSSARGDRQAL        | 4739       |
| MNSSARGDRQSL        | 4740       |
| MNSSARGDRQYL        | 4741       |
| MNSSGRGDRAAL        | 4742       |
| MNSSGRGDRAAYL       | 4743       |
| MNSSGRGDRAAYL       | 4744       |
| MNSSGRGDRGAL        | 4745       |
| MNSSGRGDRGSL        | 4746       |
| MNSSGRGDRQAL        | 4747       |
| MNSSGRGDRQSL        | 4748       |
| MNSSGRGDRQYL        | 4749       |
| MNSSMRGDRAAL        | 4750       |
| MNSSMRGDRAAYL       | 4751       |
| MNSSMRGDRGSL        | 4752       |
| MNSSMRGDRQAL        | 4753       |
| MNSSMRGDRQAL        | 4754       |
| MNSSMRGDRQSL        | 4755       |
| MNSSMRGDRQYL        | 4756       |
| MNSSSRGDRAAL        | 4757       |
| MNSSTRGDRAAL        | 4758       |
| MNSSTRGDRAAYL       | 4759       |
| MNSSTRGDRQAL        | 4760       |
| MNSSTRGDRQSL        | 4761       |
| MNSSTRGDRQYL        | 4762       |
| MNSSVRGDRAAL        | 4763       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| MNSSVRGDRAAYL       | 4764       |
| MNSSVRGDRQAL        | 4765       |
| MNSSVRGDRQSL        | 4766       |
| MNSSVRGDRQYL        | 4767       |
| MNTSARGDRAAYL       | 4768       |
| MNTSGRGDRAAL        | 4769       |
| MNTSGRGDRQAL        | 4770       |
| MNTSGRGDRQYL        | 4771       |
| MNTSMRGDRAAYL       | 4772       |
| MNTSTRGDRQYL        | 4773       |
| MNYPHRGDRGAL        | 4774       |
| MNYSARGDRAAL        | 4775       |
| MNYSARGDRGYL        | 4776       |
| MNYSARGDRQAL        | 4777       |
| MNYSARGDRQSL        | 4778       |
| MNYSARGDRAAL        | 4779       |
| MNYSRGGDRAAYL       | 4780       |
| MNYSRGGDRAAYL       | 4781       |
| MNYSRGGDRAAYL       | 4782       |
| MNYSRGGDRAAYL       | 4783       |
| MNYSRGGDRAAYL       | 4784       |
| MNYSRGGDRAAYL       | 4785       |
| MNYSRGGDRAAYL       | 4786       |
| MNYSRGGDRAAYL       | 4787       |
| MNYSRGGDRAAYL       | 4788       |
| MNYSRGGDRAAYL       | 4789       |
| MNYSRGGDRAAYL       | 4790       |
| MNYSRGGDRAAYL       | 4791       |
| MNYSRGGDRAAYL       | 4792       |
| MNYSRGGDRAAYL       | 4793       |
| MNYSRGGDRAAYL       | 4794       |
| MNYSRGGDRAAYL       | 4795       |
| MNYSRGGDRAAYL       | 4796       |
| MNYSRGGDRAAYL       | 4797       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNASARGDRQSL        | 4798       |
| SNASARGDRQYL        | 4799       |
| SNASGRGDRAAL        | 4800       |
| SNASGRGDRASL        | 4801       |
| SNASGRGDRAYL        | 4802       |
| SNASGRGDRGAL        | 4803       |
| SNASGRGDRGSL        | 4804       |
| SNASGRGDRGYL        | 4805       |
| SNASGRGDRQAL        | 4806       |
| SNASGRGDRQSL        | 4807       |
| SNASGRGDRQYL        | 4808       |
| SNASIRGDRQLL        | 4809       |
| SNASMRGDRAAL        | 4810       |
| SNASMRGDRASL        | 4811       |
| SNASMRGDRGAL        | 4812       |
| SNASMRGDRGSL        | 4813       |
| SNASMRGDRQAL        | 4814       |
| SNASMRGDRQSL        | 4815       |
| SNASSRGDRAAL        | 4816       |
| SNASSRGDRASL        | 4817       |
| SNASSRGDRAYL        | 4818       |
| SNASSRGDRGAL        | 4819       |
| SNASSRGDRGSL        | 4820       |
| SNASSRGDRQAL        | 4821       |
| SNASSRGDRQSL        | 4822       |
| SNASSRGDRQYL        | 4823       |
| SNASTRGDRAAL        | 4824       |
| SNASTRGDRASL        | 4825       |
| SNASTRGDRAYL        | 4826       |
| SNASTRGDRGAL        | 4827       |
| SNASTRGDRGSL        | 4828       |
| SNASTRGDRGYL        | 4829       |
| SNASTRGDRQAL        | 4830       |
| SNASTRGDRQSL        | 4831       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNASTRGDRQYL        | 4832       |
| SNASVRGDRAAL        | 4833       |
| SNASVRGDRASL        | 4834       |
| SNASVRGDRAYL        | 4835       |
| SNASVRGDRGSL        | 4836       |
| SNASVRGDRGYL        | 4837       |
| SNASVRGDRQAL        | 4838       |
| SNASVRGDRQSL        | 4839       |
| SNASVRGDRQYL        | 4840       |
| SNGNFRGDRQNL        | 4841       |
| SNGNVRGDRGML        | 4842       |
| SNGSARGDRGYL        | 4843       |
| SNGSARGDRQAL        | 4844       |
| SNGSARGDRQSL        | 4845       |
| SNGSARGDRQYL        | 4846       |
| SNGSGRGDRASL        | 4847       |
| SNGSGRGDRAYL        | 4848       |
| SNGSGRGDRGAL        | 4849       |
| SNGSGRGDRGSL        | 4850       |
| SNGSGRGDRGYL        | 4851       |
| SNGSGRGDRQAL        | 4852       |
| SNGSGRGDRQSL        | 4853       |
| SNGSGRGDRQYL        | 4854       |
| SNGSMRGDRAYL        | 4855       |
| SNGSMRGDRGYL        | 4856       |
| SNGSMRGDRQAL        | 4857       |
| SNGSMRGDRQSL        | 4858       |
| SNGSMRGDRQYL        | 4859       |
| SNGSSRGDRGYL        | 4860       |
| SNGSSRGDRQYL        | 4861       |
| SNGSTRGDRAAL        | 4862       |
| SNGSTRGDRASL        | 4863       |
| SNGSTRGDRGAL        | 4864       |
| SNGSTRGDRGYL        | 4865       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNGSTRGDRQAL        | 4866       |
| SNGSTRGDRQSL        | 4867       |
| SNGSTRGDRQYL        | 4868       |
| SNGSVRGDRGYL        | 4869       |
| SNGSVRGDRQAL        | 4870       |
| SNGSVRGDRQSL        | 4871       |
| SNGSVRGDRQYL        | 4872       |
| SNSGMRGDRGAL        | 4873       |
| SNSSARGDRAYL        | 4874       |
| SNSSARGDRGAL        | 4875       |
| SNSSARGDRGIL        | 4876       |
| SNSSARGDRGSL        | 4877       |
| SNSSARGDRGYL        | 4878       |
| SNSSARGDRQAL        | 4879       |
| SNSSARGDRQSL        | 4880       |
| SNSSARGDRQYL        | 4881       |
| SNSSRGDRAAL         | 4882       |
| SNSSRGDRAYL         | 4883       |
| SNSSRGDRGAL         | 4884       |
| SNSSRGDRGSL         | 4885       |
| SNSSRGDRGYL         | 4886       |
| SNSSRGDRQAL         | 4887       |
| SNSSRGDRQSL         | 4888       |
| SNSSRGDRQYL         | 4889       |
| SNSSMRGDRAAL        | 4890       |
| SNSSMRGDRASL        | 4891       |
| SNSSMRGDRAYL        | 4892       |
| SNSSMRGDRGSL        | 4893       |
| SNSSMRGDRQAL        | 4894       |
| SNSSMRGDRQSL        | 4895       |
| SNSSMRGDRQYL        | 4896       |
| SNSSSRGDRAAL        | 4897       |
| SNSSSRGDRGSL        | 4898       |
| SNSSSRGDRQAL        | 4899       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNSSSRGDRQSL        | 4900       |
| SNSSSRGDRQYL        | 4901       |
| SNSSTRGDRAAL        | 4902       |
| SNSSTRGDRASL        | 4903       |
| SNSSTRGDRGSL        | 4904       |
| SNSSTRGDRGYL        | 4905       |
| SNSSTRGDRQAL        | 4906       |
| SNSSTRGDRQSL        | 4907       |
| SNSSTRGDRQYL        | 4908       |
| SNSSVRGDRQAL        | 4909       |
| SNSSVRGDRQSL        | 4910       |
| SNSSVRGDRQYL        | 4911       |
| SNTSARGDRAAL        | 4912       |
| SNTSARGDRGAL        | 4913       |
| SNTSARGDRGSL        | 4914       |
| SNTSARGDRGYL        | 4915       |
| SNTSARGDRQAL        | 4916       |
| SNTSARGDRQSL        | 4917       |
| SNTSARGDRQYL        | 4918       |
| SNTSGRGDRAAL        | 4919       |
| SNTSGRGDRASL        | 4920       |
| SNTSGRGDRGAL        | 4921       |
| SNTSGRGDRGSL        | 4922       |
| SNTSGRGDRGYL        | 4923       |
| SNTSGRGDRQAL        | 4924       |
| SNTSGRGDRQSL        | 4925       |
| SNTSGRGDRQYL        | 4926       |
| SNTSMRGDRAYL        | 4927       |
| SNTSMRGDRGSL        | 4928       |
| SNTSMRGDRQAL        | 4929       |
| SNTSMRGDRQSL        | 4930       |
| SNTSSRGDRQAL        | 4931       |
| SNTSTRGDRQAL        | 4932       |
| SNTSTRGDRQSL        | 4933       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNTSTRGDRQYL        | 4934       |
| SNTSVRGDRAYL        | 4935       |
| SNTSVRGDRQAL        | 4936       |
| SNTSVRGDRQSL        | 4937       |
| SNTSVRGDRQYL        | 4938       |
| SNYPHRGDRGAL        | 4939       |
| SNYSARGDRAAL        | 4940       |
| SNYSARGDRASL        | 4941       |
| SNYSARGDRGAL        | 4942       |
| SNYSARGDRGSL        | 4943       |
| SNYSARGDRQAL        | 4944       |
| SNYSARGDRQSL        | 4945       |
| SNYSARGDRQYL        | 4946       |
| SNYSGRGDRAAL        | 4947       |
| SNYSGRGDRGAL        | 4948       |
| SNYSGRGDRGSL        | 4949       |
| SNYSGRGDRQAL        | 4950       |
| SNYSGRGDRQSL        | 4951       |
| SNYSMRGDRAAL        | 4952       |
| SNYSMRGDRASL        | 4953       |
| SNYSMRGDRGSL        | 4954       |
| SNYSMRGDRQAL        | 4955       |
| SNYSMRGDRQSL        | 4956       |
| SNYSSRGDRGAL        | 4957       |
| SNYSSRGDRGSL        | 4958       |
| SNYSSRGDRQAL        | 4959       |
| SNYSSRGDRQSL        | 4960       |
| SNYSTRGDRAAL        | 4961       |
| SNYSTRGDRGAL        | 4962       |
| SNYSTRGDRGSL        | 4963       |
| SNYSTRGDRQAL        | 4964       |
| SNYSTRGDRQSL        | 4965       |
| SNYSTRGDRQYL        | 4966       |
| SNYSVRGDRQAL        | 4967       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| SNYSVRGDRQSL        | 4968       |
| SNYSVRGDRQYL        | 4969       |
| TNSGMRGDRGAL        | 4970       |
| VNASARGDRAAL        | 4971       |
| VNASARGDRGAL        | 4972       |
| VNASARGDRGSL        | 4973       |
| VNASARGDRGYL        | 4974       |
| VNASARGDRQAL        | 4975       |
| VNASARGDRQYL        | 4976       |
| VNASGRGDRAAL        | 4977       |
| VNASGRGDRA YL       | 4978       |
| VNASGRGDRGAL        | 4979       |
| VNASGRGDRGSL        | 4980       |
| VNASGRGDRGYL        | 4981       |
| VNASGRGDRQAL        | 4982       |
| VNASGRGDRQYL        | 4983       |
| VNASMRGDRA YL       | 4984       |
| VNASMRGDRQAL        | 4985       |
| VNASMRGDRQSL        | 4986       |
| VNASSRGDRGSL        | 4987       |
| VNASSRGDRQAL        | 4988       |
| VNASSRGDRQYL        | 4989       |
| VNASTRGDRAAL        | 4990       |
| VNASTRGDRGAL        | 4991       |
| VNASTRGDRGSL        | 4992       |
| VNASTRGDRGYL        | 4993       |
| VNASTRGDRQAL        | 4994       |
| VNASTRGDRQSL        | 4995       |
| VNASTRGDRQYL        | 4996       |
| VNASVRGDRGSL        | 4997       |
| VNASVRGDRGYL        | 4998       |
| VNASVRGDRQAL        | 4999       |
| VNASVRGDRQSL        | 5000       |
| VNASVRGDRQYL        | 5001       |



| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| VNGNFRGDRQNL        | 5002       |
| VNGNVRGDRGML        | 5003       |
| VNGSARGDRAYL        | 5004       |
| VNGSARGDRGAL        | 5005       |
| VNGSARGDRGSL        | 5006       |
| VNGSARGDRGYL        | 5007       |
| VNGSARGDRQAL        | 5008       |
| VNGSARGDRQSL        | 5009       |
| VNGSARGDRQYL        | 5010       |
| VNGSGRGDRAAL        | 5011       |
| VNGSGRGDRASL        | 5012       |
| VNGSGRGDRAYL        | 5013       |
| VNGSGRGDRGAL        | 5014       |
| VNGSGRGDRGSL        | 5015       |
| VNGSGRGDRGYL        | 5016       |
| VNGSGRGDRQAL        | 5017       |
| VNGSGRGDRQSL        | 5018       |
| VNGSGRGDRQYL        | 5019       |
| VNGSMRGDRGYL        | 5020       |
| VNGSMRGDRQAL        | 5021       |
| VNGSMRGDRQSL        | 5022       |
| VNGSMRGDRQYL        | 5023       |
| VNGSSRGDRAYL        | 5024       |
| VNGSSRGDRGAL        | 5025       |
| VNGSSRGDRGSL        | 5026       |
| VNGSSRGDRQAL        | 5027       |
| VNGSSRGDRQSL        | 5028       |
| VNGSSRGDRQYL        | 5029       |
| VNGSTRGDRAAL        | 5030       |
| VNGSTRGDRAYL        | 5031       |
| VNGSTRGDRGAL        | 5032       |
| VNGSTRGDRGYL        | 5033       |
| VNGSTRGDRQAL        | 5034       |
| VNGSTRGDRQSL        | 5035       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| VNGSTRGDRQYL        | 5036       |
| VNGSVRGDRAYL        | 5037       |
| VNGSVRGDRQAL        | 5038       |
| VNGSVRGDRQSL        | 5039       |
| VNGSVRGDRQYL        | 5040       |
| VNSGMRGDRGAL        | 5041       |
| VNSSARGDRGAL        | 5042       |
| VNSSARGDRGSL        | 5043       |
| VNSSARGDRGYL        | 5044       |
| VNSSARGDRQAL        | 5045       |
| VNSSARGDRQSL        | 5046       |
| VNSSARGDRQYL        | 5047       |
| VNSSRGDRAAL         | 5048       |
| VNSSRGDRAYL         | 5049       |
| VNSSRGDRGAL         | 5050       |
| VNSSRGDRQAL         | 5051       |
| VNSSRGDRQSL         | 5052       |
| VNSSRGDRQYL         | 5053       |
| VNSSMRGDRAYL        | 5054       |
| VNSSMRGDRQAL        | 5055       |
| VNSSMRGDRQSL        | 5056       |
| VNSSMRGDRQYL        | 5057       |
| VNSSSRGDRGSL        | 5058       |
| VNSSSRGDRQAL        | 5059       |
| VNSSSRGDRQSL        | 5060       |
| VNSSTRGDRGAL        | 5061       |
| VNSSTRGDRQAL        | 5062       |
| VNSSTRGDRQSL        | 5063       |
| VNSSTRGDRQYL        | 5064       |
| VNSSVRGDRAYL        | 5065       |
| VNSSVRGDRQAL        | 5066       |
| VNSSVRGDRQSL        | 5067       |
| VNTSARGDRAYL        | 5068       |
| VNTSGRGDRAAL        | 5069       |

| Amino Acid Sequence | SEQ ID NO: |
|---------------------|------------|
| VNTSGRGDRGAL        | 5070       |
| VNTSGRGDRGSL        | 5071       |
| VNTSGRGDRGYL        | 5072       |
| VNTSGRGDRQAL        | 5073       |
| VNTSGRGDRQSL        | 5074       |
| VNTSGRGDRQYL        | 5075       |
| VNTSTRGDRAYL        | 5076       |
| VNYPHRGDRGAL        | 5077       |
| VNYSARGDRGAL        | 5078       |
| VNYSARGDRGSL        | 5079       |
| VNYSARGDRQAL        | 5080       |
| VNYSARGDRQSL        | 5081       |
| VNYSRGDRAAL         | 5082       |
| VNYSRGDRGAL         | 5083       |
| VNYSRGDRQAL         | 5084       |
| VNYSRGDRQSL         | 5085       |
| VNYSRGDRQYL         | 5086       |
| VNYSSRGDRGSL        | 5087       |
| VNYSSRGDRGYL        | 5088       |

*Table 5b: Split Amino Acid Sequences from  
Table 5a*

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| ANASA                     | 5089             | RGDRAAL     | 5888             |
| ANASA                     | 5090             | RGDRGSL     | 5889             |
| ANASA                     | 5091             | RGDRGYL     | 5890             |
| ANASA                     | 5092             | RGDRQAL     | 5891             |
| ANASA                     | 5093             | RGDRQSL     | 5892             |
| ANASA                     | 5094             | RGDRQYL     | 5893             |
| ANASG                     | 5095             | RGDRAAL     | 5894             |
| ANASG                     | 5096             | RGDRASL     | 5895             |
| ANASG                     | 5097             | RGDRAYL     | 5896             |
| ANASG                     | 5098             | RGDRGAL     | 5897             |
| ANASG                     | 5099             | RGDRGSL     | 5898             |
| ANASG                     | 5100             | RGDRGYL     | 5899             |
| ANASG                     | 5101             | RGDRQAL     | 5900             |
| ANASG                     | 5102             | RGDRQSL     | 5901             |
| ANASG                     | 5103             | RGDRQYL     | 5902             |
| ANASM                     | 5104             | RGDRAAL     | 5903             |
| ANASM                     | 5105             | RGDRASL     | 5904             |
| ANASM                     | 5106             | RGDRAYL     | 5905             |
| ANASM                     | 5107             | RGDRQAL     | 5906             |
| ANASM                     | 5108             | RGDRQSL     | 5907             |
| ANASS                     | 5109             | RGDRGSL     | 5908             |
| ANASS                     | 5110             | RGDRGYL     | 5909             |
| ANASS                     | 5111             | RGDRQAL     | 5910             |
| ANASS                     | 5112             | RGDRQSL     | 5911             |
| ANASS                     | 5113             | RGDRQYL     | 5912             |
| ANAST                     | 5114             | RGDRASL     | 5913             |
| ANAST                     | 5115             | RGDRAYL     | 5914             |
| ANAST                     | 5116             | RGDRGAL     | 5915             |
| ANAST                     | 5117             | RGDRGSL     | 5916             |
| ANAST                     | 5118             | RGDRGYL     | 5917             |
| ANAST                     | 5119             | RGDRQAL     | 5918             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| ANAST                     | 5120             | RGDRQSL     | 5919             |
| ANAST                     | 5121             | RGDRQYL     | 5920             |
| ANASV                     | 5122             | RGDRASL     | 5921             |
| ANASV                     | 5123             | RGDRGYL     | 5922             |
| ANASV                     | 5124             | RGDRQAL     | 5923             |
| ANASV                     | 5125             | RGDRQSL     | 5924             |
| ANASV                     | 5126             | RGDRQYL     | 5925             |
| ANGNF                     | 5127             | RGDRQNL     | 5926             |
| ANGNV                     | 5128             | RGDRGML     | 5927             |
| ANGSA                     | 5129             | RGDRAYL     | 5928             |
| ANGSA                     | 5130             | RGDRGSL     | 5929             |
| ANGSA                     | 5131             | RGDRGYL     | 5930             |
| ANGSA                     | 5132             | RGDRQAL     | 5931             |
| ANGSA                     | 5133             | RGDRQYL     | 5932             |
| ANGSG                     | 5134             | RGDRAAL     | 5933             |
| ANGSG                     | 5135             | RGDRAYL     | 5934             |
| ANGSG                     | 5136             | RGDRGAL     | 5935             |
| ANGSG                     | 5137             | RGDRGSL     | 5936             |
| ANGSG                     | 5138             | RGDRGYL     | 5937             |
| ANGSG                     | 5139             | RGDRQAL     | 5938             |
| ANGSG                     | 5140             | RGDRQSL     | 5939             |
| ANGSG                     | 5141             | RGDRQYL     | 5940             |
| ANGSM                     | 5142             | RGDRGYL     | 5941             |
| ANGSM                     | 5143             | RGDRQAL     | 5942             |
| ANGSM                     | 5144             | RGDRQSL     | 5943             |
| ANGSM                     | 5145             | RGDRQYL     | 5944             |
| ANGSS                     | 5146             | RGDRAYL     | 5945             |
| ANGSS                     | 5147             | RGDRGSL     | 5946             |
| ANGSS                     | 5148             | RGDRGYL     | 5947             |
| ANGSS                     | 5149             | RGDRQAL     | 5948             |
| ANGSS                     | 5150             | RGDRQSL     | 5949             |
| ANGSS                     | 5151             | RGDRQYL     | 5950             |
| ANGST                     | 5152             | RGDRAAL     | 5951             |
| ANGST                     | 5153             | RGDRAYL     | 5952             |

| 5 aa subs-titution | SEQ ID NO: | 7 aa insert | SEQ ID NO: |
|--------------------|------------|-------------|------------|
| ANGST              | 5154       | RGDRGAL     | 5953       |
| ANGST              | 5155       | RGDRGYL     | 5954       |
| ANGST              | 5156       | RGDRQAL     | 5955       |
| ANGST              | 5157       | RGDRQSL     | 5956       |
| ANGST              | 5158       | RGDRQYL     | 5957       |
| ANGSV              | 5159       | RGDRAYL     | 5958       |
| ANGSV              | 5160       | RGDRGYL     | 5959       |
| ANGSV              | 5161       | RGDRQAL     | 5960       |
| ANGSV              | 5162       | RGDRQYL     | 5961       |
| ANSGM              | 5163       | RGDRGAL     | 5962       |
| ANSSA              | 5164       | RGDRGAL     | 5963       |
| ANSSA              | 5165       | RGDRGSL     | 5964       |
| ANSSA              | 5166       | RGDRGYL     | 5965       |
| ANSSA              | 5167       | RGDRQAL     | 5966       |
| ANSSA              | 5168       | RGDRQSL     | 5967       |
| ANSSA              | 5169       | RGDRQYL     | 5968       |
| ANSSG              | 5170       | RGDRAAL     | 5969       |
| ANSSG              | 5171       | RGDRASL     | 5970       |
| ANSSG              | 5172       | RGDRAYL     | 5971       |
| ANSSG              | 5173       | RGDRGAL     | 5972       |
| ANSSG              | 5174       | RGDRGSL     | 5973       |
| ANSSG              | 5175       | RGDRGYL     | 5974       |
| ANSSG              | 5176       | RGDRQAL     | 5975       |
| ANSSG              | 5177       | RGDRQSL     | 5976       |
| ANSSG              | 5178       | RGDRQYL     | 5977       |
| ANSSM              | 5179       | RGDRAYL     | 5978       |
| ANSSM              | 5180       | RGDRQAL     | 5979       |
| ANSSM              | 5181       | RGDRQSL     | 5980       |
| ANSSM              | 5182       | RGDRQYL     | 5981       |
| ANSSS              | 5183       | RGDRGSL     | 5982       |
| ANSSS              | 5184       | RGDRGYL     | 5983       |
| ANSSS              | 5185       | RGDRQAL     | 5984       |
| ANSSS              | 5186       | RGDRQSL     | 5985       |
| ANSSS              | 5187       | RGDRQYL     | 5986       |

| 5 aa subs-titution | SEQ ID NO: | 7 aa insert | SEQ ID NO: |
|--------------------|------------|-------------|------------|
| ANSST              | 5188       | RGDRAAL     | 5987       |
| ANSST              | 5189       | RGDRGSL     | 5988       |
| ANSST              | 5190       | RGDRQAL     | 5989       |
| ANSST              | 5191       | RGDRQSL     | 5990       |
| ANSST              | 5192       | RGDRQYL     | 5991       |
| ANSSV              | 5193       | RGDRAYL     | 5992       |
| ANSSV              | 5194       | RGDRGYL     | 5993       |
| ANSSV              | 5195       | RGDRQAL     | 5994       |
| ANSSV              | 5196       | RGDRQSL     | 5995       |
| ANSSV              | 5197       | RGDRQYL     | 5996       |
| ANTSA              | 5198       | RGDRAYL     | 5997       |
| ANTSA              | 5199       | RGDRGAL     | 5998       |
| ANTSA              | 5200       | RGDRGSL     | 5999       |
| ANTSA              | 5201       | RGDRGYL     | 6000       |
| ANTSA              | 5202       | RGDRQAL     | 6001       |
| ANTSA              | 5203       | RGDRQYL     | 6002       |
| ANTSG              | 5204       | RGDRASL     | 6003       |
| ANTSG              | 5205       | RGDRGAL     | 6004       |
| ANTSG              | 5206       | RGDRGSL     | 6005       |
| ANTSG              | 5207       | RGDRGYL     | 6006       |
| ANTSG              | 5208       | RGDRQAL     | 6007       |
| ANTSG              | 5209       | RGDRQSL     | 6008       |
| ANTSG              | 5210       | RGDRQYL     | 6009       |
| ANTSM              | 5211       | RGDRAYL     | 6010       |
| ANTSM              | 5212       | RGDRQAL     | 6011       |
| ANTSM              | 5213       | RGDRQSL     | 6012       |
| ANTSM              | 5214       | RGDRQYL     | 6013       |
| ANTSS              | 5215       | RGDRGSL     | 6014       |
| ANTSS              | 5216       | RGDRQAL     | 6015       |
| ANTSS              | 5217       | RGDRQYL     | 6016       |
| ANTST              | 5218       | RGDRAAL     | 6017       |
| ANTST              | 5219       | RGDRQAL     | 6018       |
| ANTST              | 5220       | RGDRQSL     | 6019       |
| ANTST              | 5221       | RGDRQYL     | 6020       |

| 5 aa subs-titution | SEQ ID NO: | 7 aa insert | SEQ ID NO: |
|--------------------|------------|-------------|------------|
| ANTSV              | 5222       | RGDRAYL     | 6021       |
| ANTSV              | 5223       | RGDRGSL     | 6022       |
| ANTSV              | 5224       | RGDRQAL     | 6023       |
| ANTSV              | 5225       | RGDRQSL     | 6024       |
| ANTSV              | 5226       | RGDRQYL     | 6025       |
| ANYPH              | 5227       | RGDRGAL     | 6026       |
| ANYSA              | 5228       | RGDRAAL     | 6027       |
| ANYSA              | 5229       | RGDRASL     | 6028       |
| ANYSA              | 5230       | RGDRGAL     | 6029       |
| ANYSA              | 5231       | RGDRGSL     | 6030       |
| ANYSA              | 5232       | RGDRQAL     | 6031       |
| ANYSA              | 5233       | RGDRQSL     | 6032       |
| ANYSG              | 5234       | RGDRAAL     | 6033       |
| ANYSG              | 5235       | RGDRASL     | 6034       |
| ANYSG              | 5236       | RGDRGAL     | 6035       |
| ANYSG              | 5237       | RGDRGSL     | 6036       |
| ANYSG              | 5238       | RGDRQAL     | 6037       |
| ANYSG              | 5239       | RGDRQSL     | 6038       |
| ANYSG              | 5240       | RGDRQYL     | 6039       |
| ANYSM              | 5241       | RGDRAAL     | 6040       |
| ANYSM              | 5242       | RGDRASL     | 6041       |
| ANYSM              | 5243       | RGDRAYL     | 6042       |
| ANYSM              | 5244       | RGDRQAL     | 6043       |
| ANYSM              | 5245       | RGDRQSL     | 6044       |
| ANYSS              | 5246       | RGDRGAL     | 6045       |
| ANYSS              | 5247       | RGDRGSL     | 6046       |
| ANYSS              | 5248       | RGDRQAL     | 6047       |
| ANYSS              | 5249       | RGDRQSL     | 6048       |
| ANYSS              | 5250       | RGDRQYL     | 6049       |
| ANYST              | 5251       | RGDRQAL     | 6050       |
| ANYST              | 5252       | RGDRQSL     | 6051       |
| ANYST              | 5253       | RGDRQYL     | 6052       |
| ANYSV              | 5254       | RGDRQAL     | 6053       |
| ANYSV              | 5255       | RGDRQSL     | 6054       |

| 5 aa subs-titution | SEQ ID NO: | 7 aa insert | SEQ ID NO: |
|--------------------|------------|-------------|------------|
| ANYSV              | 5256       | RGDRQYL     | 6055       |
| FNSGM              | 5257       | RGDRGAL     | 6056       |
| GNSGM              | 5258       | RGDRGAL     | 6057       |
| HNSGM              | 5259       | RGDRGAL     | 6058       |
| LNASA              | 5260       | RGDRAAL     | 6059       |
| LNASA              | 5261       | RGDRASL     | 6060       |
| LNASA              | 5262       | RGDRAYL     | 6061       |
| LNASA              | 5263       | RGDRGAL     | 6062       |
| LNASA              | 5264       | RGDRGSL     | 6063       |
| LNASA              | 5265       | RGDRGYL     | 6064       |
| LNASA              | 5266       | RGDRQAL     | 6065       |
| LNASA              | 5267       | RGDRQSL     | 6066       |
| LNASA              | 5268       | RGDRQYL     | 6067       |
| LNASG              | 5269       | RGDRAAL     | 6068       |
| LNASG              | 5270       | RGDRASL     | 6069       |
| LNASG              | 5271       | RGDRAYL     | 6070       |
| LNASG              | 5272       | RGDRGAL     | 6071       |
| LNASG              | 5273       | RGDRGSL     | 6072       |
| LNASG              | 5274       | RGDRGYL     | 6073       |
| LNASG              | 5275       | RGDRQAL     | 6074       |
| LNASG              | 5276       | RGDRQSL     | 6075       |
| LNASG              | 5277       | RGDRQYL     | 6076       |
| LNASI              | 5278       | RGDRQLL     | 6077       |
| LNASM              | 5279       | RGDRAAL     | 6078       |
| LNASM              | 5280       | RGDRASL     | 6079       |
| LNASM              | 5281       | RGDRAYL     | 6080       |
| LNASM              | 5282       | RGDRGAL     | 6081       |
| LNASM              | 5283       | RGDRGSL     | 6082       |
| LNASM              | 5284       | RGDRGYL     | 6083       |
| LNASM              | 5285       | RGDRQAL     | 6084       |
| LNASM              | 5286       | RGDRQSL     | 6085       |
| LNASM              | 5287       | RGDRQYL     | 6086       |
| LNASS              | 5288       | RGDRAAL     | 6087       |
| LNASS              | 5289       | RGDRASL     | 6088       |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNASS                     | 5290             | RGDRGAL     | 6089             |
| LNASS                     | 5291             | RGDRGSL     | 6090             |
| LNASS                     | 5292             | RGDRQAL     | 6091             |
| LNASS                     | 5293             | RGDRQSL     | 6092             |
| LNASS                     | 5294             | RGDRQYL     | 6093             |
| LNAST                     | 5295             | RGDRAAL     | 6094             |
| LNAST                     | 5296             | RGDRASL     | 6095             |
| LNAST                     | 5297             | RGDRGAL     | 6096             |
| LNAST                     | 5298             | RGDRGSL     | 6097             |
| LNAST                     | 5299             | RGDRGYL     | 6098             |
| LNAST                     | 5300             | RGDRQAL     | 6099             |
| LNAST                     | 5301             | RGDRQSL     | 6100             |
| LNAST                     | 5302             | RGDRQYL     | 6101             |
| LNASV                     | 5303             | RGDRAAL     | 6102             |
| LNASV                     | 5304             | RGDRASL     | 6103             |
| LNASV                     | 5305             | RGDRGAL     | 6104             |
| LNASV                     | 5306             | RGDRGSL     | 6105             |
| LNASV                     | 5307             | RGDRQAL     | 6106             |
| LNASV                     | 5308             | RGDRQSL     | 6107             |
| LNASV                     | 5309             | RGDRQYL     | 6108             |
| LNGNF                     | 5310             | RGDRQNL     | 6109             |
| LNGNV                     | 5311             | RGDRGML     | 6110             |
| LNGSA                     | 5312             | RGDRAAL     | 6111             |
| LNGSA                     | 5313             | RGDRAYL     | 6112             |
| LNGSA                     | 5314             | RGDRGSL     | 6113             |
| LNGSA                     | 5315             | RGDRGYL     | 6114             |
| LNGSA                     | 5316             | RGDRQAL     | 6115             |
| LNGSA                     | 5317             | RGDRQSL     | 6116             |
| LNGSA                     | 5318             | RGDRQYL     | 6117             |
| LNGSG                     | 5319             | RGDRAAL     | 6118             |
| LNGSG                     | 5320             | RGDRAYL     | 6119             |
| LNGSG                     | 5321             | RGDRGAL     | 6120             |
| LNGSG                     | 5322             | RGDRGSL     | 6121             |
| LNGSG                     | 5323             | RGDRGYL     | 6122             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNGSG                     | 5324             | RGDRQAL     | 6123             |
| LNGSG                     | 5325             | RGDRQYL     | 6124             |
| LNGSM                     | 5326             | RGDRASL     | 6125             |
| LNGSM                     | 5327             | RGDRGYL     | 6126             |
| LNGSM                     | 5328             | RGDRQAL     | 6127             |
| LNGSM                     | 5329             | RGDRQSL     | 6128             |
| LNGSM                     | 5330             | RGDRQYL     | 6129             |
| LNGSS                     | 5331             | RGDRAAL     | 6130             |
| LNGSS                     | 5332             | RGDRAYL     | 6131             |
| LNGSS                     | 5333             | RGDRGAL     | 6132             |
| LNGSS                     | 5334             | RGDRQYL     | 6133             |
| LNGST                     | 5335             | RGDRAAL     | 6134             |
| LNGST                     | 5336             | RGDRASL     | 6135             |
| LNGST                     | 5337             | RGDRAYL     | 6136             |
| LNGST                     | 5338             | RGDRGAL     | 6137             |
| LNGST                     | 5339             | RGDRGSL     | 6138             |
| LNGST                     | 5340             | RGDRGYL     | 6139             |
| LNGST                     | 5341             | RGDRQAL     | 6140             |
| LNGST                     | 5342             | RGDRQSL     | 6141             |
| LNGST                     | 5343             | RGDRQYL     | 6142             |
| LNGSV                     | 5344             | RGDRASL     | 6143             |
| LNGSV                     | 5345             | RGDRAYL     | 6144             |
| LNGSV                     | 5346             | RGDRGYL     | 6145             |
| LNGSV                     | 5347             | RGDRQAL     | 6146             |
| LNGSV                     | 5348             | RGDRQSL     | 6147             |
| LNGSV                     | 5349             | RGDRQYL     | 6148             |
| LNSGM                     | 5350             | RGDRGAL     | 6149             |
| LNSSA                     | 5351             | RGDRASL     | 6150             |
| LNSSA                     | 5352             | RGDRAYL     | 6151             |
| LNSSA                     | 5353             | RGDRGAL     | 6152             |
| LNSSA                     | 5354             | RGDRGIL     | 6153             |
| LNSSA                     | 5355             | RGDRGSL     | 6154             |
| LNSSA                     | 5356             | RGDRGYL     | 6155             |
| LNSSA                     | 5357             | RGDRQAL     | 6156             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNSSA                     | 5358             | RGDRQSL     | 6157             |
| LNSSA                     | 5359             | RGDRQYL     | 6158             |
| LNSSG                     | 5360             | RGDRAAL     | 6159             |
| LNSSG                     | 5361             | RGDRASL     | 6160             |
| LNSSG                     | 5362             | RGDRAYL     | 6161             |
| LNSSG                     | 5363             | RGDRGAL     | 6162             |
| LNSSG                     | 5364             | RGDRGSL     | 6163             |
| LNSSG                     | 5365             | RGDRGYL     | 6164             |
| LNSSG                     | 5366             | RGDRQAL     | 6165             |
| LNSSG                     | 5367             | RGDRQSL     | 6166             |
| LNSSG                     | 5368             | RGDRQYL     | 6167             |
| LNSSM                     | 5369             | RGDRAAL     | 6168             |
| LNSSM                     | 5370             | RGDRASL     | 6169             |
| LNSSM                     | 5371             | RGDRAYL     | 6170             |
| LNSSM                     | 5372             | RGDRGAL     | 6171             |
| LNSSM                     | 5373             | RGDRGSL     | 6172             |
| LNSSM                     | 5374             | RGDRQAL     | 6173             |
| LNSSM                     | 5375             | RGDRQSL     | 6174             |
| LNSSM                     | 5376             | RGDRQYL     | 6175             |
| LNSSS                     | 5377             | RGDRAAL     | 6176             |
| LNSSS                     | 5378             | RGDRGAL     | 6177             |
| LNSSS                     | 5379             | RGDRGSL     | 6178             |
| LNSSS                     | 5380             | RGDRQAL     | 6179             |
| LNSSS                     | 5381             | RGDRQSL     | 6180             |
| LNSSS                     | 5382             | RGDRQYL     | 6181             |
| LNSST                     | 5383             | RGDRAAL     | 6182             |
| LNSST                     | 5384             | RGDRASL     | 6183             |
| LNSST                     | 5385             | RGDRGAL     | 6184             |
| LNSST                     | 5386             | RGDRGSL     | 6185             |
| LNSST                     | 5387             | RGDRQAL     | 6186             |
| LNSST                     | 5388             | RGDRQSL     | 6187             |
| LNSST                     | 5389             | RGDRQYL     | 6188             |
| LNSSV                     | 5390             | RGDRAAL     | 6189             |
| LNSSV                     | 5391             | RGDRASL     | 6190             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNSSV                     | 5392             | RGDRGAL     | 6191             |
| LNSSV                     | 5393             | RGDRGSL     | 6192             |
| LNSSV                     | 5394             | RGDRGYL     | 6193             |
| LNSSV                     | 5395             | RGDRQAL     | 6194             |
| LNSSV                     | 5396             | RGDRQSL     | 6195             |
| LNSSV                     | 5397             | RGDRQYL     | 6196             |
| LNTSA                     | 5398             | RGDRAAL     | 6197             |
| LNTSA                     | 5399             | RGDRASL     | 6198             |
| LNTSA                     | 5400             | RGDRAYL     | 6199             |
| LNTSA                     | 5401             | RGDRGAL     | 6200             |
| LNTSA                     | 5402             | RGDRGSL     | 6201             |
| LNTSA                     | 5403             | RGDRGYL     | 6202             |
| LNTSA                     | 5404             | RGDRQAL     | 6203             |
| LNTSA                     | 5405             | RGDRQSL     | 6204             |
| LNTSA                     | 5406             | RGDRQYL     | 6205             |
| LNTSG                     | 5407             | RGDRAAL     | 6206             |
| LNTSG                     | 5408             | RGDRASL     | 6207             |
| LNTSG                     | 5409             | RGDRAYL     | 6208             |
| LNTSG                     | 5410             | RGDRGAL     | 6209             |
| LNTSG                     | 5411             | RGDRGSL     | 6210             |
| LNTSG                     | 5412             | RGDRGYL     | 6211             |
| LNTSG                     | 5413             | RGDRQAL     | 6212             |
| LNTSG                     | 5414             | RGDRQSL     | 6213             |
| LNTSG                     | 5415             | RGDRQYL     | 6214             |
| LNTSM                     | 5416             | RGDRAAL     | 6215             |
| LNTSM                     | 5417             | RGDRASL     | 6216             |
| LNTSM                     | 5418             | RGDRAYL     | 6217             |
| LNTSM                     | 5419             | RGDRGAL     | 6218             |
| LNTSM                     | 5420             | RGDRGSL     | 6219             |
| LNTSM                     | 5421             | RGDRQAL     | 6220             |
| LNTSM                     | 5422             | RGDRQSL     | 6221             |
| LNTSM                     | 5423             | RGDRQYL     | 6222             |
| LNTSS                     | 5424             | RGDRAAL     | 6223             |
| LNTSS                     | 5425             | RGDRGSL     | 6224             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNTSS                     | 5426             | RGDRQAL     | 6225             |
| LNTSS                     | 5427             | RGDRQSL     | 6226             |
| LNTSS                     | 5428             | RGDRQYL     | 6227             |
| LNTST                     | 5429             | RGDRAAL     | 6228             |
| LNTST                     | 5430             | RGDRASL     | 6229             |
| LNTST                     | 5431             | RGDRGAL     | 6230             |
| LNTST                     | 5432             | RGDRGSL     | 6231             |
| LNTST                     | 5433             | RGDRQAL     | 6232             |
| LNTST                     | 5434             | RGDRQSL     | 6233             |
| LNTST                     | 5435             | RGDRQYL     | 6234             |
| LNTSV                     | 5436             | RGDRAAL     | 6235             |
| LNTSV                     | 5437             | RGDRASL     | 6236             |
| LNTSV                     | 5438             | RGDRAYL     | 6237             |
| LNTSV                     | 5439             | RGDRGAL     | 6238             |
| LNTSV                     | 5440             | RGDRGSL     | 6239             |
| LNTSV                     | 5441             | RGDRQAL     | 6240             |
| LNTSV                     | 5442             | RGDRQSL     | 6241             |
| LNYPH                     | 5443             | RGDRGAL     | 6242             |
| LNYS A                    | 5444             | RGDRGAL     | 6243             |
| LNYS A                    | 5445             | RGDRGSL     | 6244             |
| LNYS A                    | 5446             | RGDRQAL     | 6245             |
| LNYS A                    | 5447             | RGDRQSL     | 6246             |
| LNYS A                    | 5448             | RGDRQYL     | 6247             |
| LNYS G                    | 5449             | RGDRAAL     | 6248             |
| LNYS G                    | 5450             | RGDRASL     | 6249             |
| LNYS G                    | 5451             | RGDRGAL     | 6250             |
| LNYS G                    | 5452             | RGDRGSL     | 6251             |
| LNYS G                    | 5453             | RGDRQAL     | 6252             |
| LNYS G                    | 5454             | RGDRQSL     | 6253             |
| LNYS G                    | 5455             | RGDRQYL     | 6254             |
| LNYS M                    | 5456             | RGDRQAL     | 6255             |
| LNYS M                    | 5457             | RGDRQSL     | 6256             |
| LNYS S                    | 5458             | RGDRGAL     | 6257             |
| LNYS S                    | 5459             | RGDRGSL     | 6258             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| LNYS S                    | 5460             | RGDRQAL     | 6259             |
| LNYS S                    | 5461             | RGDRQSL     | 6260             |
| LNYS S                    | 5462             | RGDRQYL     | 6261             |
| LNYS T                    | 5463             | RGDRASL     | 6262             |
| LNYS T                    | 5464             | RGDRGAL     | 6263             |
| LNYS T                    | 5465             | RGDRGSL     | 6264             |
| LNYS T                    | 5466             | RGDRQAL     | 6265             |
| LNYS T                    | 5467             | RGDRQSL     | 6266             |
| LNYS T                    | 5468             | RGDRQYL     | 6267             |
| LNYS V                    | 5469             | RGDRQAL     | 6268             |
| LNYS V                    | 5470             | RGDRQSL     | 6269             |
| MN A S A                  | 5471             | RGDRAAL     | 6270             |
| MN A S A                  | 5472             | RGDRAYL     | 6271             |
| MN A S A                  | 5473             | RGDRGSL     | 6272             |
| MN A S A                  | 5474             | RGDRGYL     | 6273             |
| MN A S A                  | 5475             | RGDRQAL     | 6274             |
| MN A S A                  | 5476             | RGDRQSL     | 6275             |
| MN A S A                  | 5477             | RGDRQYL     | 6276             |
| MN A S G                  | 5478             | RGDRAAL     | 6277             |
| MN A S G                  | 5479             | RGDRASL     | 6278             |
| MN A S G                  | 5480             | RGDRAYL     | 6279             |
| MN A S G                  | 5481             | RGDRGSL     | 6280             |
| MN A S G                  | 5482             | RGDRQAL     | 6281             |
| MN A S G                  | 5483             | RGDRQSL     | 6282             |
| MN A S G                  | 5484             | RGDRQYL     | 6283             |
| MN A S I                  | 5485             | RGDRQLL     | 6284             |
| MN A S M                  | 5486             | RGDRAAL     | 6285             |
| MN A S M                  | 5487             | RGDRAYL     | 6286             |
| MN A S M                  | 5488             | RGDRGAL     | 6287             |
| MN A S M                  | 5489             | RGDRQAL     | 6288             |
| MN A S M                  | 5490             | RGDRQSL     | 6289             |
| MN A S S                  | 5491             | RGDRAAL     | 6290             |
| MN A S T                  | 5492             | RGDRAAL     | 6291             |
| MN A S T                  | 5493             | RGDRASL     | 6292             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| MNAST                     | 5494             | RGDRAYL     | 6293             |
| MNAST                     | 5495             | RGDRGAL     | 6294             |
| MNAST                     | 5496             | RGDRGSL     | 6295             |
| MNAST                     | 5497             | RGDRQAL     | 6296             |
| MNAST                     | 5498             | RGDRQSL     | 6297             |
| MNAST                     | 5499             | RGDRQYL     | 6298             |
| MNASV                     | 5500             | RGDRAAL     | 6299             |
| MNASV                     | 5501             | RGDRASL     | 6300             |
| MNASV                     | 5502             | RGDRAYL     | 6301             |
| MNASV                     | 5503             | RGDRQAL     | 6302             |
| MNASV                     | 5504             | RGDRQSL     | 6303             |
| MNASV                     | 5505             | RGDRQYL     | 6304             |
| MNGNF                     | 5506             | RGDRQNL     | 6305             |
| MNGSA                     | 5507             | RGDRAYL     | 6306             |
| MNGSA                     | 5508             | RGDRGYL     | 6307             |
| MNGSA                     | 5509             | RGDRQAL     | 6308             |
| MNGSA                     | 5510             | RGDRQSL     | 6309             |
| MNGSA                     | 5511             | RGDRQYL     | 6310             |
| MNGSG                     | 5512             | RGDRAAL     | 6311             |
| MNGSG                     | 5513             | RGDRAYL     | 6312             |
| MNGSG                     | 5514             | RGDRGAL     | 6313             |
| MNGSG                     | 5515             | RGDRGSL     | 6314             |
| MNGSG                     | 5516             | RGDRGYL     | 6315             |
| MNGSG                     | 5517             | RGDRQAL     | 6316             |
| MNGSG                     | 5518             | RGDRQSL     | 6317             |
| MNGSG                     | 5519             | RGDRQYL     | 6318             |
| MNGSM                     | 5520             | RGDRQAL     | 6319             |
| MNGSM                     | 5521             | RGDRQSL     | 6320             |
| MNGSM                     | 5522             | RGDRQYL     | 6321             |
| MNGSS                     | 5523             | RGDRQYL     | 6322             |
| MNGST                     | 5524             | RGDRAYL     | 6323             |
| MNGST                     | 5525             | RGDRGAL     | 6324             |
| MNGST                     | 5526             | RGDRGYL     | 6325             |
| MNGST                     | 5527             | RGDRQAL     | 6326             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| MNGST                     | 5528             | RGDRQSL     | 6327             |
| MNGST                     | 5529             | RGDRQYL     | 6328             |
| MNGSV                     | 5530             | RGDRGYL     | 6329             |
| MNGSV                     | 5531             | RGDRQAL     | 6330             |
| MNGSV                     | 5532             | RGDRQYL     | 6331             |
| MNSGM                     | 5533             | RGDRGAL     | 6332             |
| MNSSA                     | 5534             | RGDRAAL     | 6333             |
| MNSSA                     | 5535             | RGDRAYL     | 6334             |
| MNSSA                     | 5536             | RGDRGSL     | 6335             |
| MNSSA                     | 5537             | RGDRGYL     | 6336             |
| MNSSA                     | 5538             | RGDRQAL     | 6337             |
| MNSSA                     | 5539             | RGDRQSL     | 6338             |
| MNSSA                     | 5540             | RGDRQYL     | 6339             |
| MNSSG                     | 5541             | RGDRAAL     | 6340             |
| MNSSG                     | 5542             | RGDRASL     | 6341             |
| MNSSG                     | 5543             | RGDRAYL     | 6342             |
| MNSSG                     | 5544             | RGDRGAL     | 6343             |
| MNSSG                     | 5545             | RGDRGSL     | 6344             |
| MNSSG                     | 5546             | RGDRQAL     | 6345             |
| MNSSG                     | 5547             | RGDRQSL     | 6346             |
| MNSSG                     | 5548             | RGDRQYL     | 6347             |
| MNSSM                     | 5549             | RGDRAAL     | 6348             |
| MNSSM                     | 5550             | RGDRASL     | 6349             |
| MNSSM                     | 5551             | RGDRAYL     | 6350             |
| MNSSM                     | 5552             | RGDRGSL     | 6351             |
| MNSSM                     | 5553             | RGDRQAL     | 6352             |
| MNSSM                     | 5554             | RGDRQSL     | 6353             |
| MNSSM                     | 5555             | RGDRQYL     | 6354             |
| MNSSS                     | 5556             | RGDRAAL     | 6355             |
| MNSST                     | 5557             | RGDRAAL     | 6356             |
| MNSST                     | 5558             | RGDRASL     | 6357             |
| MNSST                     | 5559             | RGDRQAL     | 6358             |
| MNSST                     | 5560             | RGDRQSL     | 6359             |
| MNSST                     | 5561             | RGDRQYL     | 6360             |



| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| MNSSV                     | 5562             | RGDRAAL     | 6361             |
| MNSSV                     | 5563             | RGDRAYL     | 6362             |
| MNSSV                     | 5564             | RGDRQAL     | 6363             |
| MNSSV                     | 5565             | RGDRQSL     | 6364             |
| MNSSV                     | 5566             | RGDRQYL     | 6365             |
| MNTSA                     | 5567             | RGDRAYL     | 6366             |
| MNTSG                     | 5568             | RGDRAAL     | 6367             |
| MNTSG                     | 5569             | RGDRQAL     | 6368             |
| MNTSG                     | 5570             | RGDRQYL     | 6369             |
| MNTSM                     | 5571             | RGDRAYL     | 6370             |
| MNTST                     | 5572             | RGDRQYL     | 6371             |
| MNYPH                     | 5573             | RGDRGAL     | 6372             |
| MNYSA                     | 5574             | RGDRAAL     | 6373             |
| MNYSA                     | 5575             | RGDRGYL     | 6374             |
| MNYSA                     | 5576             | RGDRQAL     | 6375             |
| MNYSA                     | 5577             | RGDRQSL     | 6376             |
| MNYSG                     | 5578             | RGDRAAL     | 6377             |
| MNYSG                     | 5579             | RGDRASL     | 6378             |
| MNYSG                     | 5580             | RGDRGSL     | 6379             |
| MNYSG                     | 5581             | RGDRQAL     | 6380             |
| MNYSG                     | 5582             | RGDRQSL     | 6381             |
| MNYSS                     | 5583             | RGDRQAL     | 6382             |
| MNYST                     | 5584             | RGDRAAL     | 6383             |
| MNYST                     | 5585             | RGDRQAL     | 6384             |
| MNYST                     | 5586             | RGDRQSL     | 6385             |
| MNYST                     | 5587             | RGDRQYL     | 6386             |
| NNSGM                     | 5588             | RGDRGAL     | 6387             |
| QNSGM                     | 5589             | RGDRGAL     | 6388             |
| SNASA                     | 5590             | RGDRAAL     | 6389             |
| SNASA                     | 5591             | RGDRASL     | 6390             |
| SNASA                     | 5592             | RGDRAYL     | 6391             |
| SNASA                     | 5593             | RGDRGAL     | 6392             |
| SNASA                     | 5594             | RGDRGSL     | 6393             |
| SNASA                     | 5595             | RGDRGYL     | 6394             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNASA                     | 5596             | RGDRQAL     | 6395             |
| SNASA                     | 5597             | RGDRQSL     | 6396             |
| SNASA                     | 5598             | RGDRQYL     | 6397             |
| SNASG                     | 5599             | RGDRAAL     | 6398             |
| SNASG                     | 5600             | RGDRASL     | 6399             |
| SNASG                     | 5601             | RGDRAYL     | 6400             |
| SNASG                     | 5602             | RGDRGAL     | 6401             |
| SNASG                     | 5603             | RGDRGSL     | 6402             |
| SNASG                     | 5604             | RGDRGYL     | 6403             |
| SNASG                     | 5605             | RGDRQAL     | 6404             |
| SNASG                     | 5606             | RGDRQSL     | 6405             |
| SNASG                     | 5607             | RGDRQYL     | 6406             |
| SNASI                     | 5608             | RGDRQLL     | 6407             |
| SNASM                     | 5609             | RGDRAAL     | 6408             |
| SNASM                     | 5610             | RGDRASL     | 6409             |
| SNASM                     | 5611             | RGDRGAL     | 6410             |
| SNASM                     | 5612             | RGDRGSL     | 6411             |
| SNASM                     | 5613             | RGDRQAL     | 6412             |
| SNASM                     | 5614             | RGDRQSL     | 6413             |
| SNASS                     | 5615             | RGDRAAL     | 6414             |
| SNASS                     | 5616             | RGDRASL     | 6415             |
| SNASS                     | 5617             | RGDRAYL     | 6416             |
| SNASS                     | 5618             | RGDRGAL     | 6417             |
| SNASS                     | 5619             | RGDRGSL     | 6418             |
| SNASS                     | 5620             | RGDRQAL     | 6419             |
| SNASS                     | 5621             | RGDRQSL     | 6420             |
| SNASS                     | 5622             | RGDRQYL     | 6421             |
| SNAST                     | 5623             | RGDRAAL     | 6422             |
| SNAST                     | 5624             | RGDRASL     | 6423             |
| SNAST                     | 5625             | RGDRAYL     | 6424             |
| SNAST                     | 5626             | RGDRGAL     | 6425             |
| SNAST                     | 5627             | RGDRGSL     | 6426             |
| SNAST                     | 5628             | RGDRGYL     | 6427             |
| SNAST                     | 5629             | RGDRQAL     | 6428             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNAST                     | 5630             | RGDRQSL     | 6429             |
| SNAST                     | 5631             | RGDRQYL     | 6430             |
| SNASV                     | 5632             | RGDRAAL     | 6431             |
| SNASV                     | 5633             | RGDRASL     | 6432             |
| SNASV                     | 5634             | RGDRAYL     | 6433             |
| SNASV                     | 5635             | RGDRGSL     | 6434             |
| SNASV                     | 5636             | RGDRGYL     | 6435             |
| SNASV                     | 5637             | RGDRQAL     | 6436             |
| SNASV                     | 5638             | RGDRQSL     | 6437             |
| SNASV                     | 5639             | RGDRQYL     | 6438             |
| SNGNF                     | 5640             | RGDRQNL     | 6439             |
| SNGNV                     | 5641             | RGDRGML     | 6440             |
| SNGSA                     | 5642             | RGDRGYL     | 6441             |
| SNGSA                     | 5643             | RGDRQAL     | 6442             |
| SNGSA                     | 5644             | RGDRQSL     | 6443             |
| SNGSA                     | 5645             | RGDRQYL     | 6444             |
| SNGSG                     | 5646             | RGDRASL     | 6445             |
| SNGSG                     | 5647             | RGDRAYL     | 6446             |
| SNGSG                     | 5648             | RGDRGAL     | 6447             |
| SNGSG                     | 5649             | RGDRGSL     | 6448             |
| SNGSG                     | 5650             | RGDRGYL     | 6449             |
| SNGSG                     | 5651             | RGDRQAL     | 6450             |
| SNGSG                     | 5652             | RGDRQSL     | 6451             |
| SNGSG                     | 5653             | RGDRQYL     | 6452             |
| SNGSM                     | 5654             | RGDRAYL     | 6453             |
| SNGSM                     | 5655             | RGDRGYL     | 6454             |
| SNGSM                     | 5656             | RGDRQAL     | 6455             |
| SNGSM                     | 5657             | RGDRQSL     | 6456             |
| SNGSM                     | 5658             | RGDRQYL     | 6457             |
| SNGSS                     | 5659             | RGDRGYL     | 6458             |
| SNGSS                     | 5660             | RGDRQYL     | 6459             |
| SNGST                     | 5661             | RGDRAAL     | 6460             |
| SNGST                     | 5662             | RGDRASL     | 6461             |
| SNGST                     | 5663             | RGDRGAL     | 6462             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNGST                     | 5664             | RGDRGYL     | 6463             |
| SNGST                     | 5665             | RGDRQAL     | 6464             |
| SNGST                     | 5666             | RGDRQSL     | 6465             |
| SNGST                     | 5667             | RGDRQYL     | 6466             |
| SNGSV                     | 5668             | RGDRGYL     | 6467             |
| SNGSV                     | 5669             | RGDRQAL     | 6468             |
| SNGSV                     | 5670             | RGDRQSL     | 6469             |
| SNGSV                     | 5671             | RGDRQYL     | 6470             |
| SNSGM                     | 5672             | RGDRGAL     | 6471             |
| SNSSA                     | 5673             | RGDRAYL     | 6472             |
| SNSSA                     | 5674             | RGDRGAL     | 6473             |
| SNSSA                     | 5675             | RGDRGIL     | 6474             |
| SNSSA                     | 5676             | RGDRGSL     | 6475             |
| SNSSA                     | 5677             | RGDRGYL     | 6476             |
| SNSSA                     | 5678             | RGDRQAL     | 6477             |
| SNSSA                     | 5679             | RGDRQSL     | 6478             |
| SNSSA                     | 5680             | RGDRQYL     | 6479             |
| SNSSG                     | 5681             | RGDRAAL     | 6480             |
| SNSSG                     | 5682             | RGDRAYL     | 6481             |
| SNSSG                     | 5683             | RGDRGAL     | 6482             |
| SNSSG                     | 5684             | RGDRGSL     | 6483             |
| SNSSG                     | 5685             | RGDRGYL     | 6484             |
| SNSSG                     | 5686             | RGDRQAL     | 6485             |
| SNSSG                     | 5687             | RGDRQSL     | 6486             |
| SNSSG                     | 5688             | RGDRQYL     | 6487             |
| SNSSM                     | 5689             | RGDRAAL     | 6488             |
| SNSSM                     | 5690             | RGDRASL     | 6489             |
| SNSSM                     | 5691             | RGDRAYL     | 6490             |
| SNSSM                     | 5692             | RGDRGSL     | 6491             |
| SNSSM                     | 5693             | RGDRQAL     | 6492             |
| SNSSM                     | 5694             | RGDRQSL     | 6493             |
| SNSSM                     | 5695             | RGDRQYL     | 6494             |
| SNSSS                     | 5696             | RGDRAAL     | 6495             |
| SNSSS                     | 5697             | RGDRGSL     | 6496             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNSSS                     | 5698             | RGDRQAL     | 6497             |
| SNSSS                     | 5699             | RGDRQSL     | 6498             |
| SNSSS                     | 5700             | RGDRQYL     | 6499             |
| SNSST                     | 5701             | RGDRAAL     | 6500             |
| SNSST                     | 5702             | RGDRASL     | 6501             |
| SNSST                     | 5703             | RGDRGSL     | 6502             |
| SNSST                     | 5704             | RGDRGYL     | 6503             |
| SNSST                     | 5705             | RGDRQAL     | 6504             |
| SNSST                     | 5706             | RGDRQSL     | 6505             |
| SNSST                     | 5707             | RGDRQYL     | 6506             |
| SNSSV                     | 5708             | RGDRQAL     | 6507             |
| SNSSV                     | 5709             | RGDRQSL     | 6508             |
| SNSSV                     | 5710             | RGDRQYL     | 6509             |
| SNTSA                     | 5711             | RGDRAAL     | 6510             |
| SNTSA                     | 5712             | RGDRGAL     | 6511             |
| SNTSA                     | 5713             | RGDRGSL     | 6512             |
| SNTSA                     | 5714             | RGDRGYL     | 6513             |
| SNTSA                     | 5715             | RGDRQAL     | 6514             |
| SNTSA                     | 5716             | RGDRQSL     | 6515             |
| SNTSA                     | 5717             | RGDRQYL     | 6516             |
| SNTSG                     | 5718             | RGDRAAL     | 6517             |
| SNTSG                     | 5719             | RGDRASL     | 6518             |
| SNTSG                     | 5720             | RGDRGAL     | 6519             |
| SNTSG                     | 5721             | RGDRGSL     | 6520             |
| SNTSG                     | 5722             | RGDRGYL     | 6521             |
| SNTSG                     | 5723             | RGDRQAL     | 6522             |
| SNTSG                     | 5724             | RGDRQSL     | 6523             |
| SNTSG                     | 5725             | RGDRQYL     | 6524             |
| SNTSM                     | 5726             | RGDRAYL     | 6525             |
| SNTSM                     | 5727             | RGDRGSL     | 6526             |
| SNTSM                     | 5728             | RGDRQAL     | 6527             |
| SNTSM                     | 5729             | RGDRQSL     | 6528             |
| SNTSS                     | 5730             | RGDRQAL     | 6529             |
| SNTST                     | 5731             | RGDRQAL     | 6530             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNTST                     | 5732             | RGDRQSL     | 6531             |
| SNTST                     | 5733             | RGDRQYL     | 6532             |
| SNTSV                     | 5734             | RGDRAYL     | 6533             |
| SNTSV                     | 5735             | RGDRQAL     | 6534             |
| SNTSV                     | 5736             | RGDRQSL     | 6535             |
| SNTSV                     | 5737             | RGDRQYL     | 6536             |
| SNYPH                     | 5738             | RGDRGAL     | 6537             |
| SNYSA                     | 5739             | RGDRAAL     | 6538             |
| SNYSA                     | 5740             | RGDRASL     | 6539             |
| SNYSA                     | 5741             | RGDRGAL     | 6540             |
| SNYSA                     | 5742             | RGDRGSL     | 6541             |
| SNYSA                     | 5743             | RGDRQAL     | 6542             |
| SNYSA                     | 5744             | RGDRQSL     | 6543             |
| SNYSA                     | 5745             | RGDRQYL     | 6544             |
| SNYSG                     | 5746             | RGDRAAL     | 6545             |
| SNYSG                     | 5747             | RGDRGAL     | 6546             |
| SNYSG                     | 5748             | RGDRGSL     | 6547             |
| SNYSG                     | 5749             | RGDRQAL     | 6548             |
| SNYSG                     | 5750             | RGDRQSL     | 6549             |
| SNYSM                     | 5751             | RGDRAAL     | 6550             |
| SNYSM                     | 5752             | RGDRASL     | 6551             |
| SNYSM                     | 5753             | RGDRGSL     | 6552             |
| SNYSM                     | 5754             | RGDRQAL     | 6553             |
| SNYSM                     | 5755             | RGDRQSL     | 6554             |
| SNYSS                     | 5756             | RGDRGAL     | 6555             |
| SNYSS                     | 5757             | RGDRGSL     | 6556             |
| SNYSS                     | 5758             | RGDRQAL     | 6557             |
| SNYSS                     | 5759             | RGDRQSL     | 6558             |
| SNYST                     | 5760             | RGDRAAL     | 6559             |
| SNYST                     | 5761             | RGDRGAL     | 6560             |
| SNYST                     | 5762             | RGDRGSL     | 6561             |
| SNYST                     | 5763             | RGDRQAL     | 6562             |
| SNYST                     | 5764             | RGDRQSL     | 6563             |
| SNYST                     | 5765             | RGDRQYL     | 6564             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| SNYSV                     | 5766             | RGDRQAL     | 6565             |
| SNYSV                     | 5767             | RGDRQSL     | 6566             |
| SNYSV                     | 5768             | RGDRQYL     | 6567             |
| TNSGM                     | 5769             | RGDRGAL     | 6568             |
| VNASA                     | 5770             | RGDRAAL     | 6569             |
| VNASA                     | 5771             | RGDRGAL     | 6570             |
| VNASA                     | 5772             | RGDRGSL     | 6571             |
| VNASA                     | 5773             | RGDRGYL     | 6572             |
| VNASA                     | 5774             | RGDRQAL     | 6573             |
| VNASA                     | 5775             | RGDRQYL     | 6574             |
| VNASG                     | 5776             | RGDRAAL     | 6575             |
| VNASG                     | 5777             | RGDRAYL     | 6576             |
| VNASG                     | 5778             | RGDRGAL     | 6577             |
| VNASG                     | 5779             | RGDRGSL     | 6578             |
| VNASG                     | 5780             | RGDRGYL     | 6579             |
| VNASG                     | 5781             | RGDRQAL     | 6580             |
| VNASG                     | 5782             | RGDRQYL     | 6581             |
| VNASM                     | 5783             | RGDRAYL     | 6582             |
| VNASM                     | 5784             | RGDRQAL     | 6583             |
| VNASM                     | 5785             | RGDRQSL     | 6584             |
| VNASS                     | 5786             | RGDRGSL     | 6585             |
| VNASS                     | 5787             | RGDRQAL     | 6586             |
| VNASS                     | 5788             | RGDRQYL     | 6587             |
| VNAST                     | 5789             | RGDRAAL     | 6588             |
| VNAST                     | 5790             | RGDRGAL     | 6589             |
| VNAST                     | 5791             | RGDRGSL     | 6590             |
| VNAST                     | 5792             | RGDRGYL     | 6591             |
| VNAST                     | 5793             | RGDRQAL     | 6592             |
| VNAST                     | 5794             | RGDRQSL     | 6593             |
| VNASV                     | 5795             | RGDRQYL     | 6594             |
| VNASV                     | 5796             | RGDRGSL     | 6595             |
| VNASV                     | 5797             | RGDRGYL     | 6596             |
| VNASV                     | 5798             | RGDRQAL     | 6597             |
| VNASV                     | 5799             | RGDRQSL     | 6598             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| VNASV                     | 5800             | RGDRQYL     | 6599             |
| VNGNF                     | 5801             | RGDRQNL     | 6600             |
| VNGNV                     | 5802             | RGDRGML     | 6601             |
| VNGSA                     | 5803             | RGDRAYL     | 6602             |
| VNGSA                     | 5804             | RGDRGAL     | 6603             |
| VNGSA                     | 5805             | RGDRGSL     | 6604             |
| VNGSA                     | 5806             | RGDRGYL     | 6605             |
| VNGSA                     | 5807             | RGDRQAL     | 6606             |
| VNGSA                     | 5808             | RGDRQSL     | 6607             |
| VNGSA                     | 5809             | RGDRQYL     | 6608             |
| VNGSG                     | 5810             | RGDRAAL     | 6609             |
| VNGSG                     | 5811             | RGDRASL     | 6610             |
| VNGSG                     | 5812             | RGDRAYL     | 6611             |
| VNGSG                     | 5813             | RGDRGAL     | 6612             |
| VNGSG                     | 5814             | RGDRGSL     | 6613             |
| VNGSG                     | 5815             | RGDRGYL     | 6614             |
| VNGSG                     | 5816             | RGDRQAL     | 6615             |
| VNGSG                     | 5817             | RGDRQSL     | 6616             |
| VNGSG                     | 5818             | RGDRQYL     | 6617             |
| VNGSM                     | 5819             | RGDRGYL     | 6618             |
| VNGSM                     | 5820             | RGDRQAL     | 6619             |
| VNGSM                     | 5821             | RGDRQSL     | 6620             |
| VNGSM                     | 5822             | RGDRQYL     | 6621             |
| VNGSS                     | 5823             | RGDRAYL     | 6622             |
| VNGSS                     | 5824             | RGDRGAL     | 6623             |
| VNGSS                     | 5825             | RGDRGSL     | 6624             |
| VNGSS                     | 5826             | RGDRQAL     | 6625             |
| VNGSS                     | 5827             | RGDRQSL     | 6626             |
| VNGSS                     | 5828             | RGDRQYL     | 6627             |
| VNGST                     | 5829             | RGDRAAL     | 6628             |
| VNGST                     | 5830             | RGDRAYL     | 6629             |
| VNGST                     | 5831             | RGDRGAL     | 6630             |
| VNGST                     | 5832             | RGDRGYL     | 6631             |
| VNGST                     | 5833             | RGDRQAL     | 6632             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| VNGST                     | 5834             | RGDRQSL     | 6633             |
| VNGST                     | 5835             | RGDRQYL     | 6634             |
| VNGSV                     | 5836             | RGDRAYL     | 6635             |
| VNGSV                     | 5837             | RGDRQAL     | 6636             |
| VNGSV                     | 5838             | RGDRQSL     | 6637             |
| VNGSV                     | 5839             | RGDRQYL     | 6638             |
| VNSGM                     | 5840             | RGDRGAL     | 6639             |
| VNSSA                     | 5841             | RGDRGAL     | 6640             |
| VNSSA                     | 5842             | RGDRGSL     | 6641             |
| VNSSA                     | 5843             | RGDRGYL     | 6642             |
| VNSSA                     | 5844             | RGDRQAL     | 6643             |
| VNSSA                     | 5845             | RGDRQSL     | 6644             |
| VNSSA                     | 5846             | RGDRQYL     | 6645             |
| VNSSG                     | 5847             | RGDRAAL     | 6646             |
| VNSSG                     | 5848             | RGDRAYL     | 6647             |
| VNSSG                     | 5849             | RGDRGAL     | 6648             |
| VNSSG                     | 5850             | RGDRQAL     | 6649             |
| VNSSG                     | 5851             | RGDRQSL     | 6650             |
| VNSSG                     | 5852             | RGDRQYL     | 6651             |
| VNSSM                     | 5853             | RGDRAYL     | 6652             |
| VNSSM                     | 5854             | RGDRQAL     | 6653             |
| VNSSM                     | 5855             | RGDRQSL     | 6654             |
| VNSSM                     | 5856             | RGDRQYL     | 6655             |
| VNSSS                     | 5857             | RGDRGSL     | 6656             |
| VNSSS                     | 5858             | RGDRQAL     | 6657             |
| VNSSS                     | 5859             | RGDRQSL     | 6658             |
| VNSST                     | 5860             | RGDRGAL     | 6659             |
| VNSST                     | 5861             | RGDRQAL     | 6660             |
| VNSST                     | 5862             | RGDRQSL     | 6661             |
| VNSST                     | 5863             | RGDRQYL     | 6662             |
| VNSSV                     | 5864             | RGDRAYL     | 6663             |
| VNSSV                     | 5865             | RGDRQAL     | 6664             |
| VNSSV                     | 5866             | RGDRQSL     | 6665             |
| VNTSA                     | 5867             | RGDRAYL     | 6666             |

| 5 aa<br>subs-<br>titution | SEQ<br>ID<br>NO: | 7 aa insert | SEQ<br>ID<br>NO: |
|---------------------------|------------------|-------------|------------------|
| VNTSG                     | 5868             | RGDRAAL     | 6667             |
| VNTSG                     | 5869             | RGDRGAL     | 6668             |
| VNTSG                     | 5870             | RGDRGSL     | 6669             |
| VNTSG                     | 5871             | RGDRGYL     | 6670             |
| VNTSG                     | 5872             | RGDRQAL     | 6671             |
| VNTSG                     | 5873             | RGDRQSL     | 6672             |
| VNTSG                     | 5874             | RGDRQYL     | 6673             |
| VNTST                     | 5875             | RGDRAYL     | 6674             |
| VNYPH                     | 5876             | RGDRGAL     | 6675             |
| VNYSA                     | 5877             | RGDRGAL     | 6676             |
| VNYSA                     | 5878             | RGDRGSL     | 6677             |
| VNYSA                     | 5879             | RGDRQAL     | 6678             |
| VNYSA                     | 5880             | RGDRQSL     | 6679             |
| VNYSG                     | 5881             | RGDRAAL     | 6680             |
| VNYSG                     | 5882             | RGDRGAL     | 6681             |
| VNYSG                     | 5883             | RGDRQAL     | 6682             |
| VNYSG                     | 5884             | RGDRQSL     | 6683             |
| VNYSG                     | 5885             | RGDRQYL     | 6684             |
| VNYSS                     | 5886             | RGDRGSL     | 6685             |
| VNYSS                     | 5887             | RGDRGYL     | 6686             |

Table 6. Exemplary miRNA sequences targeting a DUX4 transcript

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1250      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2010      | AAGCCCG<br>GacAaGAG<br>GACGGC | 2770      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCTCGTCCCGGGCTTTGTCTGGCAATACCT<br>GAAGCCCGGacAaGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCCCACGGT | 3530      | GCCGTCCCTCGTCCC<br>CGGGCTTTGTCTG<br>GCAATACCTGAAGC<br>CCGGACAAGAGGA<br>CGGC | 41              |
| 1251      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2011      | AAGCCCG<br>GttAaGAG<br>GACGGC | 2771      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCTCGTCCCGGGCTTTGTCTGGCAATACCT<br>GAAGCCCGGttAaGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCCCACGGT | 3531      | GCCGTCCCTCGTCCC<br>CGGGCTTTGTCTG<br>GCAATACCTGAAGC<br>CCGGTAAAGAGGA<br>CGGC | 41              |
| 1252      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2012      | AAGCCCG<br>GtaAgGAG<br>GACGGC | 2772      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCTCGTCCCGGGCTTTGTCTGGCAATACCT<br>GAAGCCCGGtaAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCCCACGGT | 3532      | GCCGTCCCTCGTCCC<br>CGGGCTTTGTCTG<br>GCAATACCTGAAGC<br>CCGGTAAAGAGGA<br>CGGC | 41              |
| 1253      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2013      | AAGCCCG<br>GaaAgGAG<br>GACGGC | 2773      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCTCGTCCCGGGCTTTGTCTGGCAATACCT<br>GAAGCCCGGaaAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCCCACGGT | 3533      | GCCGTCCCTCGTCCC<br>CGGGCTTTGTCTG<br>GCAATACCTGAAGC<br>CCGGCAAGGAGGA<br>CGGC | 41              |
| 1254      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2014      | AAGCCCG<br>GatAgGAG<br>GACGGC | 2774      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCTCGTCCCGGGCTTTGTCTGGCAATACCT<br>GAAGCCCGGatAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCCCACGGT | 3534      | GCCGTCCCTCGTCCC<br>CGGGCTTTGTCTG<br>GCAATACCTGAAGC<br>CCGGATAGGAGGA<br>CGGC | 41              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1255      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2015      | AAGCCCG<br>GtcAgGAG<br>GACGGC | 2775      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCCCTCGTCCCGGGCTTGTCTGGCAATACCT<br>GAAGCCCGGcAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT   | 3535      | GCCGTCCCTCGTCCC<br>CGGGCTTGTCTG<br>GCAATACCTGAAGC<br>CCGGTAGGAGGA<br>CGGC   | 41              |
| 1256      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2016      | AAGCCCG<br>GacAgGAG<br>GACGGC | 2776      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCCCTCGTCCCGGGCTTGTCTGGCAATACCT<br>GAAGCCCGGacAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3536      | GCCGTCCCTCGTCCC<br>CGGGCTTGTCTG<br>GCAATACCTGAAGC<br>CCGGACAGGAGGA<br>CGGC  | 41              |
| 1257      | GCCGTCC<br>TCGTCCC<br>CGGGCTT | 2017      | AAGCCCG<br>GtcAgGAG<br>GACGGC | 2777      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CGTCCCTCGTCCCGGGCTTGTCTGGCAATACCT<br>GAAGCCCGGtcAgGAGGACGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3537      | GCCGTCCCTCGTCCC<br>CGGGCTTGTCTG<br>GCAATACCTGAAGC<br>CCGGTACAGGAGGA<br>CGGC | 41              |
| 1258      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2018      | ACCCCGA<br>GaaAtAGC<br>GAGGCC | 2778      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CTTCGCTTTGGCTCGGGGTGTCTGGCAATACCT<br>GACCCCGAGaaAtAGCGAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3538      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGAAATAGCGA<br>GGCC   | 79              |
| 1259      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2019      | ACCCCGA<br>GgaAtAGC<br>GAGGCC | 2779      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CTTCGCTTTGGCTCGGGGTGTCTGGCAATACCT<br>GACCCCGAGgaAtAGCGAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3539      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGAAATAGCGA<br>GGCC   | 79              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1260      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2020      | ACCCCGA<br>GagAaAGC<br>GAGGCC | 2780      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGagAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3540      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGAGATAGCGA<br>GGCC | 79              |
| 1261      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2021      | ACCCCGA<br>GggAaAGC<br>GAGGCC | 2781      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGggAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3541      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGGATAGCGA<br>GGCC  | 79              |
| 1262      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2022      | ACCCCGA<br>GaaAaAGC<br>GAGGCC | 2782      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGaaAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3542      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGAAACAGCGA<br>GGCC | 79              |
| 1263      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2023      | ACCCCGA<br>GgaAaAGC<br>GAGGCC | 2783      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGgaAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3543      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGGAACAGCGA<br>GGCC | 79              |
| 1264      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2024      | ACCCCGA<br>GagAaAGC<br>GAGGCC | 2784      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGagAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3544      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGAGACAGCGA<br>GGCC | 79              |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1265      | GGCCTCG<br>CTTTGGC<br>TCGGGGT | 2025      | ACCCCGA<br>GggAaAGC<br>GAGGCC | 2785      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTCGCTTTGGCTCGGGGTGTGTCTGGCAATACCT<br>GACCCCGAGgAaAGCGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 3545      | GGCCTCGCTTTGGC<br>TCGGGGTGTCTG<br>GCAATACCTGACCC<br>CGAGGGACAGCGA<br>GGCC | 79              |
| 1266      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2026      | CCGAGCC<br>AttGaGAG<br>GCCCTG | 2786      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTGTCTGGCAATACC<br>TGCCGAGCCAttGaAGGCCCTTGCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3546      | CAGGGCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCATTGAGAGGCC<br>CTG | 82              |
| 1267      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2027      | CCGAGCC<br>ActGaGAG<br>GCCCTG | 2787      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTGTCTGGCAATACC<br>TGCCGAGCCActGaAGGCCCTTGCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3547      | CAGGGCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCACTGAGAGGC<br>CCTG | 82              |
| 1268      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2028      | CCGAGCC<br>AteGaGAG<br>GCCCTG | 2788      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTGTCTGGCAATACC<br>TGCCGAGCCAtcGaAGGCCCTTGCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3548      | CAGGGCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCATCGAGAGGC<br>CCTG | 82              |
| 1269      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2029      | CCGAGCC<br>AceGaGAG<br>GCCCTG | 2789      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTGTCTGGCAATACC<br>TGCCGAGCCAceGaAGGCCCTTGCAACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3549      | CAGGGCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCACCGAGAGGC<br>CCTG | 82              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1270      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2030      | CCGAGCC<br>AttGgGAG<br>GCCCTG  | 2790      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTCTGGCAATACC<br>TGCCGAGCCAttGgGAGGCCCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3550      | CAGGGCCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCATTGGGAGGCC<br>CTG | 82              |
| 1271      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2031      | CCGAGCC<br>ActGgGAG<br>GCCCTG  | 2791      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTCTGGCAATACC<br>TGCCGAGCCActGgGAGGCCCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3551      | CAGGGCCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCACTGGGAGGC<br>CCTG | 82              |
| 1272      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2032      | CCGAGCC<br>AtcGgGAG<br>GCCCTG  | 2792      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTCTGGCAATACC<br>TGCCGAGCCAtcGgGAGGCCCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3552      | CAGGGCCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCATCGGGAGGC<br>CCTG | 82              |
| 1273      | CAGGGCC<br>TCGCTTT<br>GGCTCGG | 2033      | CCGAGCC<br>AccGgGAG<br>GCCCTG  | 2793      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GGGCTCGCTTTGGCTCGGTGTCTGGCAATACC<br>TGCCGAGCCAccGgGAGGCCCTGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3553      | CAGGGCCTCGCTTT<br>GGCTCGGTGTCTG<br>GCAATACCTGCCGA<br>GCCACCGGGAGGC<br>CCTG | 82              |
| 1274      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2034      | GACGCGG<br>CggGacCAG<br>AAGGCC | 2794      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTCTGGCGGGCCGCGTCTGTCTGGCAATACC<br>TGGACGCGGCgGacAAGGCCCCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT   | 3554      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCGGACAGAA<br>GGCC  | 263             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                             | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1275      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2035      | GACGCGG<br>CaaGgCAG<br>AAGGCC | 2795      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTGGCAATACC<br>TGGACGCGGC <sup>aa</sup> GaCAGAAAGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3555      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCAAGCAGAA<br>GGCC  | 263             |
| 1276      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2036      | GACGCGG<br>CgaGgCAG<br>AAGGCC | 2796      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTGGCAATACC<br>TGGACGCGGC <sup>ga</sup> GaCAGAAAGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3556      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCGAGACAGAA<br>GGCC | 263             |
| 1277      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2037      | GACGCGG<br>CagGgCAG<br>AAGGCC | 2797      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTGGCAATACC<br>TGGACGCGGC <sup>ag</sup> GaCAGAAAGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3557      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCAAGCAGAA<br>GGCC  | 263             |
| 1278      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2038      | GACGCGG<br>CaaGgCAG<br>AAGGCC | 2798      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTGGCAATACC<br>TGGACGCGGC <sup>aa</sup> GgCAGAAAGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3558      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCAAGCAGAA<br>GGCC  | 263             |
| 1279      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2039      | GACGCGG<br>CgaGgCAG<br>AAGGCC | 2799      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTGGCAATACC<br>TGGACGCGGC <sup>ga</sup> GgCAGAAAGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3559      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCGAGGAGAA<br>GGCC  | 263             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1280      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2040      | GACGCGG<br>CagGgCAG<br>AAGGCC | 2800      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTTGGCAATACC<br>TGGACGCGGgagGgCAGAGGCCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT   | 3560      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGAGGGCAGAA<br>GGCC  | 263             |
| 1281      | GGCCTTC<br>TGGCGGG<br>CCGCGTC | 2041      | GACGCGG<br>CggGgCAG<br>AAGGCC | 2801      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CCTTCTGGCGGGCCGCTCTGTCTTGGCAATACC<br>TGGACGCGGgGgCAGAGGCCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT     | 3561      | GGCCTTCTGGCGGG<br>CCGCGTCTGTCTG<br>GCAATACCTGGACG<br>CGGCGGGCAGAA<br>GGCC  | 263             |
| 1282      | AGCTCCT<br>CCCGGGC<br>GGCGATG | 2042      | CATCGCC<br>GagCcGGA<br>GGAGCT | 2802      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGCGATGTGTCTTGGCAATACC<br>TGCATCGCCGagCcGGAGGAGCTCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 3562      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGAGCCGGAGG<br>AGCT | 360             |
| 1283      | AGCTCCT<br>CCCGGGC<br>GGCGATG | 2043      | CATCGCC<br>GgaCaGGA<br>GGAGCT | 2803      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGCGATGTGTCTTGGCAATACC<br>TGCATCGCCGgaCaGGAGGAGCTCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 3563      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGGACAGGAGG<br>AGCT | 360             |
| 1284      | AGCTCCT<br>CCCGGGC<br>GGCGATG | 2044      | CATCGCC<br>GggCaGGA<br>GGAGCT | 2804      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGCGATGTGTCTTGGCAATACC<br>TGCATCGCCGggCaGGAGGAGCTCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 3564      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGGGCAGGAGG<br>AGCT | 360             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1285      | AGCTCCT<br>CCCGGC<br>GGCGATG | 2045      | CATCGCC<br>GaaCtGGA<br>GGAGCT | 2805      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGGCGATGTGTTCCTGGCAATAACC<br>TGCAATCGCCGaaCtGGAGGAGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3565      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGAACTGGAGG<br>AGCT | 360             |
| 1286      | AGCTCCT<br>CCCGGC<br>GGCGATG | 2046      | CATCGCC<br>GaaCtGGA<br>GGAGCT | 2806      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGGCGATGTGTTCCTGGCAATAACC<br>TGCAATCGCCGaaCtGGAGGAGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3566      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGAACTGGAGG<br>AGCT | 360             |
| 1287      | AGCTCCT<br>CCCGGC<br>GGCGATG | 2047      | CATCGCC<br>GggCtGGA<br>GGAGCT | 2807      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGGCGATGTGTTCCTGGCAATAACC<br>TGCAATCGCCGggCtGGAGGAGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3567      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGGCTGGAGG<br>AGCT  | 360             |
| 1288      | AGCTCCT<br>CCCGGC<br>GGCGATG | 2048      | CATCGCC<br>GaaCtGGA<br>GGAGCT | 2808      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGGCGATGTGTTCCTGGCAATAACC<br>TGCAATCGCCGaaCtGGAGGAGCTCACGGAGGCCCT<br>GCCCTGACTGCCACGGT | 3568      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGAACTGGAGG<br>AGCT | 360             |
| 1289      | AGCTCCT<br>CCCGGC<br>GGCGATG | 2049      | CATCGCC<br>GaaCtGGA<br>GGAGCT | 2809      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CTCCTCCCGGGCGGCGATGTGTTCCTGGCAATAACC<br>TGCAATCGCCGaaCtGGAGGAGCTCACGGAGGCCCT<br>GCCCTGACTGCCACGGT | 3569      | AGCTCCTCCCGGGC<br>GGCGATGTGTCTG<br>GCAATACCTGCATC<br>GCCGAACTGGAGG<br>AGCT | 360             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1290      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2050      | GCCCGCG<br>CctGaAGG<br>CGGCCT | 2810      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTTCTGGCAATACC<br>TGGCCCGGCcGaAGCGGCCCTACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3570      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCTGAAGGCG<br>GCCCT | 468             |
| 1291      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2051      | GCCCGCG<br>CtaGaAGG<br>CGGCCT | 2811      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTTCTGGCAATACC<br>TGGCCCGGCtaGaAGCGGCCCTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3571      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGTAGAAGGCG<br>GCCCT | 468             |
| 1292      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2052      | GCCCGCG<br>CcaGaAGG<br>CGGCCT | 2812      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTTCTGGCAATACC<br>TGGCCCGGCcaGaAGCGGCCCTACGGAGGCCCT<br>GCCCTGACTGCCACGGT | 3572      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCAGAAGGCG<br>GCCCT | 468             |
| 1293      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2053      | GCCCGCG<br>CccGaAGG<br>CGGCCT | 2813      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTTCTGGCAATACC<br>TGGCCCGGCccGaAGCGGCCCTACGGAGGCCCT<br>GCCCTGACTGCCACGGT | 3573      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCCGAAGGCG<br>GCCCT | 468             |
| 1294      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2054      | GCCCGCG<br>CttGgAGG<br>CGGCCT | 2814      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTTCTGGCAATACC<br>TGGCCCGGCttGgAGCGGCCCTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3574      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGTTGGAGGCG<br>GCCCT | 468             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                             | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1295      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2055      | GCCCGCG<br>CctGgAGG<br>CGGCCT | 2815      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTCTGGCAATACC<br>TGGCCCGGCcGgAGGCGGCCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3575      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCTGGAGGCG<br>GCCCT | 468             |
| 1296      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2056      | GCCCGCG<br>CtcGgAGG<br>CGGCCT | 2816      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTCTGGCAATACC<br>TGGCCCGGCcGgAGGCGGCCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3576      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCTGGAGGCG<br>GCCCT | 468             |
| 1297      | AGGCCGC<br>CTGCCCTG<br>CGCGGGC | 2057      | GCCCGCG<br>CccGgAGG<br>CGGCCT | 2817      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCGCTTGCCTGCGCGGGCTGTCTGGCAATACC<br>TGGCCCGGCcGgAGGCGGCCTCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3577      | AGGCCGCTGCCTG<br>CGCGGGCTGTCTG<br>GCAATACCTGGCCC<br>GCGCCGGAGGCG<br>GCCCT | 468             |
| 1298      | CCGGGGG<br>CCGCGCT<br>GCACAGG  | 2058      | CCTGTGC<br>AagGaGGC<br>CCCCGG | 2818      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACAGGTGTCTGGCAATACC<br>TGCTGTGCAagGaGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3578      | CCGGGGCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCAAGGAGGCC<br>CCGG   | 486             |
| 1299      | CCGGGGG<br>CCGCGCT<br>GCACAGG  | 2059      | CCTGTGC<br>AtaGaGGC<br>CCCCGG | 2819      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACAGGTGTCTGGCAATACC<br>TGCTGTGCAtaGaGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3579      | CCGGGGCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCATAGAGGCC<br>CGG    | 486             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1300      | CCGGGGG<br>CCGCGCT<br>GCACAGG | 2060      | CCTGTGC<br>AaaGaaGGC<br>CCCCGG | 2820      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACACAGGTGTCTGGCAATACC<br>TGCCCTGTGCAaaGaaGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3580      | CCGGGGGCCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCACAGAGGCCCC<br>CGG | 486             |
| 1301      | CCGGGGG<br>CCGCGCT<br>GCACAGG | 2061      | CCTGTGC<br>AagGaaGGC<br>CCCCGG | 2821      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACACAGGTGTCTGGCAATACC<br>TGCCCTGTGCAagGaaGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3581      | CCGGGGGCCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCATGGAGGCCCC<br>CGG | 486             |
| 1302      | CCGGGGG<br>CCGCGCT<br>GCACAGG | 2062      | CCTGTGC<br>AagGaaGGC<br>CCCCGG | 2822      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACACAGGTGTCTGGCAATACC<br>TGCCCTGTGCAagGaaGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3582      | CCGGGGGCCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCACGGAGGCCCC<br>CGG | 486             |
| 1303      | CCGGGGG<br>CCGCGCT<br>GCACAGG | 2063      | CCTGTGC<br>AaaGgGGC<br>CCCCGG  | 2823      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACACAGGTGTCTGGCAATACC<br>TGCCCTGTGCAaaGgGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 3583      | CCGGGGGCCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCAAGGGGCCCC<br>CCGG | 486             |
| 1304      | CCGGGGG<br>CCGCGCT<br>GCACAGG | 2064      | CCTGTGC<br>AaaGgGGC<br>CCCCGG  | 2824      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCCGCGCTGCACACAGGTGTCTGGCAATACC<br>TGCCCTGTGCAaaGgGGCCCCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 3584      | CCGGGGGCCGCGCT<br>GCACAGGTGTCTG<br>GCAATACCTGCCTG<br>TGCATAGGGGCCCC<br>CGG | 486             |



| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1305      | CCGGGGG<br>CCGGGCT<br>GCAC/AGG | 2065      | CCTGTGC<br>AagCgGGC<br>CCCCGG | 2825      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGCTGCACACAGGTGTCTTGGCAATACC<br>TGCCTGTGCAgCgGGCCCCCGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3585      | CCGGGGGCCGGCT<br>GCACAGGTGTCTTG<br>GCAATACCTGCCTG<br>TGCAAGGGGGCCC<br>CCGG   | 486             |
| 1306      | CGAGGGA<br>GCAGGGT<br>GACCCCC  | 2066      | GGGGGTG<br>AgaCgGCT<br>CCCTCG | 2826      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGGGAGC/AGGGTGACCCCTGTCTTGGCAATACC<br>TGGGGGTCAgaCgGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3586      | CGAGGGAGCAGGG<br>TGACCCCCCTGTCT<br>GGCAATACCTGGG<br>GGGTCAAGCGGCTC<br>CCTCG  | 508             |
| 1307      | CGAGGGA<br>GCAGGGT<br>GACCCCC  | 2067      | GGGGGTG<br>AaaCaGCT<br>CCCTCG | 2827      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGGGAGC/AGGGTGACCCCTGTCTTGGCAATACC<br>TGGGGGTCAaaCaGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3587      | CGAGGGAGCAGGG<br>TGACCCCCCTGTCT<br>GGCAATACCTGGG<br>GGGTCAAAACAGCTC<br>CCTCG | 508             |
| 1308      | CGAGGGA<br>GCAGGGT<br>GACCCCC  | 2068      | GGGGGTG<br>AggCaGCT<br>CCCTCG | 2828      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGGGAGC/AGGGTGACCCCTGTCTTGGCAATACC<br>TGGGGGTCAggCaGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3588      | CGAGGGAGCAGGG<br>TGACCCCCCTGTCT<br>GGCAATACCTGGG<br>GGGTCAAGCAGCTC<br>CCTCG  | 508             |
| 1309      | CGAGGGA<br>GCAGGGT<br>GACCCCC  | 2069      | GGGGGTG<br>AaaCcGCT<br>CCCTCG | 2829      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGGGAGC/AGGGTGACCCCTGTCTTGGCAATACC<br>TGGGGGTCAaaCcGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3589      | CGAGGGAGCAGGG<br>TGACCCCCCTGTCT<br>GGCAATACCTGGG<br>GGGTCAAAACCGCTC<br>CCTCG | 508             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1310      | CGAGGGA<br>GCAGGGT<br>GACCCCC | 2070      | GGGGGTC<br>AgaCgGCT<br>CCCTCG | 2830      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>AGGGAGCAGGGTGACCCCTGTCTGGCAATACC<br>TGGGGGGTCAgaCgGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3590      | CGAGGGAGCAGGG<br>TGACCCCTGTCT<br>GGCAATACCTGGG<br>GGGTACAGCCGCTC<br>CCTCG  | 508             |
| 1311      | CGAGGGA<br>GCAGGGT<br>GACCCCC | 2071      | GGGGGTC<br>AgaCgGCT<br>CCCTCG | 2831      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>AGGGAGCAGGGTGACCCCTGTCTGGCAATACC<br>TGGGGGGTCAgaCgGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3591      | CGAGGGAGCAGGG<br>TGACCCCTGTCT<br>GGCAATACCTGGG<br>GGGTACAGCCGCTC<br>CCTCG  | 508             |
| 1312      | CGAGGGA<br>GCAGGGT<br>GACCCCC | 2072      | GGGGGTC<br>AagCgGCT<br>CCCTCG | 2832      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>AGGGAGCAGGGTGACCCCTGTCTGGCAATACC<br>TGGGGGGTCAagCgGCTCCCTCGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3592      | CGAGGGAGCAGGG<br>TGACCCCTGTCT<br>GGCAATACCTGGG<br>GGGTCAAGCGGCTC<br>CCTCG  | 508             |
| 1313      | CGAGGGA<br>GCAGGGT<br>GACCCCC | 2073      | GGGGGTC<br>AagCgGCT<br>CCCTCG | 2833      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>AGGGAGCAGGGTGACCCCTGTCTGGCAATACC<br>TGGGGGGTCAagCgGCTCCCTCGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3593      | CGAGGGAGCAGGG<br>TGACCCCTGTCT<br>GGCAATACCTGGG<br>GGGTACAGCCGCTC<br>CCTCG  | 508             |
| 1314      | TGGGCGA<br>AGCGGAC<br>CCACGAG | 2074      | CTCGTGG<br>GggGgCTT<br>CGCCCA | 2834      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGgGgCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3594      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGGGGGCTTCG<br>CCCA | 525             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1315      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2075      | CTCGTGG<br>GaaGaCTT<br>CGCCCA | 2835      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGaaGaCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3595      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGAAGACTTCG<br>CCCA | 525             |
| 1316      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2076      | CTCGTGG<br>GaaGaCTT<br>CGCCCA | 2836      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGaaGaCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3596      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGAGACTTCG<br>CCCA  | 525             |
| 1317      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2077      | CTCGTGG<br>GagGaCTT<br>CGCCCA | 2837      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGgagGaCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3597      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGAGACTTCG<br>CCCA  | 525             |
| 1318      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2078      | CTCGTGG<br>GegGaCTT<br>CGCCCA | 2838      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGegGaCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3598      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGCGGACTTCG<br>CCCA | 525             |
| 1319      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2079      | CTCGTGG<br>GggGaCTT<br>CGCCCA | 2839      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGCTCGTGGGggGaCTTCGCCCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3599      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGCTC<br>GTGGGGGACTTCG<br>CCCA  | 525             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1320      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2080      | CTCGTGG<br>GgaGgCTT<br>CGCCCA | 2840      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGTCTGTGGGgaGgCTTCGCCACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT    | 3600      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGTCTC<br>GTGGGAGGCTTCG<br>CCCA | 525             |
| 1321      | TGGGCGA<br>AGGCGAC<br>CCACGAG | 2081      | CTCGTGG<br>GagGgCTT<br>CGCCCA | 2841      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCGAAGGCGACCCACGAGTGTCTGGCAATAC<br>CTGTCTGTGGGgaGgCTTCGCCACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT    | 3601      | TGGGCGAAGGCGA<br>CCCACGAGTGTCT<br>GGCAATACCTGTCTC<br>GTGGGAGGCTTCG<br>CCCA | 525             |
| 1322      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2082      | GGTCGCC<br>TagGaCCA<br>CACCGG | 2842      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCCC<br>GGTGTGGGCGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTagGaCCACACCGGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3602      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTAGGACCACA<br>CCGG | 531             |
| 1323      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2083      | GGTCGCC<br>TgaGaCCA<br>CACCGG | 2843      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCCC<br>GGTGTGGGCGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTgaGaCCACACCGGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3603      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTCAGACCACA<br>CCGG | 531             |
| 1324      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2084      | GGTCGCC<br>TgaGaCCA<br>CACCGG | 2844      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCCC<br>GGTGTGGGCGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTgaGaCCACACCGGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3604      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTGAGACCACA<br>CCGG | 531             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1325      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2085      | GGTCGCC<br>TgaGgCCA<br>CACCGG | 2845      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGTGTGGGCGGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTgaGCCACACCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3605      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTCGGACCACA<br>CCGG  | 531             |
| 1326      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2086      | GGTCGCC<br>TaaGgCCA<br>CACCGG | 2846      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGTGTGGGCGGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTaaGgCCACACCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3606      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTAAGGCCACA<br>CCGG  | 531             |
| 1327      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2087      | GGTCGCC<br>TcaGgCCA<br>CACCGG | 2847      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGTGTGGGCGGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTcaGgCCACACCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3607      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTCAGGCCACA<br>CCGG  | 531             |
| 1328      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2088      | GGTCGCC<br>TgaGgCCA<br>CACCGG | 2848      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGTGTGGGCGGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTgaGgCCACACCGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3608      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTGAGGCCACA<br>CCGG  | 531             |
| 1329      | CCGGTGT<br>GGCGGAA<br>GGCGACC | 2089      | GGTCGCC<br>TggGgCCA<br>CACCGG | 2849      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGTGTGGGCGGAAGGCGACCTGTCTGGCAATACC<br>TGGGTCGCCCTggGgCCACACCGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3609      | CCGGTGTGGGCGA<br>AGGCGACCTGTCT<br>GGCAATACCTGGGT<br>CGCCTGGGGGCCACA<br>CCGG | 531             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1330      | CGCCGGT<br>GTGGGCG<br>AAGGCCA | 2090      | TCGCCCTT<br>CaaCgACA<br>CCGGCG | 2850      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGGCGAAGGCGATGTTCTGGCAATACC<br>TGTGCGCTTCaaCgACACCGGGCGACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3610      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCAACGACACCG<br>GCG | 533             |
| 1331      | CGCCGGT<br>GTGGGCG<br>AAGGCCA | 2091      | TCGCCCTT<br>CtgCgACA<br>CCGGCG | 2851      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGGCGAAGGCGATGTTCTGGCAATACC<br>TGTGCGCTTCtgCgACACCGGGCGACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3611      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCTGCGACACCG<br>GCG | 533             |
| 1332      | CGCCGGT<br>GTGGGCG<br>AAGGCCA | 2092      | TCGCCCTT<br>CaaCaACA<br>CCGGCG | 2852      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGGCGAAGGCGATGTTCTGGCAATACC<br>TGTGCGCTTCaaCaACACCGGGCGACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3612      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCAACAACACCG<br>GCG | 533             |
| 1333      | CGCCGGT<br>GTGGGCG<br>AAGGCCA | 2093      | TCGCCCTT<br>CcaCaACA<br>CCGGCG | 2853      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGGCGAAGGCGATGTTCTGGCAATACC<br>TGTGCGCTTCcaCaACACCGGGCGACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3613      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCCACAACACCG<br>GCG | 533             |
| 1334      | CGCCGGT<br>GTGGGCG<br>AAGGCCA | 2094      | TCGCCCTT<br>CagCaACA<br>CCGGCG | 2854      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGGCGAAGGCGATGTTCTGGCAATACC<br>TGTGCGCTTCagCaACACCGGGCGACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3614      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCAGCAACACCG<br>GCG | 533             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                                                | SEQ ID NO | full                                                                                                                                                           | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|----------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1335      | CGCCGGT<br>GTGGGCG<br>AAGGCGA | 2095      | TCGCCCTT<br>C <sub>19</sub> G <sub>1</sub> ACA<br>CCGGCG | 2855      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGCGGAAGCGGATGTTCTGGCAATACC<br>TGTGCGCTTC <sub>19</sub> G <sub>1</sub> ACAACCGGCGACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3615      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCTGCAACACCG<br>GCG | 533             |
| 1336      | CGCCGGT<br>GTGGGCG<br>AAGGCGA | 2096      | TCGCCCTT<br>C <sub>19</sub> G <sub>1</sub> ACA<br>CCGGCG | 2856      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGCGGAAGCGGATGTTCTGGCAATACC<br>TGTGCGCTTC <sub>19</sub> G <sub>1</sub> ACAACCGGCGACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3616      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCCGCAACACCG<br>GCG | 533             |
| 1337      | CGCCGGT<br>GTGGGCG<br>AAGGCGA | 2097      | TCGCCCTT<br>C <sub>19</sub> G <sub>1</sub> ACA<br>CCGGCG | 2857      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGTGTGGCGGAAGCGGATGTTCTGGCAATACC<br>TGTGCGCTTC <sub>19</sub> G <sub>1</sub> ACAACCGGCGACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3617      | CGCCGGTGTGGGCG<br>AAGGCGATGTTCTG<br>GCAATACCTGTGCG<br>CTTCTACGACACCG<br>GCG | 533             |
| 1338      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2098      | CGGCGCG<br>TatG <sub>1</sub> AACG<br>GGGCT               | 2858      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTCCCCACGCGCCGTGTCTGGCAATACC<br>TGC GGCGCT <sub>19</sub> G <sub>1</sub> AACGGGGCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT   | 3618      | AGCCCCGTCCCCA<br>CGCGCGTGTCTG<br>GCAATACCTGCGGC<br>GCGTATGTAAACGGG<br>GCT   | 549             |
| 1339      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2099      | CGGCGCG<br>T <sub>19</sub> aG <sub>1</sub> AAC<br>GGGCT  | 2859      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTCCCCACGCGCCGTGTCTGGCAATACC<br>TGC GGCGCT <sub>19</sub> aG <sub>1</sub> AACGGGGCTCACGGAGGCCCT<br>GCCCTGACTGCCACCGT  | 3619      | AGCCCCGTCCCCA<br>CGCGCGTGTCTG<br>GCAATACCTGCGGC<br>GCGTAAAGAAACGG<br>GGCT   | 549             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                            | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------|-----------------|
| 1340      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2100      | CGGCGCG<br>TetGcAAC<br>GGGGCT | 2860      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTtGcAACGGGGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3620      | AGCCCCGTTCCTCCACGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GGCT | 549             |
| 1341      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2101      | CGGCGCG<br>TaaGcAAC<br>GGGGCT | 2861      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTtGcAACGGGGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3621      | AGCCCCGTTCCTCCACGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GGCT | 549             |
| 1342      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2102      | CGGCGCG<br>TttGcAAC<br>GGGGCT | 2862      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTtGcAACGGGGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3622      | AGCCCCGTTCCTCCACGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GGCT | 549             |
| 1343      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2103      | CGGCGCG<br>TaaGcAAC<br>GGGGCT | 2863      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTtGcAACGGGGCTCACGGAGGCCCTG<br>GGCT             | 3623      | AGCCCCGTTCCTCCACGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GGCT | 549             |
| 1344      | AGCCCCG<br>TTCCCCA<br>CGCGCCG | 2104      | CGGCGCG<br>TatGcAAC<br>GGGGCT | 2864      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTtGcAACGGGGCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3624      | AGCCCCGTTCCTCCACGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GGCT | 549             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1345      | AGCCCGG<br>TTCCCCA<br>CGGGCGG | 2105      | CGGCGCG<br>TetGeAAC<br>GGGGCT | 2865      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CCCCGTTCCTCCACGCGCCGTGTCTGGCAATACC<br>TGCGGCGGTGGeAACGCGGGCTACGGAGGCCTG<br>CCCTGACTGCCACGGT    | 3625      | AGCCCCGTTCCTCC<br>CGCGCGGTGTCTG<br>GCAATACCTGCGGC<br>GCGTCTGCAACGGG<br>GCT | 549             |
| 1346      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2106      | CGCCCCG<br>GggCaTCC<br>GGACGG | 2866      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGGAGAGCGGGCGGTGTCTGGCAATACC<br>TGCGCCCCGGGgCaTCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT  | 3626      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGGCATCCGG<br>ACGG  | 726             |
| 1347      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2107      | CGCCCCG<br>GaaCaTCC<br>GGACGG | 2867      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGGAGAGCGGGCGGTGTCTGGCAATACC<br>TGCGCCCCGGGaaCaTCCGGACGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3627      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGAAACATCCGG<br>ACGG | 726             |
| 1348      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2108      | CGCCCCG<br>GgaCaTCC<br>GGACGG | 2868      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGGAGAGCGGGCGGTGTCTGGCAATACC<br>TGCGCCCCGGGgaCaTCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3628      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGACATCCGG<br>ACGG  | 726             |
| 1349      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2109      | CGCCCCG<br>GacCaTCC<br>GGACGG | 2869      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGGAGAGCGGGCGGTGTCTGGCAATACC<br>TGCGCCCCGGGacCaTCCGGACGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3629      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGACCATCCGG<br>ACGG | 726             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                                  | SEQ ID NO | full                                                                                                                                              | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|--------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1350      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2110      | CGCCCCG<br>GaaC <sub>g</sub> TCC<br>GGACGG | 2870      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGAGAGCCGGGCGTGTCTGGCAATACC<br>TGCGCCCCGgaaC <sub>g</sub> TCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3630      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGAAACGTCCGG<br>ACGG | 726             |
| 1351      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2111      | CGCCCCG<br>GgaC <sub>g</sub> TCC<br>GGACGG | 2871      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGAGAGCCGGGCGTGTCTGGCAATACC<br>TGCGCCCCGgaaC <sub>g</sub> TCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3631      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGACGTCCGG<br>ACGG  | 726             |
| 1352      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2112      | CGCCCCG<br>GgcC <sub>g</sub> TCC<br>GGACGG | 2872      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGAGAGCCGGGCGTGTCTGGCAATACC<br>TGCGCCCCGgC <sub>g</sub> TCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT   | 3632      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGGCGGTCCGG<br>ACGG | 726             |
| 1353      | CCGTCCG<br>GAGGAGC<br>CGGGGCG | 2113      | CGCCCCG<br>GggC <sub>g</sub> TCC<br>GGACGG | 2873      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GTCCGGAGAGAGCCGGGCGTGTCTGGCAATACC<br>TGCGCCCCGggC <sub>g</sub> TCCGGACGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3633      | CCGTCCGGAGGAG<br>CCGGGGCGTGTCT<br>GGCAATACCTGCGC<br>CCCGGGCGGTCCGG<br>ACGG | 726             |
| 1354      | AGAGCGC<br>CCGTCC<br>GGAGGAG  | 2114      | CTCCTCC<br>GtcCtGGG<br>CGTCT               | 2874      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCCGTCCGGAGAGTGTCTGGCAATACC<br>TGTCTCTCCGtcCtGGGCGCTCTACGGAGGCCTGC<br>CCTGACTGCCCCACGGT                | 3634      | AGAGCGCCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGTCTTGGGCGC<br>TCT | 734             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1355      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2115      | CTCCTCC<br>GatCaGGG<br>CGCTCT | 2875      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGatCaGGGCGCTCTACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 3635      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGATCAGGGCGC<br>TCT | 734             |
| 1356      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2116      | CTCCTCC<br>GttCtGGGC<br>GCTCT | 2876      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGttCtGGGCGCTCTACGGAGGCGCTGC<br>CCTGACTGCCACCGGT | 3636      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGTTCTGGGCGC<br>TCT | 734             |
| 1357      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2117      | CTCCTCC<br>GetCtGGG<br>CGCTCT | 2877      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGetCtGGGCGCTCTACGGAGGCGCTGC<br>CCTGACTGCCACCGGT | 3637      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGCTCTGGGCGC<br>TCT | 734             |
| 1358      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2118      | CTCCTCC<br>GacCtGGG<br>CGCTCT | 2878      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGacCtGGGCGCTCTACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 3638      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGACCTGGGCGC<br>TCT | 734             |
| 1359      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2119      | CTCCTCC<br>GatCtGGG<br>CGCTCT | 2879      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGatCtGGGCGCTCTACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 3639      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGATCAGGGCGC<br>TCT | 734             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1360      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2120      | CTCCTCC<br>GttCcGGG<br>CGCTCT | 2880      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGttCcGGGCGCTCTCACGGAGGCGCTGC<br>CCTGACTGCCACGGT | 3640      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGTCCGGGGCGC<br>TCT  | 734             |
| 1361      | AGAGCGC<br>CCCGTCC<br>GGAGGAG | 2121      | CTCCTCC<br>GttCcGGG<br>CGCTCT | 2881      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>AGCGCCCGTCCGGAGGAGTGTCTGGCAATACC<br>TGCTCCTCCGttCcGGGCGCTCTCACGGAGGCGCTG<br>CCTGACTGCCACGGT  | 3641      | AGAGCGCCCGTCC<br>GGAGGAGTGTCTG<br>GCAATACCTGCTCC<br>TCCGTCCGGGGCGC<br>TCT  | 734             |
| 1362      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2122      | CTCCCCA<br>GgaCaCGC<br>CCCCGG | 2882      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGTCCCCAGgaCaCGCCCCCGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT   | 3642      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGGACACGCCC<br>CCGG | 995             |
| 1363      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2123      | CTCCCCA<br>GagCaCGC<br>CCCCGG | 2883      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGTCCCCAGagCaCGCCCCCGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT   | 3643      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGGACACGCCC<br>CCGG | 995             |
| 1364      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2124      | CTCCCCA<br>GggCaCGC<br>CCCCGG | 2884      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGTCCCCAGggCaCGCCCCCGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT   | 3644      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGGACACGCCC<br>CCGG | 995             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1365      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2125      | CTCCCCA<br>GaaCtCGC<br>CCCCGG | 2885      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGCTCCCCAGaaCtCGCCCCCGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3645      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGAACTCGCCC<br>CCGG | 995             |
| 1366      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2126      | CTCCCCA<br>GggCtCGC<br>CCCCGG | 2886      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGCTCCCCAGggCtCGCCCCCGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3646      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGGGCTCGCCC<br>CCGG | 995             |
| 1367      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2127      | CTCCCCA<br>GaaCcCGC<br>CCCCGG | 2887      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGCTCCCCAGaaCcCGCCCCCGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3647      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGAACTCGCCC<br>CCGG | 995             |
| 1368      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2128      | CTCCCCA<br>GgaCcCGC<br>CCCCGG | 2888      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGCTCCCCAGgaCcCGCCCCCGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3648      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGAACTCGCCC<br>CCGG | 995             |
| 1369      | CCGGGGG<br>CGCGGGC<br>TGGGGAG | 2129      | CTCCCCA<br>GggCcCGC<br>CCCCGG | 2889      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>GGGGCGCGGGCTGGGGAGTGTCTGGCAATAC<br>CTGCTCCCCAGggCcCGCCCCCGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3649      | CCGGGGGCGCGGG<br>CTGGGGAGTGTCT<br>GGCAATACCTGCTC<br>CCCAGGGCCCGCCC<br>CCGG | 995             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1370      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2130      | GCGCCCC<br>CccAaGCC<br>TCCGCC | 2890      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCccAaGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3650      | GGCGGAGGCGGTCC<br>GGGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCCAGGCCCTC<br>CGCC  | 1006            |
| 1371      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2131      | GCGCCCC<br>CatAaGCC<br>TCCGCC | 2891      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCatAaGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3651      | GGCGGAGGCGGTCC<br>GGGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCATAAGCCTC<br>CGCC  | 1006            |
| 1372      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2132      | GCGCCCC<br>CctAaGCC<br>TCCGCC | 2892      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCctAaGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3652      | GGCGGAGGCGGTCC<br>GGGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCCTAAGCCTC<br>CGCC  | 1006            |
| 1373      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2133      | GCGCCCC<br>CacAaGCC<br>TCCGCC | 2893      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCacAaGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3653      | GGCGGAGGCGGTCC<br>GGGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCCAAGCCTC<br>CGCC   | 1006            |
| 1374      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2134      | GCGCCCC<br>CtcAaGCC<br>TCCGCC | 2894      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCtcAaGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3654      | GGCGGAGGCGGTCC<br>GGGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCCTCAAGCCTC<br>CGCC | 1006            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1375      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2135      | GCGCCCC<br>CeaAgGCC<br>TCCGCC | 2895      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCeaAgGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3655      | GGCGGAGGCGGTCC<br>GGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCCAAGGCCTC<br>CGCC | 1006            |
| 1376      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2136      | GCGCCCC<br>CatAgGCC<br>TCCGCC | 2896      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCatAgGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3656      | GGCGGAGGCGGTCC<br>GGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCATAGGCCTC<br>CGCC | 1006            |
| 1377      | GGCGGAG<br>GCGTCCG<br>GGGGCGC | 2137      | GCGCCCC<br>CacAgGCC<br>TCCGCC | 2897      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGAGCGTCCGGGGGCGCTGTCTTGGAATACC<br>TGGCGCCCCCacAgGCCCTCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3657      | GGCGGAGGCGGTCC<br>GGGGCGCTGTCT<br>GGCAATACCTGGCG<br>CCCCACAGGCCTC<br>CGCC | 1006            |
| 1378      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2138      | GAGCTTT<br>AtaAgCGG<br>GGTCT  | 2898      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCTCCTAAAGCTCTGTCTTGGAATACC<br>TGGAGCTTTAtaAgCGGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3658      | AGACCCCGCTCCT<br>AAAGCTCTGTCTG<br>GCAATACCTGGAGC<br>TTTATAAGCGGGG<br>TCT  | 1267            |
| 1379      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2139      | GAGCTTT<br>AtaAaCGG<br>GGTCT  | 2899      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCTCCTAAAGCTCTGTCTTGGAATACC<br>TGGAGCTTTAtaAaCGGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3659      | AGACCCCGCTCCT<br>AAAGCTCTGTCTG<br>GCAATACCTGGAGC<br>TTTATAAAGCGGGG<br>TCT | 1267            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1380      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2140      | GAGCTTT<br>AatAaGCG<br>GGGTCT | 2900      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCGTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAatAaGCGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3660      | AGACCCCGCGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTAATAAGCGGGG<br>TCT | 1267            |
| 1381      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2141      | GAGCTTT<br>ActAaGCG<br>GGGTCT | 2901      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCGTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAatAaGCGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3661      | AGACCCCGCGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTACTAAGCGGGG<br>TCT | 1267            |
| 1382      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2142      | GAGCTTT<br>AtcAaGCG<br>GGGTCT | 2902      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCGTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAtcAaGCGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3662      | AGACCCCGCGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTATCAAGCGGGG<br>TCT | 1267            |
| 1383      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2143      | GAGCTTT<br>AatAgGCG<br>GGGTCT | 2903      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCGTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAatAgGCGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3663      | AGACCCCGCGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTAATAAGCGGGG<br>TCT | 1267            |
| 1384      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2144      | GAGCTTT<br>AttAgGCG<br>GGGTCT | 2904      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCGTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAttAgGCGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3664      | AGACCCCGCGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTATTAGCGGGG<br>TCT  | 1267            |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                    | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------|-----------------|
| 1385      | AGACCCC<br>GCGTCCT<br>AAAGCTC | 2145      | GAGCTTT<br>AtcAgCG<br>GGGTCT  | 2905      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ACCCCGCTCCTAAAGCTCTGTTCGGCAATACC<br>TGGAGCTTTAtcAgGGGGTCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT   | 3665      | AGACCCCGGTCCT<br>AAAGCTCTGTTCCTG<br>GCAATACCTGGAGC<br>TTTATCAGGCGGGG<br>TCT    | 1267            |
| 1386      | GGGCCTA<br>GACCCCG<br>CGTCCTA | 2146      | TAGGACG<br>CcaGatCT<br>AGGCC  | 2906      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCCTAGACCCCGCTCCTATGTTCGGCAATACC<br>TGTAGGACGCaGatCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3666      | GGGCCTAGACCCCG<br>CGTCCTATGTTCCTG<br>GCAATACCTGTAGG<br>ACGCCAGATCTAGG<br>CCC   | 1273            |
| 1387      | GGGCCTA<br>GACCCCG<br>CGTCCTA | 2147      | TAGGACG<br>CatGfTCTA<br>GGCCC | 2907      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCCTAGACCCCGCTCCTATGTTCGGCAATACC<br>TGTAGGACGcatGfTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3667      | GGGCCTAGACCCCG<br>CGTCCTATGTTCCTG<br>GCAATACCTGTAGG<br>ACGCATGTTCCTAGG<br>CCC  | 1273            |
| 1388      | GGGCCTA<br>GACCCCG<br>CGTCCTA | 2148      | TAGGACG<br>CttGfTCTA<br>GGCCC | 2908      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCCTAGACCCCGCTCCTATGTTCGGCAATACC<br>TGTAGGACGcttGfTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3668      | GGGCCTAGACCCCG<br>CGTCCTATGTTCCTG<br>GCAATACCTGTAGG<br>ACGCTGTTCCTAGG<br>CCC   | 1273            |
| 1389      | GGGCCTA<br>GACCCCG<br>CGTCCTA | 2149      | TAGGACG<br>CetGfTCTA<br>GGCCC | 2909      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCCTAGACCCCGCTCCTATGTTCGGCAATACC<br>TGTAGGACGcetGfTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3669      | GGGCCTAGACCCCG<br>CGTCCTATGTTCCTG<br>GCAATACCTGTAGG<br>ACGCCGTGTTCCTAGG<br>CCC | 1273            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1390      | GGGCCTA<br>GACCCG<br>CGTCCTA  | 2150      | TAGGACG<br>CtcGcTCT<br>GGCCC  | 2910      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCTTAGACCCCCGCGTCTCTATGTTCTGGCAATACC<br>TGTAGGACGcGcTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3670      | GGGCCTAGACCCCG<br>CGTCCTATGTTCTG<br>GCAATACCTGTAGG<br>ACGCTCGTCTAGG<br>CCC  | 1273            |
| 1391      | GGGCCTA<br>GACCCG<br>CGTCCTA  | 2151      | TAGGACG<br>CaaGcTCT<br>AGGCC  | 2911      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCTTAGACCCCCGCGTCTCTATGTTCTGGCAATACC<br>TGTAGGACGcGcTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3671      | GGGCCTAGACCCCG<br>CGTCCTATGTTCTG<br>GCAATACCTGTAGG<br>ACGAAAGCTCTAGG<br>CCC | 1273            |
| 1392      | GGGCCTA<br>GACCCG<br>CGTCCTA  | 2152      | TAGGACG<br>CetGcTCTA<br>GGCCC | 2912      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCTTAGACCCCCGCGTCTCTATGTTCTGGCAATACC<br>TGTAGGACGcGcTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3672      | GGGCCTAGACCCCG<br>CGTCCTATGTTCTG<br>GCAATACCTGTAGG<br>ACGCTGCTCTAGG<br>CCC  | 1273            |
| 1393      | GGGCCTA<br>GACCCG<br>CGTCCTA  | 2153      | TAGGACG<br>CccGcTCT<br>AGGCC  | 2913      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GCTTAGACCCCCGCGTCTCTATGTTCTGGCAATACC<br>TGTAGGACGcGcTCTAGGCCCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3673      | GGGCCTAGACCCCG<br>CGTCCTATGTTCTG<br>GCAATACCTGTAGG<br>ACGCCGCTCTAGG<br>CCC  | 1273            |
| 1394      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2154      | ACAGGGG<br>GggTcCGT<br>GAGCCA | 2914      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCAGCAAGGCCCTCTGTGTTCTGGCAATACC<br>TGACAGGGGGggTcCGTGTAGCCACACGGAGGCCCT<br>GCCCTGACTGCCACGGT | 3674      | TGGCTCAGAAAGC<br>CCCCGTGTGTCTG<br>GCAATACCTGACAG<br>GGGGGTCCCGTGA<br>GCCA   | 609             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                                  | SEQ ID NO | full                                                                                                                                               | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|--------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1395      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2155      | ACAGGGG<br>GacT <sub>a</sub> CGT<br>GAGCCA | 2915      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGacT <sub>a</sub> CGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3675      | TGGCTCACGAAAGC<br>CCCCTGTGTCTG<br>GCAATACCTGACAG<br>GGGGACTACGTGA<br>GCCA | 609             |
| 1396      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2156      | ACAGGGG<br>GagT <sub>a</sub> CGT<br>GAGCCA | 2916      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGagT <sub>a</sub> CGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3676      | TGGCTCACGAAAGC<br>CCCCTGTGTCTG<br>GCAATACCTGACAG<br>GGGGAGTACGTGA<br>GCCA | 609             |
| 1397      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2157      | ACAGGGG<br>GaaT <sub>a</sub> CGT<br>GAGCCA | 2917      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGaaT <sub>a</sub> CGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3677      | TGGCTCACGAAAGC<br>CCCCTGTGTCTG<br>GCAATACCTGACAG<br>GGGGAATCCGTGA<br>GCCA | 609             |
| 1398      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2158      | ACAGGGG<br>GacT <sub>a</sub> CGT<br>GAGCCA | 2918      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGacT <sub>a</sub> CGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3678      | TGGCTCACGAAAGC<br>CCCCTGTGTCTG<br>GCAATACCTGACAG<br>GGGGACTCCGTGA<br>GCCA | 609             |
| 1399      | TGGCTCA<br>CGAAAGC<br>CCCCTGT | 2159      | ACAGGGG<br>GgcT <sub>a</sub> CGT<br>GAGCCA | 2919      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGgcT <sub>a</sub> CGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3679      | TGGCTCACGAAAGC<br>CCCCTGTGTCTG<br>GCAATACCTGACAG<br>GGGGCTCCGTGA<br>GCCA  | 609             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1400      | TGGCTCA<br>CGAAAGC<br>CCCCGT  | 2160      | ACAGGGG<br>GgaTgCGT<br>GAGCCA | 2920      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGgaTgCGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3680      | TGGCTCAGAAAGC<br>CCCCGTGTGTCTG<br>GCAATACCTGACAG<br>GGGGGATGCGGTGA<br>GCCA  | 609             |
| 1401      | TGGCTCA<br>CGAAAGC<br>CCCCGT  | 2161      | ACAGGGG<br>GacTgCGT<br>GAGCCA | 2921      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTCACGAAAGCCCCCTGTGTGTCTGGCAATACC<br>TGACAGGGGGacTgCGTGAGCCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3681      | TGGCTCAGAAAGC<br>CCCCGTGTGTCTG<br>GCAATACCTGACAG<br>GGGGACTGCGGTGA<br>GCCA  | 609             |
| 1402      | TGCTTGG<br>CTCACGA<br>AAGCCCC | 2162      | GGGGCTT<br>TaaTtAGCC<br>AGGCA | 2922      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCTCACGAAAGCCCCCTGTGTGTGGCAATACC<br>TGGGGGCTTaaTtAGCCAGGCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3682      | TGCTTGGCTCACGA<br>AAGCCCCGTGTCTG<br>GCAATACCTGGGG<br>GCTTTAATTAGCCA<br>GGCA | 613             |
| 1403      | TGCTTGG<br>CTCACGA<br>AAGCCCC | 2163      | GGGGCTT<br>TgaTtAGC<br>CAGGCA | 2923      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCTCACGAAAGCCCCCTGTGTGTGGCAATACC<br>TGGGGGCTTgTtAGCCAGGCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3683      | TGCTTGGCTCACGA<br>AAGCCCCGTGTCTG<br>GCAATACCTGGGG<br>GCTTTGATAAGCCA<br>GGCA | 613             |
| 1404      | TGCTTGG<br>CTCACGA<br>AAGCCCC | 2164      | GGGGCTT<br>TgtTtAGC<br>CAGGCA | 2924      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCTCACGAAAGCCCCCTGTGTGTGGCAATACC<br>TGGGGGCTTgtTtAGCCAGGCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3684      | TGCTTGGCTCACGA<br>AAGCCCCGTGTCTG<br>GCAATACCTGGGG<br>GCTTTGTtAAGCCA<br>GGCA | 613             |

| SEQ ID NO | guide                  | SEQ ID NO | passenger                | SEQ ID NO | full                                                                                                                       | SEQ ID NO | SenLoopAnti                                                      | target position |
|-----------|------------------------|-----------|--------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------|-----------------|
| 1405      | TGCTGG CTCACGA AAGCCCC | 2165      | GGGGCTT TgcTgcAGC CAGGCA | 2925      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG CCTGGCTCACGAAAGCCCTGTTCTGGCAATACC TGGGGGCTTTgcTgcAGCCAGGCACACGGAGGCCTG CCTGACTGCCACCGGT | 3685      | TGCCTGGCTCACGA AAGCCCCCTGTCTG GCAATACCTGGGG GCTTTACTAAGCCA GGCA  | 613             |
| 1406      | TGCTGG CTCACGA AAGCCCC | 2166      | GGGGCTT TgcTgcAGC CAGGCA | 2926      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG CCTGGCTCACGAAAGCCCTGTTCTGGCAATACC TGGGGGCTTTgcTgcAGCCAGGCACACGGAGGCCTG CCTGACTGCCACCGGT | 3686      | TGCCTGGCTCACGA AAGCCCCCTGTCTG GCAATACCTGGGG GCTTTACTAAGCCA GGCA  | 613             |
| 1407      | TGCTGG CTCACGA AAGCCCC | 2167      | GGGGCTT TgcTgcAGC CAGGCA | 2927      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG CCTGGCTCACGAAAGCCCTGTTCTGGCAATACC TGGGGGCTTTgcTgcAGCCAGGCACACGGAGGCCTG CCTGACTGCCACCGGT | 3687      | TGCCTGGCTCACGA AAGCCCCCTGTCTG GCAATACCTGGGG GCTTTGCTTACGCCA GGCA | 613             |
| 1408      | TGCTGG CTCACGA AAGCCCC | 2168      | GGGGCTT TgcTgcAGC CAGGCA | 2928      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG CCTGGCTCACGAAAGCCCTGTTCTGGCAATACC TGGGGGCTTTgcTgcAGCCAGGCACACGGAGGCCTG CCTGACTGCCACCGGT | 3688      | TGCCTGGCTCACGA AAGCCCCCTGTCTG GCAATACCTGGGG GCTTTGATCAGCCA GGCA  | 613             |
| 1409      | TGCTGG CTCACGA AAGCCCC | 2169      | GGGGCTT TgcTgcAGC CAGGCA | 2929      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG CCTGGCTCACGAAAGCCCTGTTCTGGCAATACC TGGGGGCTTTgcTgcAGCCAGGCACACGGAGGCCTG CCTGACTGCCACCGGT | 3689      | TGCCTGGCTCACGA AAGCCCCCTGTCTG GCAATACCTGGGG GCTTTGCTCAGCCA GGCA  | 613             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                              | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1410      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2170      | CTTTCGT<br>GttCaAGG<br>CAGCGA | 2930      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTGGCTCAGCAAGAGTGTCTGGCAATACC<br>TGCTTTCGTGttCaAGGACGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3690      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTTCAGAGGCAG<br>CGA | 617             |
| 1411      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2171      | CTTTCGT<br>GttCgAGG<br>CAGCGA | 2931      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTGGCTCAGCAAGAGTGTCTGGCAATACC<br>TGCTTTCGTGttCgAGGACGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3691      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTTCGAGGCAG<br>CGA  | 617             |
| 1412      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2172      | CTTTCGT<br>GttCaAGG<br>CAGCGA | 2932      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTGGCTCAGCAAGAGTGTCTGGCAATACC<br>TGCTTTCGTGttCaAGGACGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3692      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTTCAGAGGCAG<br>CGA | 617             |
| 1413      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2173      | CTTTCGT<br>GttCgAGG<br>CAGCGA | 2933      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTGGCTCAGCAAGAGTGTCTGGCAATACC<br>TGCTTTCGTGttCgAGGACGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3693      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTACGAGGCA<br>GCGA  | 617             |
| 1414      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2174      | CTTTCGT<br>GttCgAGG<br>CAGCGA | 2934      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTGGCTCAGCAAGAGTGTCTGGCAATACC<br>TGCTTTCGTGttCgAGGACGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3694      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTACGAGGCA<br>GCGA  | 617             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1415      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2175      | CTTTTCGT<br>GctCgAGG<br>CAGCGA | 2935      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTTGGCTCAGCAAAGTGTCTGGCAATACC<br>TGCTTTTCGTGctCgAGGCAAGCAGACCGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3695      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTCCGAGGCAG<br>CGA  | 617             |
| 1416      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2176      | CTTTTCGT<br>GtcCgAGG<br>CAGCGA | 2936      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTTGGCTCAGCAAAGTGTCTGGCAATACC<br>TGCTTTTCGTGtcCgAGGCAAGCAGACCGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3696      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTCCGAGGCAG<br>CGA  | 617             |
| 1417      | TCGCTGC<br>CTGGCTC<br>ACGAAAG | 2177      | CTTTTCGT<br>GccCgAGG<br>CAGCGA | 2937      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GCTGCTTGGCTCAGCAAAGTGTCTGGCAATACC<br>TGCTTTTCGTGccCgAGGCAAGCAGACCGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3697      | TCGCTGCCTGGCTC<br>ACGAAAGTGTCTG<br>GCAATACCTGCTTT<br>CGTGTCCGAGGCAG<br>GCGA | 617             |
| 1418      | TGGGCTG<br>CAGCGCG<br>GGGCGGG | 2178      | CCGCCCC<br>CagGatTGC<br>AGCCCA | 2938      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GGCTGCAGCGCGGGGGCGGTGTCTGGCAATACC<br>TGCCGCCCCCagGatTGCAGCCCCACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3698      | TGGGCTGCAGCGCG<br>GGGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCAGGATGCAGC<br>CCA  | 641             |
| 1419      | TGGGCTG<br>CAGCGCG<br>GGGCGGG | 2179      | CCGCCCC<br>CaaGatTGC<br>AGCCCA | 2939      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>GGCTGCAGCGCGGGGGCGGTGTCTGGCAATACC<br>TGCCGCCCCCaaGatTGCAGCCCCACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3699      | TGGGCTGCAGCGCG<br>GGGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCAAGATGCAGC<br>CCA  | 641             |

| SEQ ID NO | guide                       | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                              | SEQ ID NO | SenLoopAnti                                                              | target position |
|-----------|-----------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------|-----------------|
| 1420      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2180      | CCGCCCC<br>CtgGaTGC<br>AGCCCA | 2940      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGAATACC<br>TGCCGCCCCCtgGaTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3700      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCGGATGCAGC<br>CCA  | 641             |
| 1421      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2181      | CCGCCCC<br>CtgGaTGC<br>AGCCCA | 2941      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGAATACC<br>TGCCGCCCCCtgGaTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3701      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCGGATGCAGC<br>CCA  | 641             |
| 1422      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2182      | CCGCCCC<br>CtaGgTGC<br>AGCCCA | 2942      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGAATACC<br>TGCCGCCCCCtaGgTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3702      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCTAGGTGCAGC<br>CCA | 641             |
| 1423      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2183      | CCGCCCC<br>CcaGgTGC<br>AGCCCA | 2943      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGAATACC<br>TGCCGCCCCCcaGgTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3703      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCCAGGTGCAGC<br>CCA | 641             |
| 1424      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2184      | CCGCCCC<br>CtgGgTGC<br>AGCCCA | 2944      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGAATACC<br>TGCCGCCCCCtgGgTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3704      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCGC<br>CCCCTGGGTGCAGC<br>CCA | 641             |



| SEQ ID NO | guide                       | SEQ ID NO | passenger                               | SEQ ID NO | full                                                                                                                                            | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-----------------------------|-----------|-----------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1425      | TGGGCTG<br>CAGCGG<br>GGGCGG | 2185      | CCGCCCC<br>C <sub>8</sub> gTGC<br>AGCCA | 2945      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GGCTGCAGCGCGGGGGGGTGTCTTGGCAATACC<br>TGCCGCCCCC <sub>8</sub> gTGCAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT   | 3705      | TGGGCTGCAGCGG<br>GGGCGGTGTCTG<br>GCAATACCTGCCG<br>CCCCGGGTGCAGC<br>CCA     | 641             |
| 1426      | CGCGGG<br>GCAGGT<br>GGGAGAT | 2186      | ATCTCCC<br>AtgCaGCC<br>CCGGCG           | 2946      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATGTCTTGGCAATACC<br>TGATCTCCCA <sub>8</sub> gCaGCCCGGGCAGCGAGGCCCTG<br>CCCTGACTGCCACGGT   | 3706      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTG<br>GCAATACCTGATCT<br>CCCATGCCGCCCG<br>GCG  | 685             |
| 1427      | CGCGGG<br>GCAGGT<br>GGGAGAT | 2187      | ATCTCCC<br>AtaCaGCC<br>CCGGCG           | 2947      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATGTCTTGGCAATACC<br>TGATCTCCCA <sub>8</sub> taCaGCCCGGGCAGCGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3707      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTG<br>GCAATACCTGATCT<br>CCCATAAGCCCCG<br>GCG  | 685             |
| 1428      | CGCGGG<br>GCAGGT<br>GGGAGAT | 2188      | ATCTCCC<br>AcaCaGCC<br>CCGGCG           | 2948      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATGTCTTGGCAATACC<br>TGATCTCCCA <sub>8</sub> acaCaGCCCGGGCAGCGAGGCCCTG<br>CCCTGACTGCCACGGT | 3708      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTG<br>GCAATACCTGATCT<br>CCCACAGCCCCG<br>GCG   | 685             |
| 1429      | CGCGGG<br>GCAGGT<br>GGGAGAT | 2189      | ATCTCCC<br>AtgCaGCC<br>CCGGCG           | 2949      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATGTCTTGGCAATACC<br>TGATCTCCCA <sub>8</sub> AtgCaGCCCGGGCAGCGAGGCCCTG<br>CCCTGACTGCCACGGT | 3709      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTG<br>GCAATACCTGATCT<br>CCCATGCAGCCCCG<br>GCG | 685             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1430      | CGCCGGG<br>GCAGGTT<br>GGGAGAT | 2190      | ATCTCCC<br>AegCaGCC<br>CCGGCG | 2950      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATTGTCTGGCAATACC<br>TGATCTCCCAegCaGCCCCGGCGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 3710      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTTG<br>GCAATACCTGATCT<br>CCCACGCGGCCCGG<br>GCG | 685             |
| 1431      | CGCCGGG<br>GCAGGTT<br>GGGAGAT | 2191      | ATCTCCC<br>AtaCaGCC<br>CCGGCG | 2951      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATTGTCTGGCAATACC<br>TGATCTCCCAtaCaGCCCCGGCGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 3711      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTTG<br>GCAATACCTGATCT<br>CCCATACCGGCCCG<br>GCG | 685             |
| 1432      | CGCCGGG<br>GCAGGTT<br>GGGAGAT | 2192      | ATCTCCC<br>AigCaGCC<br>CCGGCG | 2952      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATTGTCTGGCAATACC<br>TGATCTCCCAigCaGCCCCGGCGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 3712      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTTG<br>GCAATACCTGATCT<br>CCCATGCGGCCCGG<br>GCG | 685             |
| 1433      | CGCCGGG<br>GCAGGTT<br>GGGAGAT | 2193      | ATCTCCC<br>AegCaGCC<br>CCGGCG | 2953      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCGGGGCAGGTGGGAGATTGTCTGGCAATACC<br>TGATCTCCCAegCaGCCCCGGCGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 3713      | CGCCGGGGCAGGTT<br>GGGAGATTGTCTTG<br>GCAATACCTGATCT<br>CCCACGCGGCCCGG<br>GCG | 685             |
| 1434      | AATCCCC<br>GCGGCC<br>GGGCGAG  | 2194      | CTGCCCC<br>GegGaGCC<br>GGGATT | 2954      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGGAGATTGTCTGGCAATACC<br>TGCTGCCCCCGegGaGCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3714      | AATCCCCGCGCGCC<br>GGGGCAGTGTCTTG<br>GCAATACCTGCTGC<br>CCCGCGGAGCGGG<br>GATT | 695             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1435      | AATCCCC<br>GCGGCC<br>GGGCGAG | 2195      | CTGCCCC<br>GtaGagCG<br>GGGATT | 2955      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGCAGTGTCTGGCAATACC<br>TGCTGCCCCGtaGagCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3715      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGTAGAGCGGG<br>GATT | 695             |
| 1436      | AATCCCC<br>GCGGCC<br>GGGCGAG | 2196      | CTGCCCC<br>GagGagCG<br>GGGATT | 2956      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGCAGTGTCTGGCAATACC<br>TGCTGCCCCGagGagCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3716      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGAGGAGCGGG<br>GATT | 695             |
| 1437      | AATCCCC<br>GCGGCC<br>GGGCGAG | 2197      | CTGCCCC<br>GtgGagCG<br>GGGATT | 2957      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGCAGTGTCTGGCAATACC<br>TGCTGCCCCGtgGagCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3717      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGTGGAGCGGG<br>GATT | 695             |
| 1438      | AATCCCC<br>GCGGCC<br>GGGCGAG | 2198      | CTGCCCC<br>GaaGgCG<br>GGGATT  | 2958      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGCAGTGTCTGGCAATACC<br>TGCTGCCCCGaaGgCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3718      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGAAGGCGGG<br>GATT  | 695             |
| 1439      | AATCCCC<br>GCGGCC<br>GGGCGAG | 2199      | CTGCCCC<br>GaaGgCG<br>GGGATT  | 2959      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCCGCGCGCGGGCAGTGTCTGGCAATACC<br>TGCTGCCCCGaaGgCGGGGATTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3719      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGCAGGCGGG<br>GATT  | 695             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                             | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1440      | AATCCCC<br>GCGGCC<br>GGGCGAG  | 2200      | CTGCCCC<br>GagGgGCG<br>GGGATT | 2960      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCGCGCGCCGGGCGAGTGTCTGGCAATACC<br>TGCTGCCCGGgGgGCGGGGATTACGGAGGCCT<br>GCCCTGACTGCCACGGT  | 3720      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGAGGGCGGG<br>GATT  | 695             |
| 1441      | AATCCCC<br>GCGGCC<br>GGGCGAG  | 2201      | CTGCCCC<br>GegGgGCG<br>GGGATT | 2961      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>TCCCGCGCGCCGGGCGAGTGTCTGGCAATACC<br>TGCTGCCCGGgGgGCGGGGATTACGGAGGCCT<br>GCCCTGACTGCCACGGT  | 3721      | AATCCCCGCGCGCC<br>GGGCGAGTGTCTG<br>GCAATACCTGCTGC<br>CCCGCGGGCGGG<br>GATT  | 695             |
| 1442      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2202      | GGGGATT<br>TacCaTAC<br>GCCGCC | 2962      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCTGTCTGGCAATACC<br>TGGGGGATTaaCaTACGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACGGT  | 3722      | GGCGGCGTAGGCG<br>AAATCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTACCATACG<br>CCGCC  | 709             |
| 1443      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2203      | GGGGATT<br>TaaCaTAC<br>GCCGCC | 2963      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCTGTCTGGCAATACC<br>TGGGGGATTaaCaTACGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACGGT  | 3723      | GGCGGCGTAGGCG<br>AAATCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTAAACATACG<br>CCGCC | 709             |
| 1444      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2204      | GGGGATT<br>TgaCaTAC<br>GCCGCC | 2964      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCTGTCTGGCAATACC<br>TGGGGGATTTgaCaTACGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3724      | GGCGGCGTAGGCG<br>AAATCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTTGACATACG<br>CCGCC | 709             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1445      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2205      | GGGGATT<br>TgtCaTAC<br>GCCGCC | 2965      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCCCTGTTCTGGCAATACC<br>TGGGGGATTTgtCaTACGCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3725      | GGCGGCGTAGGCG<br>AAATCCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTGTACATACG<br>CCGCC | 709             |
| 1446      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2206      | GGGGATT<br>TgtCgTAC<br>GCCGCC | 2966      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCCCTGTTCTGGCAATACC<br>TGGGGGATTTgtCgTACGCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3726      | GGCGGCGTAGGCG<br>AAATCCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTGTACGTACG<br>CCGCC | 709             |
| 1447      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2207      | GGGGATT<br>TgtCgTAC<br>GCCGCC | 2967      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCCCTGTTCTGGCAATACC<br>TGGGGGATTTgtCgTACGCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3727      | GGCGGCGTAGGCG<br>AAATCCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTGTCTGTACG<br>CCGCC | 709             |
| 1448      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2208      | GGGGATT<br>TgtCgTAC<br>GCCGCC | 2968      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCCCTGTTCTGGCAATACC<br>TGGGGGATTTgtCgTACGCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3728      | GGCGGCGTAGGCG<br>AAATCCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTACCGTACG<br>CCGCC  | 709             |
| 1449      | GGCGGCG<br>TAGGCGA<br>AATCCCC | 2209      | GGGGATT<br>TgtCgTAC<br>GCCGCC | 2969      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGGCGTAGGCGAAATCCCCCTGTTCTGGCAATACC<br>TGGGGGATTTgtCgTACGCCGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3729      | GGCGGCGTAGGCG<br>AAATCCCCCTGTCT<br>GGCAATACCTGGG<br>GGATTGTCCGTACG<br>CCGCC | 709             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1450      | GTCCGGA<br>GGAGCCG<br>GGCGGC | 2210      | GCCGCCC<br>CccCgCCT<br>CCGGAC | 2970      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGGAGGAGCGGGGGCTGTCTGGCAATAC<br>CTGGCCGCCCCcCgCCTCCGGACACCGGAGGCCT<br>GCCCTGACTGCCCCACGGT   | 3730      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCCCCCCCTCC<br>GGAC | 724             |
| 1451      | GTCCGGA<br>GGAGCCG<br>GGCGGC | 2211      | GCCGCCC<br>CatCaCCTC<br>CGGAC | 2971      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGGAGGAGCGGGGGCTGTCTGGCAATAC<br>CTGGCCGCCCCCatCaCCTCCGGACACCGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3731      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCATCACCTCC<br>GGAC | 724             |
| 1452      | GTCCGGA<br>GGAGCCG<br>GGCGGC | 2212      | GCCGCCC<br>CtaCgCCTC<br>CGGAC | 2972      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGGAGGAGCGGGGGCTGTCTGGCAATAC<br>CTGGCCGCCCCtCaCgCCTCCGGACACCGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3732      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCTACCCCTCC<br>GGAC | 724             |
| 1453      | GTCCGGA<br>GGAGCCG<br>GGCGGC | 2213      | GCCGCCC<br>CcaCgCCT<br>CCGGAC | 2973      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGGAGGAGCGGGGGCTGTCTGGCAATAC<br>CTGGCCGCCCCCaCgCCTCCGGACACCGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3733      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCACCCCTCC<br>GGAC  | 724             |
| 1454      | GTCCGGA<br>GGAGCCG<br>GGCGGC | 2214      | GCCGCCC<br>CatCgCCTC<br>CGGAC | 2974      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGGAGGAGCGGGGGCTGTCTGGCAATAC<br>CTGGCCGCCCCCatCgCCTCCGGACACCGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3734      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCATCCCTCC<br>GGAC  | 724             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1455      | GTCCGGA<br>GGAGCCG<br>GGGCGGC | 2215      | GCCGCCC<br>CctCctTC<br>CGGAC  | 2975      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGAGGAGAGCCGGGGCGGCTGTCTGGCAATAC<br>CTGGCCGCCCCctCctCCTCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3735      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCCTCCCCCTCC<br>GGAC | 724             |
| 1456      | GTCCGGA<br>GGAGCCG<br>GGGCGGC | 2216      | GCCGCCC<br>CacCctTC<br>CCGAC  | 2976      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGAGGAGAGCCGGGGCGGCTGTCTGGCAATAC<br>CTGGCCGCCCCacCctCCTCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3736      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCACCCCCCTCC<br>GGAC | 724             |
| 1457      | GTCCGGA<br>GGAGCCG<br>GGGCGGC | 2217      | GCCGCCC<br>CctCctTC<br>CGGAC  | 2977      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCGAGGAGAGCCGGGGCGGCTGTCTGGCAATAC<br>CTGGCCGCCCCctCctCCTCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3737      | GTCCGGAGGAGCC<br>GGGGCGGCTGTCT<br>GGCAATACCTGGCC<br>GCCCCCTCCCCCTCC<br>GGAC | 724             |
| 1458      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2218      | GGGCGCT<br>CaaCgACC<br>CTCAGG | 2978      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCaaCgACCCCTCAGGCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3738      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCAACGACCC<br>TCAGG  | 746             |
| 1459      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2219      | GGGCGCT<br>CcaCaACC<br>CTCAGG | 2979      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCcaCaACCCCTCAGGCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3739      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCCACAAACCC<br>TCAGG | 746             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1460      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2220      | GGGCGCT<br>CgaCaACC<br>CTCAGG | 2980      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCgaCaACCCTCAGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3740      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCGACAACCC<br>TCAGG | 746             |
| 1461      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2221      | GGGCGCT<br>CagCaACC<br>CTCAGG | 2981      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCagCaACCCTCAGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3741      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCAGCAACCC<br>TCAGG | 746             |
| 1462      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2222      | GGGCGCT<br>CegCaACC<br>CTCAGG | 2982      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCegCaACCCTCAGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3742      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCCGCAACCC<br>TCAGG | 746             |
| 1463      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2223      | GGGCGCT<br>CggCaACC<br>CTCAGG | 2983      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCggCaACCCTCAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGT | 3743      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCGGCAACCC<br>TCAGG | 746             |
| 1464      | CCTGAGG<br>GTGGGAG<br>AGCGCCC | 2224      | GGGCGCT<br>CegCaACC<br>CTCAGG | 2984      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGAGGGTGGGAGAGCGCCCTGTCTGGCAATACC<br>TGGGGCGCTCegCaACCCTCAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGT | 3744      | CCTGAGGGTGGGA<br>GAGCGCCCTGTCT<br>GGCAATACCTGGG<br>GCGCTCCGCGACCC<br>TCAGG | 746             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                                  | SEQ ID NO | full                                                                                                                                                            | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|--------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1465      | CCTGAGG<br>GTGGGAG<br>AGCGGCC | 2225      | GGCGGCT<br>CggC <sub>2</sub> ACC<br>CTCAGG | 2985      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>TGAGGGTGGGAGAGCGCCTGTCTTGGCAATACC<br>TGGGGCGCTC <sub>2</sub> ggC <sub>2</sub> ACCCTCAGGCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3745      | CCTGAGGGTGGGA<br>GAGCGCCTGTCT<br>GGCAATACCTGGG<br>GGCTGGCGACCC<br>TCAGG   | 746             |
| 1466      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2226      | GGCGCTC<br>TaaCtCCCT<br>CAGGC              | 2986      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCCTGTCTTGGCAATACC<br>TGGGGCGCTC <sub>2</sub> TaaCtCCCTCAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT             | 3746      | GCCTGAGGGTGGG<br>AGAGCGCCTGTCT<br>GGCAATACCTGGG<br>GCTCTAACTCCCTC<br>AGGC | 747             |
| 1467      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2227      | GGCGCTC<br>TgaCtCCCT<br>CAGGC              | 2987      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCCTGTCTTGGCAATACC<br>TGGGGCGCTC <sub>2</sub> TgaCtCCCTCAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT             | 3747      | GCCTGAGGGTGGG<br>AGAGCGCCTGTCT<br>GGCAATACCTGGG<br>GCTCTGACTCCCTC<br>AGGC | 747             |
| 1468      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2228      | GGCGCTC<br>TggCtCCCT<br>CAGGC              | 2988      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCCTGTCTTGGCAATACC<br>TGGGGCGCTC <sub>2</sub> TggCtCCCTCAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT             | 3748      | GCCTGAGGGTGGG<br>AGAGCGCCTGTCT<br>GGCAATACCTGGG<br>GCTCTAGCTCCCTC<br>AGGC | 747             |
| 1469      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2229      | GGCGCTC<br>TggCtCCCT<br>CAGGC              | 2989      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCCTGTCTTGGCAATACC<br>TGGGGCGCTC <sub>2</sub> TggCtCCCTCAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT             | 3749      | GCCTGAGGGTGGG<br>AGAGCGCCTGTCT<br>GGCAATACCTGGG<br>GCTCTGGCTCCCTC<br>AGGC | 747             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1470      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2230      | GGCGCTC<br>TaaCεCCC<br>TCAGGC | 2990      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCTGTCTTGGAATACC<br>TGGGCGCTCTaaCεCCCTCAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT     | 3750      | GCCTGAGGGTGGG<br>AGAGCGCTGTCT<br>GGCAATACCTGGGC<br>GCTCTAACCCCTC<br>AGGC   | 747             |
| 1471      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2231      | GGCGCTC<br>TgaCεCCC<br>TCAGGC | 2991      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCTGTCTTGGAATACC<br>TGGGCGCTCTgaCεCCCTCAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT     | 3751      | GCCTGAGGGTGGG<br>AGAGCGCTGTCT<br>GGCAATACCTGGGC<br>GCTCTGACCCCTC<br>AGGC   | 747             |
| 1472      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2232      | GGCGCTC<br>TagCεCCC<br>TCAGGC | 2992      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCTGTCTTGGAATACC<br>TGGGCGCTCTagCεCCCTCAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT     | 3752      | GCCTGAGGGTGGG<br>AGAGCGCTGTCT<br>GGCAATACCTGGGC<br>GCTCTAGCCCTC<br>AGGC    | 747             |
| 1473      | GCCTGAG<br>GGTGGGA<br>GAGCGCC | 2233      | GGCGCTC<br>TggCεCCC<br>TCAGGC | 2993      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGGC<br>CTGAGGGTGGGAGAGCGCTGTCTTGGAATACC<br>TGGGCGCTCTggCεCCCTCAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT     | 3753      | GCCTGAGGGTGGG<br>AGAGCGCTGTCT<br>GGCAATACCTGGGC<br>GCTCTGGCCCTC<br>AGGC    | 747             |
| 1474      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2234      | CCTCAGG<br>CaaCaCGG<br>TGGCCT | 2994      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGAG<br>GCCACCGAGGAGCCTGAGGCTGTCTTGGAATACC<br>TGCCCTCAGGCCaaCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3754      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAACACGGT<br>GGCCT | 760             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1475      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2235      | CCTCAGG<br>CagCaCGG<br>TGGCCT | 2995      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGagCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3755      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAGCACGGT<br>GGCCT | 760             |
| 1476      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2236      | CCTCAGG<br>CagCaCGG<br>TGGCCT | 2996      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGagCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3756      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAGCACGGT<br>GGCCT | 760             |
| 1477      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2237      | CCTCAGG<br>CaaCaCGG<br>TGGCCT | 2997      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGaaCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3757      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAACCCGGT<br>GGCCT | 760             |
| 1478      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2238      | CCTCAGG<br>CcaCaCGG<br>TGGCCT | 2998      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGcaCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3758      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCACCCGGTG<br>GCCCT | 760             |
| 1479      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2239      | CCTCAGG<br>CagCaCGG<br>TGGCCT | 2999      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGagCaCGGTGGCCTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3759      | AGGCCACCGAGGA<br>GCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAGCCCGGT<br>GGCCT | 760             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1480      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2240      | CCTCAGG<br>CggCcCGG<br>TGGCCT | 3000      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGgCgCGGTGGCCTCACGGAGGCGCTG<br>CCCTGACTGCCACCGGT  | 3760      | AGGCCACCGAGGA<br>GCCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGCGGCCCGGT<br>GGCCT  | 760             |
| 1481      | AGGCCAC<br>CGAGGAG<br>CCTGAGG | 2241      | CCTCAGG<br>CaaCgCGG<br>TGGCCT | 3001      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCCACCGAGAGAGCTGAGGTGTCTTGGCAATACC<br>TGCCCTCAGGCGaaCgCGGTGGCCTCACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 3761      | AGGCCACCGAGGA<br>GCCCTGAGGTGTCT<br>GGCAATACCTGCCT<br>CAGGCAACGCGGT<br>GGCCT | 760             |
| 1482      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2242      | CCGCTCA<br>AaaGaGGC<br>CGCAGG | 3002      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCGC<br>TGCGGCCCGCTTGAGCGGTGTCTTGGCAATACC<br>TGCCGCTCAaaGaGGCCCGCAGGCACGGAGGCGCT<br>GCCCTGACTGCCACCGGT   | 3762      | CCTGCGGCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAAAAGAGGCCG<br>CAGG   | 863             |
| 1483      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2243      | CCGCTCA<br>AcaGaGGC<br>CGCAGG | 3003      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCGC<br>TGCGGCCCGCTTGAGCGGTGTCTTGGCAATACC<br>TGCCGCTCAaCaGaGGCCCGCAGGCACGGAGGCGCT<br>GCCCTGACTGCCACCGGT  | 3763      | CCTGCGGCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAACAGAGGCCG<br>CAGG   | 863             |
| 1484      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2244      | CCGCTCA<br>AegGaGGC<br>CGCAGG | 3004      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCGC<br>TGCGGCCCGCTTGAGCGGTGTCTTGGCAATACC<br>TGCCGCTCAaegGaGGCCCGCAGGCACGGAGGCGCT<br>GCCCTGACTGCCACCGGT  | 3764      | CCTGCGGCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAACGAGAGGCCG<br>CAGG  | 863             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                              | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1485      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2245      | CCGCTCA<br>AaaGtGGC<br>CGCAGG | 3005      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCGGCCCGCTTGAGCGGTGTTCTGGCAATACC<br>TGCCGCTCAaaGtGGCCGACGGCAGGAGGCCTG<br>CCCTGACTGCCACCGT  | 3765      | CCTGGGGCCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAAAAGTGGCCGC<br>AGG | 863             |
| 1486      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2246      | CCGCTCA<br>AaaGtGGC<br>CGCAGG | 3006      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCGGCCCGCTTGAGCGGTGTTCTGGCAATACC<br>TGCCGCTCAaaGtGGCCGACGGCAGGAGGCCTG<br>CCCTGACTGCCACCGT  | 3766      | CCTGGGGCCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAACAGTGGCCGC<br>AGG | 863             |
| 1487      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2247      | CCGCTCA<br>AagGtGGC<br>CGCAGG | 3007      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCGGCCCGCTTGAGCGGTGTTCTGGCAATACC<br>TGCCGCTCAaagGtGGCCGACGGCAGGAGGCCTG<br>CCCTGACTGCCACCGT | 3767      | CCTGGGGCCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAAAAGTGGCCGC<br>AGG | 863             |
| 1488      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2248      | CCGCTCA<br>AaaGcGGC<br>CGCAGG | 3008      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCGGCCCGCTTGAGCGGTGTTCTGGCAATACC<br>TGCCGCTCAaaGcGGCCGACGGCAGGAGGCCT<br>GCCCTGACTGCCACCGT  | 3768      | CCTGGGGCCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAAAAGCGGCCG<br>CAGG | 863             |
| 1489      | CCTGCGG<br>CCCCGCT<br>TGAGCGG | 2249      | CCGCTCA<br>AtaGcGGC<br>CGCAGG | 3009      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCGGCCCGCTTGAGCGGTGTTCTGGCAATACC<br>TGCCGCTCAAtaGcGGCCGACGGCAGGAGGCCTG<br>CCCTGACTGCCACCGT | 3769      | CCTGGGGCCCCGCT<br>TGAGCGGTGTCTG<br>GCAATACCTGCCGC<br>TCAATAGCGGCCGC<br>AGG | 863             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1490      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2250      | AACCCCA<br>AaaCaGGG<br>CAGCTC | 3010      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCCCGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAaaCaGGGCAGCTCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3770      | GAGCTGCCCCCGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAAACACAGGGCA<br>GCTC | 971             |
| 1491      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2251      | AACCCCA<br>AagCaGGG<br>CAGCTC | 3011      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCCCGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAaagCaGGGCAGCTCCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3771      | GAGCTGCCCCCGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAATGCAGGGCA<br>GCTC  | 971             |
| 1492      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2252      | AACCCCA<br>AagCtGGG<br>CAGCTC | 3012      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCCCGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAaagCtGGGCAGCTCCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3772      | GAGCTGCCCCCGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAAAGCTGGGCA<br>GCTC  | 971             |
| 1493      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2253      | AACCCCA<br>AagCtGGG<br>CAGCTC | 3013      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCCCGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAaagCtGGGCAGCTCCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3773      | GAGCTGCCCCCGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAATGCTGGGCAG<br>CTC  | 971             |
| 1494      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2254      | AACCCCA<br>AaaCaGGG<br>CAGCTC | 3014      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCCCGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAaaCaGGGCAGCTCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3774      | GAGCTGCCCCCGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAAACACCGGGCA<br>GCTC | 971             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1495      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2255      | AACCCCA<br>AagCgGGG<br>CAGCTC | 3015      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCGGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAAgCgGGGAGCTCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 3775      | GAGCTGCCCGGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAAAGCCGGGA<br>GCTC    | 971             |
| 1496      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2256      | AACCCCA<br>AagCgGGG<br>CAGCTC | 3016      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCGGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAAgCgGGGAGCTCCACGGAGGCCTG<br>GCCCTGACTGCCACCGGT   | 3776      | GAGCTGCCCGGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAATGCCGGGA<br>GCTC    | 971             |
| 1497      | GAGCTGC<br>CCCGGCT<br>TGGGGTT | 2257      | AACCCCA<br>AagCgGGG<br>CAGCTC | 3017      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>GCTGCCCGGGCTTGGGGTTTGTCTGGCAATACC<br>TGAAACCCCAAgCgGGGAGCTCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 3777      | GAGCTGCCCGGGCT<br>TGGGGTTTGTCTG<br>GCAATACCTGAACC<br>CCAAGCCGGGA<br>GCTC     | 971             |
| 1498      | CCTGCCG<br>CGCGGAG<br>GCGGAGG | 2258      | CCTCCGC<br>CggCgCGC<br>GGCAGG | 3018      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCGCgCgCGCGGCAAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 3778      | CCTGCCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCCTC<br>CGCCGGCCCGCGGC<br>AGG | 1019            |
| 1499      | CCTGCCG<br>CGCGGAG<br>GCGGAGG | 2259      | CCTCCGC<br>CagCaCGC<br>GGCAGG | 3019      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCGCagCaCGCGGCAAGGCACGGAGGCCTG<br>GCCCTGACTGCCACCGGT | 3779      | CCTGCCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCCTC<br>CGCCAGCACGCGG<br>CAGG | 1019            |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1500      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2260      | CCTCCGC<br>CaaCtCGC<br>GGC/AGG | 3020      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCCCTCCGCCaaCtCGCGGACGGAGGCGCTG<br>CCCTGACTGCCACGGT     | 3780      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCTC<br>CGCCAACTCGCGGC<br>AGG  | 1019            |
| 1501      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2261      | CCTCCGC<br>CaaCtCGC<br>GGC/AGG | 3021      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCCCTCCGCCaaCtCGCGGACGGAGGCGCTG<br>CCCTGACTGCCACGGT     | 3781      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCTC<br>CGCCAACTCGCGGC<br>AGG  | 1019            |
| 1502      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2262      | CCTCCGC<br>CggCtCGC<br>GGC/AGG | 3022      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCCCTCCGCCggCtCGCGGACGGACGGAGGCGCTG<br>CCCTGACTGCCACGGT | 3782      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCTC<br>CGCCGGCTCGCGGC<br>AGG  | 1019            |
| 1503      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2263      | CCTCCGC<br>CaaCtCGC<br>GGC/AGG | 3023      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCCCTCCGCCaaCtCGCGGACGGACGGAGGCGCTG<br>CCCTGACTGCCACGGT | 3783      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCTC<br>CGCCAACTCGCGGC<br>AGG  | 1019            |
| 1504      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2264      | CCTCCGC<br>CgaCtCGC<br>GGC/AGG | 3024      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCCCTCCGCCgaCtCGCGGACGGACGGAGGCGCTG<br>CCCTGACTGCCACGGT | 3784      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCCTC<br>CGCCGACCCCGCGGC<br>AGG | 1019            |



| SEQ ID NO | guide                          | SEQ ID NO | passenger                                  | SEQ ID NO | full                                                                                                                                            | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|--------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1505      | CCTGCCG<br>CGCGGAG<br>GCGG/AGG | 2265      | CCTCCGC<br>CagC <sub>2</sub> CGC<br>GGCAGG | 3025      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCCagC <sub>2</sub> CGCGGCAGGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3785      | CCTGCCGCGCGGAG<br>GCGGAGGTGTCTG<br>GCAATACCTGCTCC<br>CGCCAGCCCGGGC<br>AGG   | 1019            |
| 1506      | CCCTGCC<br>GCGCGGA<br>GGCGGAG  | 2266      | CTCCGCC<br>TaaGaGCG<br>GCAGGG              | 3026      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCCCTaaGaGCGGCAGGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT            | 3786      | CCCTGCCGCGCGGA<br>GGCGGAGGTGTCTG<br>GCAATACCTGCTCC<br>GCCTAAGAGCGGC<br>AGGG | 1020            |
| 1507      | CCCTGCC<br>GCGCGGA<br>GGCGGAG  | 2267      | CTCCGCC<br>TgaGaGCG<br>GCAGGG              | 3027      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCCCTgaGaGCGGCAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT            | 3787      | CCCTGCCGCGCGGA<br>GGCGGAGGTGTCTG<br>GCAATACCTGCTCC<br>GCCTGAGAGCGGC<br>AGGG | 1020            |
| 1508      | CCCTGCC<br>GCGCGGA<br>GGCGGAG  | 2268      | CTCCGCC<br>TagGaGCG<br>GCAGGG              | 3028      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCCCTagGaGCGGCAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT            | 3788      | CCCTGCCGCGCGGA<br>GGCGGAGGTGTCTG<br>GCAATACCTGCTCC<br>GCCTAGGAGCGGC<br>AGGG | 1020            |
| 1509      | CCCTGCC<br>GCGCGGA<br>GGCGGAG  | 2269      | CTCCGCC<br>TggGaGCG<br>GCAGGG              | 3029      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGGAGGTGTCTGGCAATACC<br>TGCTCCGCCCTggGaGCGGCAGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT            | 3789      | CCCTGCCGCGCGGA<br>GGCGGAGGTGTCTG<br>GCAATACCTGCTCC<br>GCCTGGGAGCGGC<br>AGGG | 1020            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1510      | CCCTGCC<br>GGCGGA<br>GGCGGAG  | 2270      | CTCCGCC<br>TaaGgGCG<br>GCAGGG | 3030      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGAGTGTCTGGCAATACC<br>TGCTCCGCCCTaaGgGCGGCACGGACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3790      | CCCTGCCGCGCGGA<br>GGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCCTAAGGCGGC<br>AGGG | 1020            |
| 1511      | CCCTGCC<br>GGCGGA<br>GGCGGAG  | 2271      | CTCCGCC<br>TgaGgGCG<br>GCAGGG | 3031      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGAGTGTCTGGCAATACC<br>TGCTCCGCCCTgaGgGCGGCACGGACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3791      | CCCTGCCGCGCGGA<br>GGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCCTAAGGCGGC<br>AGGG | 1020            |
| 1512      | CCCTGCC<br>GGCGGA<br>GGCGGAG  | 2272      | CTCCGCC<br>TagGgGCG<br>GCAGGG | 3032      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGAGTGTCTGGCAATACC<br>TGCTCCGCCCTagGgGCGGCACGGACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3792      | CCCTGCCGCGCGGA<br>GGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCCTAAGGCGGC<br>AGGG | 1020            |
| 1513      | CCCTGCC<br>GGCGGA<br>GGCGGAG  | 2273      | CTCCGCC<br>TggGgGCG<br>GCAGGG | 3033      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGCCGCGCGGAGGCGAGTGTCTGGCAATACC<br>TGCTCCGCCCTggGgGCGGCACGGACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3793      | CCCTGCCGCGCGGA<br>GGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCCTGGGCGCGC<br>AGGG | 1020            |
| 1514      | ATCTGCC<br>CTTGCCG<br>CGCGGAG | 2274      | CTCCGCC<br>CtcCgGG<br>GCAGAT  | 3034      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTTGCCGCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCCCTcCgGGGCAGATCACGGAGGCCTG<br>GCCCTGACTGCCACCGGT | 3794      | ATCTGCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GGCTCCCGGGGCA<br>GAT  | 1026            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                             | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1515      | ATCTGCC<br>CCTGCCG<br>CGCGGAG | 2275      | CTCCGCG<br>CtaCtGGG<br>GCAGAT | 3035      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTGCCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCGCtaCtGGGGCAGATCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3795      | ATCTGCCCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCGCTACTGGGGCA<br>GAT  | 1026            |
| 1516      | ATCTGCC<br>CCTGCCG<br>CGCGGAG | 2276      | CTCCGCG<br>CttCtGGGG<br>CAGAT | 3036      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTGCCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCGCttCtGGGGCAGATCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3796      | ATCTGCCCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCGCTTCTGGGGCA<br>GAT  | 1026            |
| 1517      | ATCTGCC<br>CCTGCCG<br>CGCGGAG | 2277      | CTCCGCG<br>CacCtGGG<br>GCAGAT | 3037      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTGCCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCGCacCtGGGGCAGATCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3797      | ATCTGCCCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCGCACCTGGGGC<br>AGAT  | 1026            |
| 1518      | ATCTGCC<br>CCTGCCG<br>CGCGGAG | 2278      | CTCCGCG<br>CtcCtGGG<br>GCAGAT | 3038      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTGCCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCGCtcCtGGGGCAGATCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3798      | ATCTGCCCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCGCTCCTGGGGCA<br>GAT  | 1026            |
| 1519      | ATCTGCC<br>CCTGCCG<br>CGCGGAG | 2279      | CTCCGCG<br>CccCtGGG<br>GCAGAT | 3039      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAT<br>CTGCCCTGCCGCGGAGTGTCTGGCAATACC<br>TGCTCCGCGCccCtGGGGCAGATCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3799      | ATCTGCCCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGCTCC<br>GCGCCCCCTGGGGCA<br>GAT | 1026            |

| SEQ ID NO | guide                           | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|---------------------------------|-----------|--------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1520      | ATCTGCC<br>CCTGCCG<br>CGCGGAG   | 2280      | CTCCGCG<br>CaaCεGGG<br>GCAGAT  | 3040      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAT<br>CTGCCCTTCCCGCGGAGTGTCTTGGAATACC<br>TGCTCCGGCaaCεGGGCGAGATCACGGAGGCCTG<br>CCCTGACTGCCACCGGT        | 3800      | ATCTGCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGTCTC<br>GCGCAACCGGGG<br>AGAT    | 1026            |
| 1521      | ATCTGCC<br>CCTGCCG<br>CGCGGAG   | 2281      | CTCCGCG<br>CaaCεGGG<br>GCAGAT  | 3041      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAT<br>CTGCCCTTCCCGCGGAGTGTCTTGGAATACC<br>TGCTCCGGCaaCεGGGCGAGATCACGGAGGCCTG<br>CCCTGACTGCCACCGGT        | 3801      | ATCTGCCCTGCCG<br>CGCGGAGTGTCTG<br>GCAATACCTGTCTC<br>GCGCAACCGGGG<br>AGAT    | 1026            |
| 1522      | CTTGCAAT<br>CTTGCCCC<br>TGCCGCG | 2282      | CGCGGCA<br>GaaGgAGA<br>TGCAAG  | 3042      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCCCTTCCCGCGTGTCTTGGAATACC<br>TGCGCGGCAaaGaaGgAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3802      | CTTGCAATCTGCCG<br>TGCCGCGTGTCTG<br>GCAATACCTGTCTC<br>GCAGAAAGGAGATG<br>CAAG | 1031            |
| 1523      | CTTGCAAT<br>CTTGCCCC<br>TGCCGCG | 2283      | CGCGGCA<br>GaaGaaAGA<br>TGCAAG | 3043      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCCCTTCCCGCGTGTCTTGGAATACC<br>TGCGCGGCAaaGaaGaaAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3803      | CTTGCAATCTGCCG<br>TGCCGCGTGTCTG<br>GCAATACCTGTCTC<br>GCAGAAAGGAGATG<br>CAAG | 1031            |
| 1524      | CTTGCAAT<br>CTTGCCCC<br>TGCCGCG | 2284      | CGCGGCA<br>GaaGaaAGA<br>TGCAAG | 3044      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCCCTTCCCGCGTGTCTTGGAATACC<br>TGCGCGGCAaaGaaGaaAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3804      | CTTGCAATCTGCCG<br>TGCCGCGTGTCTG<br>GCAATACCTGTCTC<br>GCAGTAAAGATG<br>CAAG   | 1031            |

| SEQ ID NO | guide          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|----------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1525      | CTTGCACTGCGCGG | 2285      | CGCGGCA<br>GacGaAGA<br>TGCAAG | 3045      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCGCGCTGCGCGGTGTCTGGCAATACC<br>TGCGCGGCAAGcGaAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3805      | CTTGCACTGCGCGG<br>TGCGCGGTGTCTG<br>GCAATACCTGCGCG<br>GCAGCTGAAGATG<br>CAAG | 1031            |
| 1526      | CTTGCACTGCGCGG | 2286      | CGCGGCA<br>GacGaAGA<br>TGCAAG | 3046      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCGCGCTGCGCGGTGTCTGGCAATACC<br>TGCGCGGCAAGcGaAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3806      | CTTGCACTGCGCGG<br>TGCGCGGTGTCTG<br>GCAATACCTGCGCG<br>GCAGACGAAGATG<br>CAAG | 1031            |
| 1527      | CTTGCACTGCGCGG | 2287      | CGCGGCA<br>GccGaAGA<br>TGCAAG | 3047      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCGCGCTGCGCGGTGTCTGGCAATACC<br>TGCGCGGCAAGcGaAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3807      | CTTGCACTGCGCGG<br>TGCGCGGTGTCTG<br>GCAATACCTGCGCG<br>GCAGCCGAAGATG<br>CAAG | 1031            |
| 1528      | CTTGCACTGCGCGG | 2288      | CGCGGCA<br>GctGgAGA<br>TGCAAG | 3048      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCGCGCTGCGCGGTGTCTGGCAATACC<br>TGCGCGGCAAGcGgAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3808      | CTTGCACTGCGCGG<br>TGCGCGGTGTCTG<br>GCAATACCTGCGCG<br>GCAGCTGGAGATG<br>CAAG | 1031            |
| 1529      | CTTGCACTGCGCGG | 2289      | CGCGGCA<br>GacGgAGA<br>TGCAAG | 3049      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TGCAATCTGCGCGCTGCGCGGTGTCTGGCAATACC<br>TGCGCGGCAAGcGgAGATGCAAGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3809      | CTTGCACTGCGCGG<br>TGCGCGGTGTCTG<br>GCAATACCTGCGCG<br>GCAGACGGAGATG<br>CAAG | 1031            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1530      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2290      | CCCGGCG<br>CggTaCCA<br>GGCGCT | 3050      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCCGGGTGTCTGGCAATACC<br>TGCCCGGGCGCagTaCCAGGCGCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3810      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGGTATACCAG<br>GCGCT | 1056            |
| 1531      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2291      | CCCGGCG<br>CagTaCCA<br>GGCGCT | 3051      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCCGGGTGTCTGGCAATACC<br>TGCCCGGGCGCagTaCCAGGCGCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3811      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGAGTGCCAG<br>GCGCT  | 1056            |
| 1532      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2292      | CCCGGCG<br>CaaTaCCA<br>GGCGCT | 3052      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCCGGGTGTCTGGCAATACC<br>TGCCCGGGCGCaaTaCCAGGCGCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3812      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGCAATACCAG<br>GCGCT | 1056            |
| 1533      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2293      | CCCGGCG<br>CgaTaCCA<br>GGCGCT | 3053      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCCGGGTGTCTGGCAATACC<br>TGCCCGGGCGCgaTaCCAGGCGCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3813      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGGATACCAG<br>GCGCT  | 1056            |
| 1534      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2294      | CCCGGCG<br>CagTaCCA<br>GGCGCT | 3054      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCCGGGTGTCTGGCAATACC<br>TGCCCGGGCGCagTaCCAGGCGCTCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3814      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGAGTACCAG<br>GCGCT  | 1056            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                              | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1535      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2295      | CCCGGCG<br>CaaTgCCA<br>GGCGCT | 3055      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCGGGTGTCTTGCAATACC<br>TGCCCGGGCGaaTgCCAGGCGCTACGGAGGCCTG<br>CCCTGACTGCCACGGT   | 3815      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGAATGCCAG<br>GCGCT | 1056            |
| 1536      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2296      | CCCGGCG<br>CgaTgCCA<br>GGCGCT | 3056      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCGGGTGTCTTGCAATACC<br>TGCCCGGGCGgaTgCCAGGCGCTACGGAGGCCTG<br>CCCTGACTGCCACGGT   | 3816      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGGATGCCAG<br>GCGCT | 1056            |
| 1537      | AGCGCCT<br>GGGAGGG<br>CGCCGGG | 2297      | CCCGGCG<br>CggTgCCA<br>GGCGCT | 3057      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>CGCTGGGAGGGCGCGGGTGTCTTGCAATACC<br>TGCCCGGGCGggTgCCAGGCGCTACGGAGGCCT<br>GCCCTGACTGCCACGGT   | 3817      | AGCGCCTGGGAGG<br>GCGCCGGGTGTCT<br>GGCAATACCTGCCC<br>GGCGGGTGCCAG<br>GCGCT | 1056            |
| 1538      | CAGACCA<br>GGCGCC<br>GGCTCCT  | 2298      | AGGAGCC<br>GaaGaCCT<br>GGTCTG | 3058      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGCTCCTGTGTCTTGCAATACC<br>TGAGGAGCCGaaGaCCTGGTCTGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3818      | CAGACAGGGCG<br>CGGCTCCTGTCT<br>GGCAATACCTGAG<br>GAGCCGAAGACCT<br>GGTCTG   | 1079            |
| 1539      | CAGACCA<br>GGCGCC<br>GGCTCCT  | 2299      | AGGAGCC<br>GtaGaCCT<br>GGTCTG | 3059      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGCTCCTGTGTCTTGCAATACC<br>TGAGGAGCCGtaGaCCTGGTCTGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3819      | CAGACAGGGCG<br>CGGCTCCTGTCT<br>GGCAATACCTGAG<br>GAGCCGTAGACCTG<br>GTCTG   | 1079            |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1540      | CAGACCA<br>GGCGCC<br>GGCTCCT | 2300      | AGGAGCC<br>GagGgCCT<br>GGTCTG | 3060      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGGCTCCTGTGTTCTGGCAATACC<br>TGAGGAGCCGagGgCCTGGTCTGCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3820      | CAGACGAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGAGGACCT<br>GGTCTG | 1079            |
| 1541      | CAGACCA<br>GGCGCC<br>GGCTCCT | 2301      | AGGAGCC<br>GegGgCCT<br>GGTCTG | 3061      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGGCTCCTGTGTTCTGGCAATACC<br>TGAGGAGCCGgGgCCTGGTCTGCACGGAGGCCT<br>GCCCTGACTGCCACGGT  | 3821      | CAGACGAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGCGGACCT<br>GGTCTG | 1079            |
| 1542      | CAGACCA<br>GGCGCC<br>GGCTCCT | 2302      | AGGAGCC<br>GtaGgCCT<br>GGTCTG | 3062      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGGCTCCTGTGTTCTGGCAATACC<br>TGAGGAGCCGtaGgCCTGGTCTGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3822      | CAGACGAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGTAGGCCTG<br>GTCTG | 1079            |
| 1543      | CAGACCA<br>GGCGCC<br>GGCTCCT | 2303      | AGGAGCC<br>GagGgCCT<br>GGTCTG | 3063      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGGCTCCTGTGTTCTGGCAATACC<br>TGAGGAGCCGagGgCCTGGTCTGCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3823      | CAGACGAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGAGGGCCT<br>GGTCTG | 1079            |
| 1544      | CAGACCA<br>GGCGCC<br>GGCTCCT | 2304      | AGGAGCC<br>GtgGgCCT<br>GGTCTG | 3064      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAGGGCGCGGCTCCTGTGTTCTGGCAATACC<br>TGAGGAGCCgtgGgCCTGGTCTGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3824      | CAGACGAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGTGGGCCTG<br>GTCTG | 1079            |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1545      | CAGACCA<br>GGCGCC<br>GGCTCCT  | 2305      | AGGAGCC<br>GegGgCCT<br>GGTCTG | 3065      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GACCAAGGGCGCGGCTCCTTGTCTGGCAATACC<br>TGAGGAGCCGgGgCCTGGTCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT   | 3825      | CAGACAGGGCGC<br>CGGCTCCTTGTCT<br>GGCAATACCTGAG<br>GAGCCGCGGCCT<br>GGTCTG   | 1079            |
| 1546      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2306      | TGAGCTC<br>CgaGaGAG<br>CCCCGA | 3066      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTCTGGCAATACC<br>TGTGAGCTCCgaGaGAGCCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3826      | TCCGGGCTCGCCAG<br>GAGCTCATGTCTG<br>GCAATACCTGTGAG<br>CTCCGAGAGAGCCC<br>GGA | 1125            |
| 1547      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2307      | TGAGCTC<br>CaaGaGAG<br>CCCCGA | 3067      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTCTGGCAATACC<br>TGTGAGCTCCaaGaGAGCCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3827      | TCCGGGCTCGCCAG<br>GAGCTCATGTCTG<br>GCAATACCTGTGAG<br>CTCCAAGAGAGCCC<br>GGA | 1125            |
| 1548      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2308      | TGAGCTC<br>CatGaGAG<br>CCCCGA | 3068      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTCTGGCAATACC<br>TGTGAGCTCCatGaGAGCCCCGGACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3828      | TCCGGGCTCGCCAG<br>GAGCTCATGTCTG<br>GCAATACCTGTGAG<br>CTCCATGAGAGCCC<br>GGA | 1125            |
| 1549      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2309      | TGAGCTC<br>CacGaGAG<br>CCCCGA | 3069      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTCTGGCAATACC<br>TGTGAGCTCCacGaGAGCCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3829      | TCCGGGCTCGCCAG<br>GAGCTCATGTCTG<br>GCAATACCTGTGAG<br>CTCCACGAGAGCCC<br>GGA | 1125            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1550      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2310      | TGAGCTC<br>CaaGgGAG<br>CCCGGA | 3070      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTTCTGGCAATACC<br>TGTGAGCTCCaaGgGAGCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3830      | TCCGGGGCTCGCCAG<br>GAGCTCATGTTCTG<br>GCAATACCTGTGAG<br>CTCCAAGGGAGGCC<br>GGA | 1125            |
| 1551      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2311      | TGAGCTC<br>CaaGgGAG<br>CCCGGA | 3071      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTTCTGGCAATACC<br>TGTGAGCTCCaaGgGAGCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3831      | TCCGGGGCTCGCCAG<br>GAGCTCATGTTCTG<br>GCAATACCTGTGAG<br>CTCCAAGGGAGGCC<br>GGA | 1125            |
| 1552      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2312      | TGAGCTC<br>CgaGgGAG<br>CCCGGA | 3072      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTTCTGGCAATACC<br>TGTGAGCTCCgaGgGAGCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3832      | TCCGGGGCTCGCCAG<br>GAGCTCATGTTCTG<br>GCAATACCTGTGAG<br>CTCCAAGGGAGGCC<br>GGA | 1125            |
| 1553      | TCCGGGC<br>TCGCCAG<br>GAGCTCA | 2313      | TGAGCTC<br>CccGgGAG<br>CCCGGA | 3073      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGGGCTCGCCAGGAGCTCATGTTCTGGCAATACC<br>TGTGAGCTCCccGgGAGCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3833      | TCCGGGGCTCGCCAG<br>GAGCTCATGTTCTG<br>GCAATACCTGTGAG<br>CTCCCCGGGAGGCC<br>GGA | 1125            |
| 1554      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2314      | CTGGCGA<br>GaaCaGAG<br>TTTCTG | 3074      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGTGAGCTCCaaGgGAGCCCGGACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT  | 3834      | CAGAAACTCCGGG<br>CTCGCCAGTGTCT<br>GGCAATACCTGTG<br>GCCGAGAACAGGT<br>TTCTG    | 1132            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1555      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2315      | CTGGCGA<br>GgaCaGAG<br>TTTCTG | 3075      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGgaCaGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3835      | CAGAAACTCCGGG<br>CTGCCAGTGTCT<br>GGCAATACCTGCTG<br>GCGAGGACAGAGT<br>TTCTG | 1132            |
| 1556      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2316      | CTGGCGA<br>GggCaGAG<br>TTTCTG | 3076      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGggCaGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3836      | CAGAAACTCCGGG<br>CTGCCAGTGTCT<br>GGCAATACCTGCTG<br>GCGAGGACAGAGT<br>TTCTG | 1132            |
| 1557      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2317      | CTGGCGA<br>GgaCtGAG<br>TTTCTG | 3077      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGgaCtGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3837      | CAGAAACTCCGGG<br>CTGCCAGTGTCT<br>GGCAATACCTGCTG<br>GCGAGGACTGAGTT<br>TCTG | 1132            |
| 1558      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2318      | CTGGCGA<br>GagCtGAG<br>TTTCTG | 3078      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGgagCtGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3838      | CAGAAACTCCGGG<br>CTGCCAGTGTCT<br>GGCAATACCTGCTG<br>GCGAGAGCTGAGTT<br>TCTG | 1132            |
| 1559      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2319      | CTGGCGA<br>GaaCcGAG<br>TTTCTG | 3079      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGaaCcGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT  | 3839      | CAGAAACTCCGGG<br>CTGCCAGTGTCT<br>GGCAATACCTGCTG<br>GCGAGAACCGAGT<br>TTCTG | 1132            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1560      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2320      | CTGGCGA<br>GagCcGAG<br>TTTCTG | 3080      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGgCcGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3840      | CAGAAACTCCGGG<br>CTCGCCAGTGTCT<br>GGCAATACCTGTG<br>GCGAGAGCCGAGT<br>TTCTG   | 1132            |
| 1561      | CAGAAAC<br>TCCGGGC<br>TCGCCAG | 2321      | CTGGCGA<br>GggCcGAG<br>TTTCTG | 3081      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GAAACTCCGGGCTCGCCAGTGTCTGGCAATACC<br>TGCTGGCGAGgCcGAGTTTCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3841      | CAGAAACTCCGGG<br>CTCGCCAGTGTCT<br>GGCAATACCTGTG<br>GCGAGGCGCGAGT<br>TTCTG   | 1132            |
| 1562      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2322      | AGTTTCT<br>GgcGaAGG<br>CGCAAC | 3082      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCTGCTGCAGAAACTGTCTGGCAATACC<br>TGAGTTTCTGgcGaAGGCGCAACCA CGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3842      | GTTGCGCCTGCTGC<br>AGAAACTGTGTCTG<br>GCAATACCTGAGTT<br>TCTGGCGAAGGCGC<br>AAC | 1145            |
| 1563      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2323      | AGTTTCT<br>GatGaAGG<br>CGCAAC | 3083      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCTGCTGCAGAAACTGTCTGGCAATACC<br>TGAGTTTCTGatGaAGGCGCAACCA CGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3843      | GTTGCGCCTGCTGC<br>AGAAACTGTGTCTG<br>GCAATACCTGAGTT<br>TCTGATGAAGGCGC<br>AAC | 1145            |
| 1564      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2324      | AGTTTCT<br>GgtGaAGG<br>CGCAAC | 3084      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCTGCTGCAGAAACTGTCTGGCAATACC<br>TGAGTTTCTGgtGaAGGCGCAACCA CGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3844      | GTTGCGCCTGCTGC<br>AGAAACTGTGTCTG<br>GCAATACCTGAGTT<br>TCTGGTGAAGGCGC<br>AAC | 1145            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1565      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2325      | AGTTTCT<br>GacGgAGG<br>CGCAAC | 3085      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCCTGCTGCAGAAACTTGTTCGGCAATACC<br>TGAGTTTCTGacGgAGGCGCAACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3845      | GTTGGCCTGCTGC<br>AGAAACTTGTTCG<br>GCAATACCTGAGTT<br>TCTGACGAGGCGC<br>AAC  | 1145            |
| 1566      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2326      | AGTTTCT<br>GatGgAGG<br>CGCAAC | 3086      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCCTGCTGCAGAAACTTGTTCGGCAATACC<br>TGAGTTTCTGatGgAGGCGCAACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3846      | GTTGGCCTGCTGC<br>AGAAACTTGTTCG<br>GCAATACCTGAGTT<br>TCTGATGGAGGCGC<br>AAC | 1145            |
| 1567      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2327      | AGTTTCT<br>GgtGgAGG<br>CGCAAC | 3087      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCCTGCTGCAGAAACTTGTTCGGCAATACC<br>TGAGTTTCTGgtGgAGGCGCAACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3847      | GTTGGCCTGCTGC<br>AGAAACTTGTTCG<br>GCAATACCTGAGTT<br>TCTGATGGAGGCGC<br>AAC | 1145            |
| 1568      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2328      | AGTTTCT<br>GacGgAGG<br>CGCAAC | 3088      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCCTGCTGCAGAAACTTGTTCGGCAATACC<br>TGAGTTTCTGacGgAGGCGCAACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3848      | GTTGGCCTGCTGC<br>AGAAACTTGTTCG<br>GCAATACCTGAGTT<br>TCTGACGAGGCGC<br>AAC  | 1145            |
| 1569      | GTTGCGC<br>CTGCTGC<br>AGAAACT | 2329      | AGTTTCT<br>GgcGgAGG<br>CGCAAC | 3089      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>TGCGCCTGCTGCAGAAACTTGTTCGGCAATACC<br>TGAGTTTCTGgcGgAGGCGCAACCCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3849      | GTTGGCCTGCTGC<br>AGAAACTTGTTCG<br>GCAATACCTGAGTT<br>TCTGCGGAGGCGC<br>AAC  | 1145            |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                                  | SEQ ID NO | full                                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|--------------------------------|-----------|--------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1570      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2330      | AGGCGCA<br>AgaT <sub>a</sub> TCC<br>TAGAAA | 3090      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCA AagT <sub>a</sub> TCCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3850      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAGATATCCTAG<br>AAA   | 1157            |
| 1571      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2331      | AGGCGCA<br>AaaT <sub>a</sub> TCC<br>TAGAAA | 3091      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCA AaaT <sub>a</sub> TCCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3851      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAAAATATCCTAG<br>AAA  | 1157            |
| 1572      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2332      | AGGCGCA<br>AagT <sub>a</sub> TCC<br>TAGAAA | 3092      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCA AagT <sub>a</sub> TCCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3852      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAAAGTATCCTAG<br>AAA  | 1157            |
| 1573      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2333      | AGGCGCA<br>AggT <sub>a</sub> TCC<br>TAGAAA | 3093      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCA AaggT <sub>a</sub> TCCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3853      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAGGTATCCTAG<br>AAA   | 1157            |
| 1574      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2334      | AGGCGCA<br>AaaT <sub>a</sub> TCC<br>TAGAAA | 3094      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCA AaaT <sub>a</sub> TCCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3854      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAAAATGTTCCTAG<br>AAA | 1157            |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1575      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2335      | AGGCGCA<br>AgaTgTCC<br>TAGAAA | 3095      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCAAggTgTCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3855      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAGATGTTCCTAG<br>AAA | 1157            |
| 1576      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2336      | AGGCGCA<br>AagTgTCC<br>TAGAAA | 3096      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCAAggTgTCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3856      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAGATGTTCCTAG<br>AAA | 1157            |
| 1577      | TTTCTAG<br>GAGAGGT<br>TGC GCCT | 2337      | AGGCGCA<br>AagTgTCC<br>TAGAAA | 3097      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>TCTAGGAGAGAGGTTCGCGCCTTGTTCGGCAATACC<br>TGAGGCGCAAggTgTCCTAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3857      | TTTCTAGGAGAGGT<br>TGC GCCTTGTTCG<br>GCAATACCTGAGGC<br>GCAAGATGTTCCTAG<br>AAA | 1157            |
| 1578      | GCCGCCG<br>TTTCTAG<br>GAGAGGT  | 2338      | ACCTCTC<br>CatGtAAC<br>GGAGGC | 3098      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTGTTCGGCAATACC<br>TGACCTCTCCatGtAACGGAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 3858      | GCCGCCGTTTCTAG<br>GAGAGGTGTTCG<br>GCAATACCTGACCT<br>CTCCATGTAAACGGA<br>GGC   | 1164            |
| 1579      | GCCGCCG<br>TTTCTAG<br>GAGAGGT  | 2339      | ACCTCTC<br>CccGtAAC<br>GGAGGC | 3099      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTGTTCGGCAATACC<br>TGACCTCTCCccGtAACGGAGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 3859      | GCCGCCGTTTCTAG<br>GAGAGGTGTTCG<br>GCAATACCTGACCT<br>CTCCCCGTAAACGGA<br>GGC   | 1164            |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1580      | GCCTCCG<br>TTTCTAG<br>GAGAGGT | 2340      | ACCTCTC<br>CgcGtAAC<br>GGAGGC | 3100      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTTGTCTGGCAATACC<br>TGACCTCTCCgGtAACGGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3860      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCGCGTAACGGA<br>GGC | 1164            |
| 1581      | GCCTCCG<br>TTTCTAG<br>GAGAGGT | 2341      | ACCTCTC<br>CatGcAAC<br>GGAGGC | 3101      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTTGTCTGGCAATACC<br>TGACCTCTCCatGcAACGGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3861      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCATGCAACGGA<br>GGC | 1164            |
| 1582      | GCCTCCG<br>TTTCTAG<br>GAGAGGT | 2342      | ACCTCTC<br>CetGcAAC<br>GGAGGC | 3102      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTTGTCTGGCAATACC<br>TGACCTCTCCetGcAACGGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3862      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCCTGCAACGGA<br>GGC | 1164            |
| 1583      | GCCTCCG<br>TTTCTAG<br>GAGAGGT | 2343      | ACCTCTC<br>CgtGcAAC<br>GGAGGC | 3103      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTTGTCTGGCAATACC<br>TGACCTCTCCgtGcAACGGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3863      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCGTGCAACGGA<br>GGC | 1164            |
| 1584      | GCCTCCG<br>TTTCTAG<br>GAGAGGT | 2344      | ACCTCTC<br>CacGcAAC<br>GGAGGC | 3104      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTCCGTTTCTAGGAGAGGTTGTCTGGCAATACC<br>TGACCTCTCCacGcAACGGAGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3864      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCACGCAACGGA<br>GGC | 1164            |



| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1585      | GCTCCG<br>TTTCTAG<br>GAGAGGT | 2345      | ACCTCTC<br>CccGcAAC<br>GGAGGC | 3105      | GCCGGCTGCACACCTCCTCGCGGGCAGCTGTGCC<br>CTCCGTTTCTAGGAGAGGTGTCTGGCAATACC<br>TGACCTCTCCcGcAACGGAGGCCACGGAGGCCTG<br>CCCTGACTGCCACGGT   | 3865      | GCCTCCGTTTCTAG<br>GAGAGGTGTCTCTG<br>GCAATACCTGACCT<br>CTCCCCGCAACGGA<br>GGC | 1164            |
| 1586      | CCCGGG<br>GCTCCG<br>TTTCTAG  | 2346      | CTAGAAA<br>CccAtGCC<br>CCGGGG | 3106      | GCCGGCTGCACACCTCCTCGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAACcAaGCCCCCGGGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT  | 3866      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACCCATGCCCCG<br>GGG  | 1171            |
| 1587      | CCCGGG<br>GCTCCG<br>TTTCTAG  | 2347      | CTAGAAA<br>CtaAaGCC<br>CCGGGG | 3107      | GCCGGCTGCACACCTCCTCGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAACtaAaGCCCCCGGGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3867      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACTAAAGCCCC<br>GGGG  | 1171            |
| 1588      | CCCGGG<br>GCTCCG<br>TTTCTAG  | 2348      | CTAGAAA<br>CcaAaGCC<br>CCGGGG | 3108      | GCCGGCTGCACACCTCCTCGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAACcaAaGCCCCCGGGGCACGGAGGCCT<br>GCCCTGACTGCCACGGT | 3868      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACCAAGCCCC<br>GGGG   | 1171            |
| 1589      | CCCGGG<br>GCTCCG<br>TTTCTAG  | 2349      | CTAGAAA<br>CatAaGCC<br>CCGGGG | 3109      | GCCGGCTGCACACCTCCTCGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAACatAaGCCCCCGGGGCACGGAGGCCTG<br>CCCTGACTGCCACGGT | 3869      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACATAAGCCCC<br>GGGG  | 1171            |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1590      | CCCCGGG<br>GCCTCCG<br>TTTCTAG  | 2350      | CTAGAAA<br>CacAaGCC<br>CCGGGG | 3110      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAAACaAaGCCCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 3870      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACACAAAGCCCC<br>GGGG | 1171            |
| 1591      | CCCCGGG<br>GCCTCCG<br>TTTCTAG  | 2351      | CTAGAAA<br>CatAaGCCC<br>CGGGG | 3111      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAAACaAaGCCCCGGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT    | 3871      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACATATGCCCCG<br>GGG  | 1171            |
| 1592      | CCCCGGG<br>GCCTCCG<br>TTTCTAG  | 2352      | CTAGAAA<br>CttAaGCCC<br>CGGGG | 3112      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAAACttAaGCCCCGGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT   | 3872      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACTTACGCCCCG<br>GGG  | 1171            |
| 1593      | CCCCGGG<br>GCCTCCG<br>TTTCTAG  | 2353      | CTAGAAA<br>CacAaGCC<br>CCGGGG | 3113      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCGGGGCTCCGTTTCTAGTGTCTGGCAATACC<br>TGCTAGAAAACacAaGCCCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3873      | CCCCGGGGCCTCCG<br>TTTCTAGTGTCTG<br>GCAATACCTGCTAG<br>AAACACACGCCCC<br>GGGG  | 1171            |
| 1594      | TCCGTCG<br>CCGTCCCT<br>CGTCCCC | 2354      | GGGGACG<br>AttAaGGC<br>GACGGA | 3114      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCGTCCCTGTCTGGCAATACCT<br>GGGGACGAtAaGGCGACGGACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT    | 3874      | TCCGTCGCCGTCCCT<br>CGTCCCTGTCTG<br>GCAATACCTGGGG<br>GACGATTAAAGGCG<br>ACGGA | 47              |

| SEQ ID NO | guide                           | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                      | target position |
|-----------|---------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------|-----------------|
| 1595      | TCCGTTCG<br>CCGTTCCT<br>CGTCCCC | 2355      | GGGGACG<br>AaaAgGGC<br>GACGGA | 3115      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCCTGTCTGGCAATACCT<br>GGGGGACGAaaAgGGCGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3875      | TCCGTGCGCCGTCTCT<br>CGTCCCCCTGTTCCTG<br>GCAATACCTTGGGG<br>GACGAAAGGGGCG<br>ACGGA | 47              |
| 1596      | TCCGTTCG<br>CCGTTCCT<br>CGTCCCC | 2356      | GGGGACG<br>AatAgGGC<br>GACGGA | 3116      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCCTGTCTGGCAATACCT<br>GGGGGACGAatAgGGCGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3876      | TCCGTGCGCCGTCTCT<br>CGTCCCCCTGTTCCTG<br>GCAATACCTTGGGG<br>GACGAATAGGGCG<br>ACGGA | 47              |
| 1597      | TCCGTTCG<br>CCGTTCCT<br>CGTCCCC | 2357      | GGGGACG<br>AttAgGGC<br>GACGGA | 3117      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCCTGTCTGGCAATACCT<br>GGGGGACGAAttAgGGCGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3877      | TCCGTGCGCCGTCTCT<br>CGTCCCCCTGTTCCTG<br>GCAATACCTTGGGG<br>GACGAATAGGGCG<br>ACGGA | 47              |
| 1598      | TCCGTTCG<br>CCGTTCCT<br>CGTCCCC | 2358      | GGGGACG<br>ActAgGGC<br>GACGGA | 3118      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCCTGTCTGGCAATACCT<br>GGGGGACGAActAgGGCGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3878      | TCCGTGCGCCGTCTCT<br>CGTCCCCCTGTTCCTG<br>GCAATACCTTGGGG<br>GACGACTAGGGCG<br>ACGGA | 47              |
| 1599      | TCCGTTCG<br>CCGTTCCT<br>CGTCCCC | 2359      | GGGGACG<br>AtcAgGGC<br>GACGGA | 3119      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCCTGTCTGGCAATACCT<br>GGGGGACGAAtcAgGGCGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3879      | TCCGTGCGCCGTCTCT<br>CGTCCCCCTGTTCCTG<br>GCAATACCTTGGGG<br>GACGATCAGGGCG<br>ACGGA | 47              |

| SEQ ID NO | guide                           | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                    | target position |
|-----------|---------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------|-----------------|
| 1600      | TCCGTTCG<br>CCGTCTCT<br>CGTCCCC | 2360      | GGGGACG<br>AcaAgGGC<br>GACGGA | 3120      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCTGTCTGGCAATACCT<br>GGGGGACGAcaAgGGGACGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 3880      | TCCGTGCGCCGTCTCT<br>CGTCCCCGTGTCTG<br>GCAATACCTGGGG<br>GACGACCAAGGGCG<br>ACGGA | 47              |
| 1601      | TCCGTTCG<br>CCGTCTCT<br>CGTCCCC | 2361      | GGGGACG<br>ACCAAGGC<br>GACGGA | 3121      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTC<br>CGTCGCCGTCTCTCGTCCCTGTCTGGCAATACCT<br>GGGGGACGAcaAgGGGACGGACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT    | 3881      | TCCGTGCGCCGTCTCT<br>CGTCCCCGTGTCTG<br>GCAATACCTGGGG<br>GACGACCAAGGGCG<br>ACGGA | 47              |
| 1602      | AACGAGT<br>CTCCGTC<br>GCCGTCC   | 2362      | GGACGGC<br>GtaGaaGA<br>CTCGTT | 3122      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTGCGCGTCCCTGTCTGGCAATACC<br>TGGGACGGCGtaGaaGAGACTCGTTACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3882      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGTAGAAAGACT<br>CGTT     | 55              |
| 1603      | AACGAGT<br>CTCCGTC<br>GCCGTCC   | 2363      | GGACGGC<br>GaaGaaGA<br>CTCGTT | 3123      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTGCGCGTCCCTGTCTGGCAATACC<br>TGGGACGGCGaaGaaGAGACTCGTTACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3883      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGCAGAAAGACT<br>CGTT     | 55              |
| 1604      | AACGAGT<br>CTCCGTC<br>GCCGTCC   | 2364      | GGACGGC<br>GtgGaaGA<br>CTCGTT | 3124      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTGCGCGTCCCTGTCTGGCAATACC<br>TGGGACGGCGtgGaaGAGACTCGTTACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3884      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGTGAAAGACT<br>CGTT      | 55              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1605      | AACGAGT<br>CTCCGTC<br>GCCGTCC | 2365      | GGACGGC<br>GtaGtAGA<br>CTCGTT | 3125      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTCGCCGTCCTGTCTGGCAATACC<br>TGGGACGGCGtaGtAGACTCGTTACGGAGGGCCTG<br>CCCTGACTGCCACCGT  | 3885      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGTAGTACTC<br>GTT   | 55              |
| 1606      | AACGAGT<br>CTCCGTC<br>GCCGTCC | 2366      | GGACGGC<br>GtgGtAGA<br>CTCGTT | 3126      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTCGCCGTCCTGTCTGGCAATACC<br>TGGGACGGCGtgGtAGACTCGTTACGGAGGGCCTG<br>CCCTGACTGCCACCGT  | 3886      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGTGGTAGACTC<br>GTT | 55              |
| 1607      | AACGAGT<br>CTCCGTC<br>GCCGTCC | 2367      | GGACGGC<br>GegGtAGA<br>CTCGTT | 3127      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTCGCCGTCCTGTCTGGCAATACC<br>TGGGACGGCGGegGtAGACTCGTTACGGAGGGCCTG<br>CCCTGACTGCCACCGT | 3887      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGCGTAGACTC<br>GTT  | 55              |
| 1608      | AACGAGT<br>CTCCGTC<br>GCCGTCC | 2368      | GGACGGC<br>GtgGcAGA<br>CTCGTT | 3128      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTCGCCGTCCTGTCTGGCAATACC<br>TGGGACGGCGtgGcAGACTCGTTACGGAGGGCCTG<br>CCCTGACTGCCACCGT  | 3888      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGTGGCAGACTC<br>GTT | 55              |
| 1609      | AACGAGT<br>CTCCGTC<br>GCCGTCC | 2369      | GGACGGC<br>GegGcAGA<br>CTCGTT | 3129      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAA<br>CGAGTCTCCGTCGCCGTCCTGTCTGGCAATACC<br>TGGGACGGCGGegGcAGACTCGTTACGGAGGGCCT<br>GCCCTGACTGCCACCGT | 3889      | AACGAGTCTCCGTC<br>GCCGTCTGTCTG<br>GCAATACCTGGGAC<br>GGCGGGCAGACT<br>CGTT  | 55              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                   | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-----------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1610      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2370      | GACGGCG<br>AgaGtGAC<br>TCGT | 3130      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAgaGtGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3890      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAGAGTGACTC<br>GTTT  | 56              |
| 1611      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2371      | GACGGCG<br>AgtGtGAC<br>TCGT | 3131      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAgtGtGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3891      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAGTGACTCG<br>TTT    | 56              |
| 1612      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2372      | GACGGCG<br>AacGtGAC<br>TCGT | 3132      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAacGtGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3892      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAAACGTGACTCG<br>TTT | 56              |
| 1613      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2373      | GACGGCG<br>AatGcGAC<br>TCGT | 3133      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAatGcGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3893      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAATGCGACTCG<br>TTT  | 56              |
| 1614      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2374      | GACGGCG<br>AgtGcGAC<br>TCGT | 3134      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGagtGcGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3894      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAGTGCGACTCG<br>TTT  | 56              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1615      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2375      | GACGGCG<br>AacGcGAC<br>TCGTTT | 3135      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAacGcGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3895      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAAACGCGACTC<br>GTTT  | 56              |
| 1616      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2376      | GACGGCG<br>AacGcGAC<br>TCGTTT | 3136      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAacGcGACTCGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3896      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAGCGCGACTC<br>GTTT   | 56              |
| 1617      | AAACGAG<br>TCTCCGT<br>CGCCGTC | 2377      | GACGGCG<br>AGCGgGA<br>CTCGTTT | 3137      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACGAGTCTCCGTGCGCGTCTGTCTGGCAATACC<br>TGGACGGCGAGCGgGACTCGTTTTCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3897      | AAACGAGTCTCCGT<br>CGCCGTCTGTCTG<br>GCAATACCTGGACG<br>GCGAGCGGGACTC<br>GTTT   | 56              |
| 1618      | CAAACGA<br>GTCTCCG<br>TCGCCGT | 2378      | ACGGCGA<br>CaaAaACT<br>CGTTTG | 3138      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AACGAGTCTCCGTGCGCGTGTGTCTGGCAATACC<br>TGACGGCGACaaAaACTCGTTTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3898      | CAAACGAGTCTCCG<br>TCGCCGTGTGTCTG<br>GCAATACCTGACGG<br>CGACAAAAACTCGT<br>TTG  | 57              |
| 1619      | CAAACGA<br>GTCTCCG<br>TCGCCGT | 2379      | ACGGCGA<br>CtaAaACT<br>CGTTTG | 3139      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AACGAGTCTCCGTGCGCGTGTGTCTGGCAATACC<br>TGACGGCGACtaAaACTCGTTTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3899      | CAAACGAGTCTCCG<br>TCGCCGTGTGTCTG<br>GCAATACCTGACGG<br>CGACTAAAAACTCGT<br>TTG | 57              |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1620      | CAAAACGA<br>GTCTCCG<br>TCGCCGT | 2380      | ACGGCGA<br>CcaAaACT<br>CGTTTG | 3140      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTTGTTCTGGCAATACC<br>TGACGGCGACcaAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3900      | CAAAACGAGTCTCCG<br>TCGCCGTGTGTTCTG<br>GCAATACCTGACGG<br>CGACCAAAACTCGT<br>TTG | 57              |
| 1621      | CAAAACGA<br>GTCTCCG<br>TCGCCGT | 2381      | ACGGCGA<br>CctAaACT<br>CGTTTG | 3141      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTTGTTCTGGCAATACC<br>TGACGGCGACctAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3901      | CAAAACGAGTCTCCG<br>TCGCCGTGTGTTCTG<br>GCAATACCTGACGG<br>CGACATAAACTCGT<br>TTG | 57              |
| 1622      | CAAAACGA<br>GTCTCCG<br>TCGCCGT | 2382      | ACGGCGA<br>CttAaACT<br>GTTTG  | 3142      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTTGTTCTGGCAATACC<br>TGACGGCGACtrAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3902      | CAAAACGAGTCTCCG<br>TCGCCGTGTGTTCTG<br>GCAATACCTGACGG<br>CGACTTAAACTCGT<br>TTG | 57              |
| 1623      | CAAAACGA<br>GTCTCCG<br>TCGCCGT | 2383      | ACGGCGA<br>CctAaACT<br>CGTTTG | 3143      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTTGTTCTGGCAATACC<br>TGACGGCGACctAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3903      | CAAAACGAGTCTCCG<br>TCGCCGTGTGTTCTG<br>GCAATACCTGACGG<br>CGACTTAAACTCGT<br>TTG | 57              |
| 1624      | CAAAACGA<br>GTCTCCG<br>TCGCCGT | 2384      | ACGGCGA<br>CacAaACT<br>CGTTTG | 3144      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTTGTTCTGGCAATACC<br>TGACGGCGACacAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3904      | CAAAACGAGTCTCCG<br>TCGCCGTGTGTTCTG<br>GCAATACCTGACGG<br>CGACACAAACTCGT<br>TTG | 57              |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1625      | CAAAACG<br>GTCTCCG<br>TCGCCGT | 2385      | ACGGCGA<br>CccAaACT<br>CGTTTG | 3145      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATAACC<br>TGACGGCGACccAaACTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3905      | CAAAACGAGTCTCC<br>TCGCCGTGTTCTG<br>GCAATACCTGACGG<br>CGACCCAAACTCGT<br>TTG   | 57              |
| 1626      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2386      | CGGCGAC<br>GatGtCTCG<br>TTTGG | 3146      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATAACC<br>TGCGGCGACGatGtCTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3906      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGATGTCCTCGTT<br>TGG | 58              |
| 1627      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2387      | CGGCGAC<br>GttGtCTCG<br>TTTGG | 3147      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATAACC<br>TGCGGCGACGttGtCTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3907      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGTTGTCCTCGTT<br>TGG | 58              |
| 1628      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2388      | CGGCGAC<br>GctGtCTCG<br>TTTGG | 3148      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATAACC<br>TGCGGCGACGctGtCTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3908      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGCTGTCCTCGTT<br>TGG | 58              |
| 1629      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2389      | CGGCGAC<br>GacGtCTC<br>GTTTGG | 3149      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATAACC<br>TGCGGCGACGacGtCTCGTTTGACACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3909      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGACGTCCTCGTT<br>TGG | 58              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1630      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2390      | CGGCGAC<br>GtcGtCTC<br>TTTGG  | 3150      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATACC<br>TGCGGCGACGtcGtCTCGTTTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3910      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGTGCTCTCGTT<br>TGG   | 58              |
| 1631      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2391      | CGGCGAC<br>GccGtCTC<br>GTTTGG | 3151      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATACC<br>TGCGGCGACGccGtCTCGTTTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3911      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGCCGTCTCGTT<br>TGG   | 58              |
| 1632      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2392      | CGGCGAC<br>GatGcCTC<br>GTTTGG | 3152      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATACC<br>TGCGGCGACGatGcCTCGTTTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT  | 3912      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGATGCCCTCGTT<br>TGG  | 58              |
| 1633      | CCAAACG<br>AGTCTCC<br>GTCGCCG | 2393      | CGGCGAC<br>GCTGgCTC<br>GTTTGG | 3153      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AAACGAGTCTCCGTCGCCGTGTTCTGGCAATACC<br>TGCGGCGACGCTGgCTCGTTTGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGT  | 3913      | CCAAACGAGTCTCC<br>GTCGCCGTGTTCTG<br>GCAATACCTGCGGC<br>GACGCTGGCTCTCGTT<br>TGG | 58              |
| 1634      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2394      | GGCGACG<br>GttAaTCGT<br>TTGGA | 3154      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTCGCCGTGTTCTGGCAATACC<br>TGCGGCGACGttAaTCGTTTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 3914      | TCCAAACGAGTCTC<br>CGTCGCCGTGTTCTG<br>GCAATACCTGGCGG<br>ACGGTTAAATCGTTT<br>GGA | 59              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1635      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2395      | GGCGACG<br>GctAaTCG<br>TTTGGA  | 3155      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATAACC<br>TGGGCGACGGctAaTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3915      | TCCAAACGAGTCTC<br>CGTCGCCCTGTCTG<br>GCAATACCTGGGCG<br>ACGGCTAATCGTTT<br>GGA  | 59              |
| 1636      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2396      | GGCGACG<br>GccAaTCG<br>TTTGGA  | 3156      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATAACC<br>TGGGCGACGGccAaTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3916      | TCCAAACGAGTCTC<br>CGTCGCCCTGTCTG<br>GCAATACCTGGGCG<br>ACGGCAATCGTTT<br>GGA   | 59              |
| 1637      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2397      | GGCGACG<br>GtaAgTCG<br>TTTGGA  | 3157      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATAACC<br>TGGGCGACGGtaAgTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3917      | TCCAAACGAGTCTC<br>CGTCGCCCTGTCTG<br>GCAATACCTGGGCG<br>ACGGTAAAGTCGTTT<br>GGA | 59              |
| 1638      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2398      | GGCGACG<br>GttAgTCGT<br>TTTGGA | 3158      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATAACC<br>TGGGCGACGGttAgTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3918      | TCCAAACGAGTCTC<br>CGTCGCCCTGTCTG<br>GCAATACCTGGGCG<br>ACGGTTAGTCGTTT<br>GGA  | 59              |
| 1639      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2399      | GGCGACG<br>GctAgTCG<br>TTTGGA  | 3159      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATAACC<br>TGGGCGACGGctAgTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3919      | TCCAAACGAGTCTC<br>CGTCGCCCTGTCTG<br>GCAATACCTGGGCG<br>ACGGCTAGTCGTTT<br>GGA  | 59              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1640      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2400      | GGCGACG<br>GtcAgTCG<br>TTTGGA  | 3160      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATACC<br>TGGCGGACGGGtcAgTCGTTTGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3920      | TCCAAACGAGTCTC<br>CGTCGCCGTGTCTG<br>GCAATACCTGGGCG<br>ACGGTCAGTCGTTT<br>GGA  | 59              |
| 1641      | TCCAAAC<br>GAGTCTC<br>CGTCGCC | 2401      | GGCGACG<br>GTCAATCG<br>TTTGGA  | 3161      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAACGAGTCTCCGTGCGCTGTTCGGCAATACC<br>TGGCGGACGGTCAATCGTTTGGACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT  | 3921      | TCCAAACGAGTCTC<br>CGTCGCCGTGTCTG<br>GCAATACCTGGGCG<br>ACGGTCATTCGTTT<br>GGA  | 59              |
| 1642      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2402      | GGCGACGG<br>AatCaCGTT<br>TGGAC | 3162      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCGCTGTTCGGCAATACC<br>TGGCGACGGAAatCaCGTTTGGACACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3922      | GTCCAAAACGAGTCT<br>CCGTGCGTGTCTG<br>GCAATACCTGGCGA<br>CGGAATCACGTTTG<br>GAC  | 60              |
| 1643      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2403      | GGCGACGG<br>AetCaCGTT<br>TGGAC | 3163      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCGCTGTTCGGCAATACC<br>TGGCGACGGAAetCaCGTTTGGACACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3923      | GTCCAAAACGAGTCT<br>CCGTGCGTGTCTG<br>GCAATACCTGGCGA<br>CGGACTCACGTTTG<br>GAC  | 60              |
| 1644      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2404      | GGCGACGG<br>AatCcCGTT<br>TGGAC | 3164      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCGCTGTTCGGCAATACC<br>TGGCGACGGAAatCcCGTTTGGACACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3924      | GTCCAAAACGAGTCT<br>CCGTGCGTGTCTG<br>GCAATACCTGGCGA<br>CGGAATCCCCGTTTG<br>GAC | 60              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1645      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2405      | GCGACGG<br>AatCgCGT<br>TTGGAC | 3165      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCTGTTCCTGGCAATACC<br>TGGCGACGGAatCgCGTTTGGACCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3925      | GTCCAAAACGAGTCT<br>CCGTCGCTGTCTG<br>GCAATACCTGGCGA<br>CGGACTCCCCGTTTG<br>GAC | 60              |
| 1646      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2406      | GCGACGG<br>AatCgCGT<br>TTGGAC | 3166      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCTGTTCCTGGCAATACC<br>TGGCGACGGAatCgCGTTTGGACCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3926      | GTCCAAAACGAGTCT<br>CCGTCGCTGTCTG<br>GCAATACCTGGCGA<br>CGGATTCGCGTTTG<br>GAC  | 60              |
| 1647      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2407      | GCGACGG<br>AttCgCGT<br>TTGGAC | 3167      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCTGTTCCTGGCAATACC<br>TGGCGACGGAatCgCGTTTGGACCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3927      | GTCCAAAACGAGTCT<br>CCGTCGCTGTCTG<br>GCAATACCTGGCGA<br>CGGATTCGCGTTTG<br>GAC  | 60              |
| 1648      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2408      | GCGACGG<br>AatCgCGT<br>TTGGAC | 3168      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCTGTTCCTGGCAATACC<br>TGGCGACGGAatCgCGTTTGGACCAACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3928      | GTCCAAAACGAGTCT<br>CCGTCGCTGTCTG<br>GCAATACCTGGCGA<br>CGGACTTCGCGTTTG<br>GAC | 60              |
| 1649      | GTCCAAA<br>CGAGTCT<br>CCGTCGC | 2409      | GCGACGG<br>AacCgCGT<br>TTGGAC | 3169      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCAAACGAGTCTCCGTGCTGTTCCTGGCAATACC<br>TGGCGACGGAacCgCGTTTGGACCAACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 3929      | GTCCAAAACGAGTCT<br>CCGTCGCTGTCTG<br>GCAATACCTGGCGA<br>CGGAACCCGCGTTTG<br>GAC | 60              |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                    | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1650      | AAAGCAG<br>GCTCGCA<br>GGGCTTC | 2410      | GAGGCC<br>TaaGtGCC<br>GCTTT  | 3170      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGCAATACCTG<br>TGGAGGCCCTaaGtGCCCTGCTTTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3930      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTAGTGCCT<br>GCTTT  | 94              |
| 1651      | AAAGCAG<br>GCTCGCA<br>GGGCTTC | 2411      | GAGGCC<br>TaaGtGCC<br>TGCTTT | 3171      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGCAATACCTG<br>TGGAGGCCCTaaGtGCCCTGCTTTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3931      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTAGTGCCT<br>GCTTT  | 94              |
| 1652      | AAAGCAG<br>GCTCGCA<br>GGGCTTC | 2412      | GAGGCC<br>TaaGtGCC<br>TGCTTT | 3172      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGCAATACCTG<br>TGGAGGCCCTaaGtGCCCTGCTTTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3932      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTAGTGCCT<br>GCTTT  | 94              |
| 1653      | AAAGCAG<br>GCTCGCA<br>GGGCTTC | 2413      | GAGGCC<br>TaaGtGCC<br>TGCTTT | 3173      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGCAATACCTG<br>TGGAGGCCCTaaGtGCCCTGCTTTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3933      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTAAGGCCCT<br>GCTTT | 94              |
| 1654      | AAAGCAG<br>GCTCGCA<br>GGGCTTC | 2414      | GAGGCC<br>TaaGtGCC<br>GCTTT  | 3174      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGCAATACCTG<br>TGGAGGCCCTaaGtGCCCTGCTTTACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3934      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTTAGGCCCT<br>GCTTT | 94              |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1655      | AAAGCAG<br>GCTCGCA<br>GGGCTC   | 2415      | GAGGCC<br>TgaGcGCC<br>TGCTTT  | 3175      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGGAATACC<br>TGGAGGCCCTgaGcGCCCTGCTTTACGGAGGGCTG<br>CCCTGACTGCCACGGT   | 3935      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTCAGGGCT<br>GCTTT    | 94              |
| 1656      | AAAGCAG<br>GCTCGCA<br>GGGCTC   | 2416      | GAGGCC<br>TgaGcGCC<br>TGCTTT  | 3176      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGGAATACC<br>TGGAGGCCCTgaGcGCCCTGCTTTACGGAGGGCTG<br>CCCTGACTGCCACGGT   | 3936      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTCAGGGCT<br>GCTTT    | 94              |
| 1657      | AAAGCAG<br>GCTCGCA<br>GGGCTC   | 2417      | GAGGCC<br>TCGGGC<br>CTGCTTT   | 3177      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>AGCAGGCTCGCAGGGCTCTGTCTTGGAATACC<br>TGGAGGCCCTCGGgGCCCTGCTTTACGGAGGGCT<br>GCCCTGACTGCCACGGT   | 3937      | AAAGCAGGCTCGC<br>AGGGCTCTGTCT<br>GGCAATACCTGGA<br>GGCCCTCAGGGCT<br>GCTTT    | 94              |
| 1658      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2418      | GCCCTGC<br>GtaCaTGCT<br>TTGAG | 3178      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTTGGAATACC<br>TGGCCCTGCGtaCaTGCTTTGAGCACGGAGGGCTG<br>CCCTGACTGCCACGGT | 3938      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGCCTACATGCTTT<br>GAG | 97              |
| 1659      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2419      | GCCCTGC<br>GtaCaTGC<br>TTTGAG | 3179      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTTGGAATACC<br>TGGCCCTGCGtaCaTGCTTTGAGCACGGAGGGCTG<br>CCCTGACTGCCACGGT | 3939      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGCCTACATGCTTT<br>GAG | 97              |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|--------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1660      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2420      | GCCCTGC<br>GttCaTGCT<br>TTTGAG | 3180      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCgtCaTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3940      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGGCTTCATGCTTT<br>GAG | 97              |
| 1661      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2421      | GCCCTGC<br>GttCaTGCT<br>TTTGAG | 3181      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCgtCaTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3941      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGGCTTCATGCTTT<br>GAG | 97              |
| 1662      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2422      | GCCCTGC<br>GttCaTGCT<br>TTTGAG | 3182      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCgtCaTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3942      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGGCTTCATGCTTT<br>GAG | 97              |
| 1663      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2423      | GCCCTGC<br>GttCaTGCT<br>TTTGAG | 3183      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCgtCaTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3943      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGGCCCCATGCTTT<br>GAG | 97              |
| 1664      | CTCAAAAG<br>CAGGCTC<br>GCAGGGC | 2424      | GCCCTGC<br>GttCaTGCT<br>TTTGAG | 3184      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCgtCaTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 3944      | CTCAAAAGCAGGCTC<br>GCAGGGCTGTCTG<br>GCAATACCTGGCCC<br>TGGCTTCATGCTTT<br>GAG | 97              |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1665      | CTCAAAG<br>CAGGCTC<br>GCAGGCG | 2425      | GCCCTGC<br>GTCCCTGC<br>TTTGAG | 3185      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CAAAAGCAGGCTCGCAGGGCTGTCTGGCAATACC<br>TGGCCCTGCGTCTCTGCTTTGAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3945      | CTCAAAGCAGGCTC<br>GCAGGCTGTCTG<br>GCAATACCTGGCCC<br>TGCGTCTTGTCTT<br>GAG    | 97              |
| 1666      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2426      | CCGGGAG<br>GtaCaGGC<br>CAGAGA | 3186      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCCGGTGTCTGGCAATACC<br>TGCCGGGAGGtaCaGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3946      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGTACAGGCCA<br>GAGA  | 369             |
| 1667      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2427      | CCGGGAG<br>GtaCaGGC<br>CAGAGA | 3187      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCCGGTGTCTGGCAATACC<br>TGCCGGGAGGtaCaGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3947      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGCACAGGCCA<br>GAGA  | 369             |
| 1668      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2428      | CCGGGAG<br>GttCaGGCC<br>AGAGA | 3188      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCCGGTGTCTGGCAATACC<br>TGCCGGGAGGttCaGGCCAGAGACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3948      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGTTCAAGGCCA<br>GAGA | 369             |
| 1669      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2429      | CCGGGAG<br>GttCaGGC<br>CAGAGA | 3189      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCCGGTGTCTGGCAATACC<br>TGCCGGGAGGttCaGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 3949      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGCTCAGGCCA<br>GAGA  | 369             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1670      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2430      | CCGGGAG<br>GtcCaGGC<br>CAGAGA | 3190      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCGGGTGTCTGGCAATACC<br>TGCCGGGAGGtcCaGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3950      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGTCCAGGCCA<br>GAGA  | 369             |
| 1671      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2431      | CCGGGAG<br>GtcCaGGC<br>CAGAGA | 3191      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCGGGTGTCTGGCAATACC<br>TGCCGGGAGGtcCaGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3951      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGCCAGGCCA<br>GAGA   | 369             |
| 1672      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2432      | CCGGGAG<br>GtaCcGGC<br>CAGAGA | 3192      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCGGGTGTCTGGCAATACC<br>TGCCGGGAGGtaCcGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3952      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGTACCGGCCA<br>GAGA  | 369             |
| 1673      | TCTCTGG<br>CCAGCTC<br>CTCCCGG | 2433      | CCGGGAG<br>GtcCcGGC<br>CAGAGA | 3193      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TCTGGCCAGCTCCTCCGGGTGTCTGGCAATACC<br>TGCCGGGAGGtcCcGGCCAGAGACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 3953      | TCTCTGGCCAGCTC<br>CTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GAGGTCCCGGCCA<br>GAGA  | 369             |
| 1674      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2434      | GAGGAGC<br>TaaCaAGA<br>GAGACG | 3194      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTaaCaAGAGAGACGACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 3954      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTAACAAAGAG<br>AGACG | 373             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1675      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2435      | GAGGAGC<br>TtaCaAGA<br>GAGACG | 3195      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTtaCaAGAGAGACGACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3955      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTTCAAGAG<br>AGACG  | 373             |
| 1676      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2436      | GAGGAGC<br>TtaCaAGA<br>GAGACG | 3196      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTtaCaAGAGAGACGACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3956      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTCAAGAG<br>AGACG   | 373             |
| 1677      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2437      | GAGGAGC<br>TtaCaAGA<br>GAGACG | 3197      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTtaCaAGAGAGACGACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3957      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTATCAAGAG<br>AGACG | 373             |
| 1678      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2438      | GAGGAGC<br>TttCaAGAG<br>AGACG | 3198      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTtCaAGAGAGACGACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3958      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTTCAAGAGA<br>GACG  | 373             |
| 1679      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2439      | GAGGAGC<br>TttCaAGA<br>GAGACG | 3199      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTCTGGCCAGCTCCTCTGTCTGGCAATACCT<br>GGAGGAGCTTtCaAGAGAGACGACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3959      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTCTCAAGAG<br>AGACG | 373             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1680      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2440      | GAGGAGC<br>TtcCgAGA<br>GAGACG | 3200      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTTGCCAGCTCCTCTGTGTCTGGCAATACCT<br>GGAGGAGCTtcCgAGAGAGACGACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 3960      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTTCCGAGAG<br>AGACG | 373             |
| 1681      | CGTCTCT<br>CTGGCCA<br>GCTCCTC | 2441      | GAGGAGC<br>TCCCAGA<br>GAGACG  | 3201      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>TCTCTTGCCAGCTCCTCTGTGTCTGGCAATACCT<br>GGAGGAGCTCCCAGAGAGACGACGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 3961      | CGTCTCTCTGGCCA<br>GCTCCTCTGTCTG<br>GCAATACCTGGAG<br>GAGCTCCCTAGAGA<br>GACG | 373             |
| 1682      | AGATCTG<br>AATCCTG<br>GACTCCG | 2442      | CGGAGTC<br>CtaGfTTCA<br>GATCT | 3202      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ATCTGAATCCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCtaGfTTCAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3962      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCTAGTTTCAGA<br>TCT  | 401             |
| 1683      | AGATCTG<br>AATCCTG<br>GACTCCG | 2443      | CGGAGTC<br>CcaGfTTCA<br>GATCT | 3203      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ATCTGAATCCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCcaGfTTCAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3963      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCAGTTTCAGA<br>TCT | 401             |
| 1684      | AGATCTG<br>AATCCTG<br>GACTCCG | 2444      | CGGAGTC<br>CttGfTTCA<br>GATCT | 3204      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>ATCTGAATCCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCttGfTTCAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 3964      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCTGTTTCAGA<br>TCT | 401             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1685      | AGATCTG<br>AATCCTG<br>GACTCCG | 2445      | CGGAGTC<br>CctGfTTCA<br>GATCT | 3205      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAG<br>ATCTGAATCTCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCcGfTTCAAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 3965      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCTGTTTCAGA<br>TCT  | 401             |
| 1686      | AGATCTG<br>AATCCTG<br>GACTCCG | 2446      | CGGAGTC<br>CctGfTTCA<br>GATCT | 3206      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAG<br>ATCTGAATCTCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCcGfTTCAAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 3966      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCTGTTTCAGA<br>TCT  | 401             |
| 1687      | AGATCTG<br>AATCCTG<br>GACTCCG | 2447      | CGGAGTC<br>CccGfTTCA<br>GATCT | 3207      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAG<br>ATCTGAATCTCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCcGfTTCAAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 3967      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCCGTTTCAGA<br>TCT  | 401             |
| 1688      | AGATCTG<br>AATCCTG<br>GACTCCG | 2448      | CGGAGTC<br>CtaGcTTCA<br>GATCT | 3208      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAG<br>ATCTGAATCTCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCtaGcTTCAAGATCTCACGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 3968      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCTAGCTTCAGA<br>TCT   | 401             |
| 1689      | AGATCTG<br>AATCCTG<br>GACTCCG | 2449      | CGGAGTC<br>CTCGgTTT<br>AGATCT | 3209      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGAG<br>ATCTGAATCTCTGGACTCCGTGTCTGGCAATACC<br>TGCGGAGTCCCTCGgTTTCAAGATCTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 3969      | AGATCTGAATCCTG<br>GACTCCGTGTCTG<br>GCAATACCTGCGGA<br>GTCCCTCGGTTCAGA<br>TCT | 401             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1690      | CAGATCT<br>GAATCCT<br>GGACTCC | 2450      | GGAGTCC<br>AaaAaTCA<br>GATCTG | 3210      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCaAaATCAGATCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3970      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCAAAAATCAG<br>ATCTG    | 402             |
| 1691      | CAGATCT<br>GAATCCT<br>GGACTCC | 2451      | GGAGTCC<br>AtaAaTCA<br>GATCTG | 3211      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCaAaATCAGATCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3971      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCATAAATCAGA<br>TCTG    | 402             |
| 1692      | CAGATCT<br>GAATCCT<br>GGACTCC | 2452      | GGAGTCC<br>AcaAaTCA<br>GATCTG | 3212      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCaAaATCAGATCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3972      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCACAAATCAGA<br>TCTG    | 402             |
| 1693      | CAGATCT<br>GAATCCT<br>GGACTCC | 2453      | GGAGTCC<br>AatAaTCA<br>GATCTG | 3213      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCaAaATCAGATCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3973      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCAAATCAGATCAGA<br>TCTG | 402             |
| 1694      | CAGATCT<br>GAATCCT<br>GGACTCC | 2454      | GGAGTCC<br>AttAaTCAG<br>ATCTG | 3214      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCaAaATCAGATCTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3974      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCATTAAATCAGA<br>TCTG   | 402             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1695      | CAGATCT<br>GAATCCT<br>GGACTCC | 2455      | GGAGTCC<br>AacAaTCA<br>GATCTG  | 3215      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCAacAaTCAGATCTGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3975      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCACTAATCAGA<br>TCTG  | 402             |
| 1696      | CAGATCT<br>GAATCCT<br>GGACTCC | 2456      | GGAGTCC<br>AacAaTCA<br>GATCTG  | 3216      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCAacAaTCAGATCTGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3976      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCAAACAATCAGA<br>TCTG | 402             |
| 1697      | CAGATCT<br>GAATCCT<br>GGACTCC | 2457      | GGAGTCC<br>AacAaTCA<br>GATCTG  | 3217      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>GATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCAacAaTCAGATCTGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 3977      | CAGATCTGAATCCT<br>GGACTCCTGTCTG<br>GCAATACCTGGGA<br>GTCCACCACTCAGA<br>TCTG  | 402             |
| 1698      | CCAGATC<br>TGAATCC<br>TGGACTC | 2458      | GAGTCCA<br>GatTaaCAG<br>ATCTGG | 3218      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCAacAaTCAGATCTGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3978      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGATTACAGATC<br>TGG  | 403             |
| 1699      | CCAGATC<br>TGAATCC<br>TGGACTC | 2459      | GAGTCCA<br>GatTaaCAGA<br>TCTGG | 3219      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCCTGTCTGGCAATACC<br>TGGGAGTCCAacAaTCAGATCTGACCGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3979      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGTTTACAGATC<br>TGG  | 403             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1700      | CCAGATC<br>TGAATCC<br>TGGACTC | 2460      | GAGTCCA<br>GacTcCAG<br>ATCTGG | 3220      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTTCGGCAATACC<br>TGGAGTCCAGacTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3980      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGCTTACAGATC<br>TGG | 403             |
| 1701      | CCAGATC<br>TGAATCC<br>TGGACTC | 2461      | GAGTCCA<br>GacTcCAG<br>ATCTGG | 3221      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTTCGGCAATACC<br>TGGAGTCCAGacTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3981      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGACTACAGATC<br>TGG | 403             |
| 1702      | CCAGATC<br>TGAATCC<br>TGGACTC | 2462      | GAGTCCA<br>GtcTcCAG<br>ATCTGG | 3222      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTTCGGCAATACC<br>TGGAGTCCAGtcTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3982      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGTCTACAGATC<br>TGG | 403             |
| 1703      | CCAGATC<br>TGAATCC<br>TGGACTC | 2463      | GAGTCCA<br>GccTcCAG<br>ATCTGG | 3223      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTTCGGCAATACC<br>TGGAGTCCAGccTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3983      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGCTTACAGATC<br>TGG | 403             |
| 1704      | CCAGATC<br>TGAATCC<br>TGGACTC | 2464      | GAGTCCA<br>GatTcCAG<br>ATCTGG | 3224      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTTCGGCAATACC<br>TGGAGTCCAGatTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3984      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGATTCAGATC<br>TGG  | 403             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1705      | CCAGATC<br>TGAATCC<br>TGGACTC | 2465      | GAGTCCA<br>GctTcCAG<br>ATCTGG | 3225      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>AGATCTGAATCCTGGACTCTGTCTTGGCAATACC<br>TGGAGTCCAGcTcCAGATCTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 3985      | CCAGATCTGAATCC<br>TGGACTCTGTCTG<br>GCAATACCTGGAGT<br>CCAGCTTCCAGATC<br>TGG   | 403             |
| 1706      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2466      | TCCAGGA<br>TaaAaATC<br>TGGTTT | 3226      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATaaAaATCTGGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3986      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATAAAATCT<br>GGTTT   | 406             |
| 1707      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2467      | TCCAGGA<br>TcaAaATC<br>TGGTTT | 3227      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATcaAaATCTGGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3987      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATCAAAATCTG<br>GTTT  | 406             |
| 1708      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2468      | TCCAGGA<br>TgaAaATC<br>TGGTTT | 3228      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATgaAaATCTGGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3988      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATGAAAATCT<br>GGTTT  | 406             |
| 1709      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2469      | TCCAGGA<br>TagAaATC<br>TGGTTT | 3229      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATagAaATCTGGTTTTCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 3989      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATAGAAAATCT<br>GGTTT | 406             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1710      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2470      | TCCAGGA<br>TggAaATC<br>TGGTTT | 3230      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATegAaATCTGGTTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3990      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATCGAAATCTG<br>GTTT | 406             |
| 1711      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2471      | TCCAGGA<br>TggAaATC<br>TGGTTT | 3231      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATggAaATCTGGTTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3991      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATGGAAATCT<br>GGTTT | 406             |
| 1712      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2472      | TCCAGGA<br>TaaAtATCT<br>GGTTT | 3232      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATaaAtATCTGGTTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3992      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATAAATATCTG<br>GTTT | 406             |
| 1713      | AAACCAG<br>ATCTGAA<br>TCCTGGA | 2473      | TCCAGGA<br>TcaAtATCT<br>GGTTT | 3233      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAA<br>ACCAGATCTGAAATCCTGGATGTTCTGGCAATACC<br>TGTCCAGGATcaAtATCTGGTTTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 3993      | AAACCAGATCTGA<br>ATCCTGGATGTTCT<br>GGCAATACCTGTCC<br>AGGATCAATATCTG<br>GTTT | 406             |
| 1714      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2474      | CCAGGAT<br>TatGfTCTG<br>GTTTC | 3234      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AAACCAGATCTGAAATCCTGGTGTCTGGCAATACC<br>TGCCAGGATtatGfTCTGGTTTCACGGAGGCCCTGC<br>CCCTGACTGCCACGGT | 3994      | GAAACCAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATATGTCTCTGG<br>TTTC  | 407             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1715      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2475      | CCAGGAT<br>TgtGtTCTG<br>GTTTC | 3235      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AACCCAGATCTGAATCCTGGTGTCTTGCCAATACC<br>TGCCAGGATTgtGtTCTGGTTTCCACGGAGGCCCTGC<br>CCTGACTGCCACCGGT | 3995      | GAAACCAAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGTCTGG<br>TTTC | 407             |
| 1716      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2476      | CCAGGAT<br>TgtGtTCTG<br>GTTTC | 3236      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AACCCAGATCTGAATCCTGGTGTCTTGCCAATACC<br>TGCCAGGATTgtGtTCTGGTTTCCACGGAGGCCCTG<br>CCTGACTGCCACCGGT  | 3996      | GAAACCAAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGTCTGG<br>TTTC | 407             |
| 1717      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2477      | CCAGGAT<br>TgtGtTCTG<br>GTTTC | 3237      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AACCCAGATCTGAATCCTGGTGTCTTGCCAATACC<br>TGCCAGGATTgtGtTCTGGTTTCCACGGAGGCCCTG<br>CCTGACTGCCACCGGT  | 3997      | GAAACCAAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGTCTGG<br>TTTC | 407             |
| 1718      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2478      | CCAGGAT<br>TgtGtTCTG<br>GTTTC | 3238      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AACCCAGATCTGAATCCTGGTGTCTTGCCAATACC<br>TGCCAGGATTgtGtTCTGGTTTCCACGGAGGCCCTG<br>CCTGACTGCCACCGGT  | 3998      | GAAACCAAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGTCTGG<br>TTTC | 407             |
| 1719      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2479      | CCAGGAT<br>TgtGtTCTG<br>GTTTC | 3239      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>AACCCAGATCTGAATCCTGGTGTCTTGCCAATACC<br>TGCCAGGATTgtGtTCTGGTTTCCACGGAGGCCCTG<br>CCTGACTGCCACCGGT  | 3999      | GAAACCAAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGTCTGG<br>TTTC | 407             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                        | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1720      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2480      | CCAGGAT<br>TaaGcTCT<br>GGTTTC | 3240      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGGA<br>AAACCCAGATCTGAATCCTGTGTGTTCTTGCCAATACC<br>TGCCAGGATTaaGcTCTGGGTTTCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4000      | GAAACCCAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTACGCTCTGG<br>TTTC | 407             |
| 1721      | GAAACCA<br>GATCTGA<br>ATCCTGG | 2481      | CCAGGAT<br>TGTGgTCT<br>GGTTTC | 3241      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGGA<br>AAACCCAGATCTGAATCCTGTGTGTTCTTGCCAATACC<br>TGCCAGGATTGTGgTCTGGGTTTCCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4001      | GAAACCCAGATCTG<br>AATCCTGGTGTCT<br>GGCAATACCTGCCA<br>GGATTGTGGTCTGG<br>TTTC | 407             |
| 1722      | TGAAACC<br>AGATCTG<br>AATCCTG | 2482      | CAGGATT<br>CtaAaCTG<br>GTTTCA | 3242      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTGTTCTTGCCAATACC<br>TGCAGGATTctaAaCTGGTTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4002      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTAAACTGGTT<br>TCA  | 408             |
| 1723      | TGAAACC<br>AGATCTG<br>AATCCTG | 2483      | CAGGATT<br>CcaAaCTG<br>GTTTCA | 3243      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTGTTCTTGCCAATACC<br>TGCAGGATTccaAaCTGGTTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4003      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCCAAACTGGTT<br>TCA  | 408             |
| 1724      | TGAAACC<br>AGATCTG<br>AATCCTG | 2484      | CAGGATT<br>CttAaCTGG<br>TTTCA | 3244      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTGTTCTTGCCAATACC<br>TGCAGGATTcttAaCTGGTTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4004      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTTAACTGGTT<br>TCA  | 408             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1725      | TGAAACC<br>AGATCTG<br>AATCCTG | 2485      | CAGGATT<br>CctAaCTG<br>GTTTCA | 3245      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTCTGGCAATACC<br>TGCAGGATTCTaAaCTGGTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4005      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTAACTGGTT<br>TCA  | 408             |
| 1726      | TGAAACC<br>AGATCTG<br>AATCCTG | 2486      | CAGGATT<br>CctAaCTG<br>GTTTCA | 3246      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTCTGGCAATACC<br>TGCAGGATTCTaAaCTGGTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4006      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTAACTGGTT<br>TCA  | 408             |
| 1727      | TGAAACC<br>AGATCTG<br>AATCCTG | 2487      | CAGGATT<br>CccAaCTG<br>GTTTCA | 3247      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTCTGGCAATACC<br>TGCAGGATTCTccAaCTGGTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4007      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCCCAACTGGTT<br>TCA | 408             |
| 1728      | TGAAACC<br>AGATCTG<br>AATCCTG | 2488      | CAGGATT<br>CtaAaCTG<br>GTTTCA | 3248      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTCTGGCAATACC<br>TGCAGGATTCTaAaCTGGTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4008      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTAACTGGTT<br>TCA  | 408             |
| 1729      | TGAAACC<br>AGATCTG<br>AATCCTG | 2489      | CAGGATT<br>CctAaCTG<br>GTTTCA | 3249      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>AAACCCAGATCTGAATCCTGTGTCTGGCAATACC<br>TGCAGGATTCTaAaCTGGTTTCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4009      | TGAAACCAGATCTG<br>AATCCTGTGTCTG<br>GCAATACCTGCAGG<br>ATTCTCACTGGTT<br>TCA  | 408             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1730      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2490      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3250      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAgtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4010      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGTACAGGTTTC<br>AGA | 410             |
| 1731      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2491      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3251      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAgtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4011      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGCACAGGTTTC<br>AGA | 410             |
| 1732      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2492      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3252      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAgtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4012      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGTCCAGGTTTC<br>AGA | 410             |
| 1733      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2493      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3253      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAgtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4013      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGCCCAGGTTTC<br>AGA | 410             |
| 1734      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2494      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3254      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAgtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4014      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGTGCAGGTTTC<br>AGA | 410             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
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| 1735      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2495      | GGATTCA<br>GegCaGGT<br>TTCAGA | 3255      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAGegCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4015      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGCGCAGGTTTC<br>AGA | 410             |
| 1736      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2496      | GGATTCA<br>GtaCaGGT<br>TTCAGA | 3256      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAGtaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4016      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGTACCGGTTTC<br>AGA | 410             |
| 1737      | TCTGAAA<br>CCAGATC<br>TGAATCC | 2497      | GGATTCA<br>GgaCaGGT<br>TTCAGA | 3257      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>TGAAACCAGATCTGAATCCTGTTCTGGCAATACC<br>TGGGATTCAGgaCaGGTTTCAGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4017      | TCTGAAACCAGATC<br>TGAATCCTGTCTG<br>GCAATACCTGGGAT<br>TCAGCACCGGTTTC<br>AGA | 410             |
| 1738      | CCCCCGC<br>CGGGGGC<br>CGCGCTG | 2498      | CAGCGCG<br>GaaCaCGG<br>CGGGGG | 3258      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTTCTGGCAATACC<br>TGCAGCGCGGaaCaCGGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT   | 4018      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGAACACGGCG<br>GGGG  | 492             |
| 1739      | CCCCCGC<br>CGGGGGC<br>CGCGCTG | 2499      | CAGCGCG<br>GgaCaCGG<br>CGGGGG | 3259      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTTCTGGCAATACC<br>TGCAGCGCGGgaCaCGGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT   | 4019      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGACACGGCG<br>GGGG   | 492             |

| SEQ ID NO | guide                       | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-----------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1740      | CCCCCG<br>CGGGGC<br>CGCGCTG | 2500      | CAGCGCG<br>GagCaCGG<br>CGGGGG | 3260      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGCGGagCaCGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4020      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGAGCACGGCG<br>GGG  | 492             |
| 1741      | CCCCCG<br>CGGGGC<br>CGCGCTG | 2501      | CAGCGCG<br>GggCaCGG<br>CGGGGG | 3261      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGCGGgCaCGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT  | 4021      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGGCACGGCG<br>GGG   | 492             |
| 1742      | CCCCCG<br>CGGGGC<br>CGCGCTG | 2502      | CAGCGCG<br>GaaCgCGG<br>CGGGGG | 3262      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGCGGaaCgCGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4022      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGAACGCGGGCG<br>GGG | 492             |
| 1743      | CCCCCG<br>CGGGGC<br>CGCGCTG | 2503      | CAGCGCG<br>GgaCgCGG<br>CGGGGG | 3263      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGCGGgaCgCGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4023      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGAGCGCGGGCG<br>GGG | 492             |
| 1744      | CCCCCG<br>CGGGGC<br>CGCGCTG | 2504      | CAGCGCG<br>GagCgCGG<br>CGGGGG | 3264      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGCGGagCgCGCGGGGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4024      | CCCCCGCGGGGGC<br>CGCGCTGTGTCTG<br>GCAATACCTGCAGC<br>GCGGAGCGCGGGCG<br>GGG | 492             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1745      | CCCCCG<br>CGGGGG<br>CGCGCTG   | 2505      | CAGCGCG<br>GGGCGG<br>GCGGGG   | 3265      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CCCCCGGGGGCGCGCTGTGTCTTCTGGCAATACC<br>TGACGCGGGGGCTCGCGGGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4025      | CCCCCGCGGGGGC<br>CGCGCTGTCTCTG<br>GCAATACCTGCAGC<br>GCGGGGCTCGGGG<br>GGG    | 492             |
| 1746      | TTCCCCA<br>CGGGCGG<br>GTGTGGG | 2506      | CCCACAC<br>CaaCaCGT<br>GGGGAA | 3266      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCGCGGGTGTGGGTGTCTGGCAATACC<br>TGCCCCAACCaCaCGTGGGGAACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 4026      | TTCCCCACGCGCGG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCCA<br>CACCAACACGTGG<br>GGAA | 542             |
| 1747      | TTCCCCA<br>CGGGCGG<br>GTGTGGG | 2507      | CCCACAC<br>CtaCaCGT<br>GGGGAA | 3267      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCGCGGGTGTGGGTGTCTGGCAATACC<br>TGCCCCAACCaCaCGTGGGGAACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT  | 4027      | TTCCCCACGCGCGG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCCA<br>CACCTACACGTGGG<br>GAA | 542             |
| 1748      | TTCCCCA<br>CGGGCGG<br>GTGTGGG | 2508      | CCCACAC<br>CcaCaCGT<br>GGGGAA | 3268      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCGCGGGTGTGGGTGTCTGGCAATACC<br>TGCCCCAACCaCaCGTGGGGAACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 4028      | TTCCCCACGCGCGG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCCA<br>CACCCACACGTGGG<br>GAA | 542             |
| 1749      | TTCCCCA<br>CGGGCGG<br>GTGTGGG | 2509      | CCCACAC<br>CatCaCGT<br>GGGGAA | 3269      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCGCGGGTGTGGGTGTCTGGCAATACC<br>TGCCCCAACCaCaCGTGGGGAACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT  | 4029      | TTCCCCACGCGCGG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCCA<br>CACCATCACGTGGG<br>GAA | 542             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1750      | TTCCCCA<br>CGGCCG<br>GTGTGGG | 2510      | CCCACAC<br>CttCaCGT<br>GGGAA   | 3270      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCCCGGTGTGGGTGTCTGGCAATACC<br>TGCCCAACACtCaCGTGGGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGT      | 4030      | TTCCCCACGCGCCG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCA<br>CACCTTCACGTGGG<br>GAA   | 542             |
| 1751      | TTCCCCA<br>CGGCCG<br>GTGTGGG | 2511      | CCCACAC<br>CctCaCGT<br>GGGAA   | 3271      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCCCGGTGTGGGTGTCTGGCAATACC<br>TGCCCAACACtCaCGTGGGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGT      | 4031      | TTCCCCACGCGCCG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCA<br>CACCTTCACGTGGG<br>GAA   | 542             |
| 1752      | TTCCCCA<br>CGGCCG<br>GTGTGGG | 2512      | CCCACAC<br>CacCaCGT<br>GGGAA   | 3272      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCCCGGTGTGGGTGTCTGGCAATACC<br>TGCCCAACACcCaCGTGGGAAACACGGAGGCCCT<br>GCCCTGACTGCCACCGT      | 4032      | TTCCCCACGCGCCG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCA<br>CACACCACGTGGG<br>GAA    | 542             |
| 1753      | TTCCCCA<br>CGGCCG<br>GTGTGGG | 2513      | CCCACAC<br>CccCaCGT<br>GGGAA   | 3273      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CCCCACGCCCGGTGTGGGTGTCTGGCAATACC<br>TGCCCAACACcCcCaCGTGGGAAACACGGAGGCCCT<br>GCCCTGACTGCCACCGT    | 4033      | TTCCCCACGCGCCG<br>GTGTGGGTGTCTG<br>GCAATACCTGCCCA<br>CACCCCCACGTGGG<br>GAA   | 542             |
| 1754      | CACGAAA<br>GCCCT<br>GTGGGAG  | 2514      | CTCCCAC<br>AaaGaGCT<br>TTCTGTG | 3274      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCCAACaaaGaGCTTTCTGTGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 4034      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGTCTC<br>CACAAAAGAGCTTTC<br>GTG | 604             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                    | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1755      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2515      | CTCCAC<br>AtaGaGCT<br>TTCGTG | 3275      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACACaGaGCTTTCGTGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4035      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGCTCC<br>CACATAGAGCTTTC<br>GTG  | 604             |
| 1756      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2516      | CTCCAC<br>AcaGaGCT<br>TTCGTG | 3276      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACACaGaGCTTTCGTGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4036      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGCTCC<br>CACACAGAGCTTTC<br>GTG  | 604             |
| 1757      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2517      | CTCCAC<br>AatGaGCT<br>TTCGTG | 3277      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACAAaGaGCTTTCGTGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4037      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGCTCC<br>CACAAATGAGCTTTC<br>GTG | 604             |
| 1758      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2518      | CTCCAC<br>AttGaGCTT<br>TCGTG | 3278      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACAAaGaGCTTTCGTGCACGGAGGCCTGC<br>CCCTGACTGCCACCGT | 4038      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGCTCC<br>CACATTGAGCTTTC<br>GTG  | 604             |
| 1759      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2519      | CTCCAC<br>AetGaGCT<br>TTCGTG | 3279      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACAAeGaGCTTTCGTGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4039      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGCTCC<br>CACACTGAGCTTTC<br>GTG  | 604             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1760      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2520      | CTCCAC<br>AacGaaGCT<br>TTCGTG  | 3280      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACaGaaGCTTTCGTGACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 4040      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGTCTC<br>CACAAAGAGCTTTC<br>GTG | 604             |
| 1761      | CACGAAA<br>GCCCCCT<br>GTGGGAG | 2521      | CTCCAC<br>AccGaaGCT<br>TTCGTG  | 3281      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CGAAAAGCCCTGTGGGAGTGTCTGGCAATACC<br>TGCTCCACaGaaGCTTTCGTGACGGAGGCCCTG<br>CCCTGACTGCCACGGT    | 4041      | CACGAAAAGCCCCCT<br>GTGGGAGTGTCTG<br>GCAATACCTGTCTC<br>CACACCGAGCTTTC<br>GTG | 604             |
| 1762      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2522      | CGGCGCG<br>CaaGaaATT<br>TCGCCT | 3282      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCGCGCGCGGTGTCTGGCAATACC<br>TGCGGCGGCaGaaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4042      | AGGCGAAATCCCC<br>GCGCGCGTGTCT<br>GGCAATACCTGCGG<br>CGCGCAAGAAATTC<br>GCCCT  | 701             |
| 1763      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2523      | CGGCGCG<br>CtaGaaATT<br>CGCCT  | 3283      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCGCGCGCGGTGTCTGGCAATACC<br>TGCGGCGGCaGaaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4043      | AGGCGAAATCCCC<br>GCGCGCGTGTCT<br>GGCAATACCTGCGG<br>CGCGTAGAAATTC<br>GCCCT   | 701             |
| 1764      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2524      | CGGCGCG<br>CcaGaaATT<br>TCGCCT | 3284      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCGCGCGCGGTGTCTGGCAATACC<br>TGCGGCGGCaGaaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4044      | AGGCGAAATCCCC<br>GCGCGCGTGTCT<br>GGCAATACCTGCGG<br>CGCGCCAGAAATTC<br>GCCCT  | 701             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                            | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1765      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2525      | CGGCGCG<br>CctGaATT<br>CGCCT   | 3285      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCCCGCGCGCTGTCTTGCAATACCTGCGGCGCGCctGaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4045      | AGGCGAAATCCCC<br>GCGCGCGCTGTCT<br>GGCAATACCTGCGG<br>CGCGCATGAATTTC<br>GCCCT  | 701             |
| 1766      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2526      | CGGCGCG<br>CctGaATT<br>CGCCT   | 3286      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCCCGCGCGCTGTCTTGCAATACCTGCGGCGCGCctGaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4046      | AGGCGAAATCCCC<br>GCGCGCGCTGTCT<br>GGCAATACCTGCGG<br>CGCGCTGAATTTC<br>GCCCT   | 701             |
| 1767      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2527      | CGGCGCG<br>CctGaATT<br>CGCCT   | 3287      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCCCGCGCGCTGTCTTGCAATACCTGCGGCGCGCctGaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4047      | AGGCGAAATCCCC<br>GCGCGCGCTGTCT<br>GGCAATACCTGCGG<br>CGCGCTGAATTTC<br>GCCCT   | 701             |
| 1768      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2528      | CGGCGCG<br>CacGaATT<br>TCGCCCT | 3288      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCCCGCGCGCTGTCTTGCAATACCTGCGGCGCGCacGaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4048      | AGGCGAAATCCCC<br>GCGCGCGCTGTCT<br>GGCAATACCTGCGG<br>CGCGCACGAATTTC<br>GCCCT  | 701             |
| 1769      | AGGCGAA<br>ATCCCCG<br>CGCGCCG | 2529      | CGGCGCG<br>CccGaATT<br>TCGCCCT | 3289      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAG<br>GCGAAATCCCCCGCGCGCTGTCTTGCAATACCTGCGGCGCGCccGaATTTCGCCCTCACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4049      | AGGCGAAATCCCC<br>GCGCGCGCTGTCT<br>GGCAATACCTGCGG<br>CGCGCCCCGAATTTC<br>GCCCT | 701             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1770      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2530      | GGCGCGC<br>GtaGtTTTC<br>GCCTA | 3290      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCCTGTTCTGGCAATACC<br>TGGGCGCGCGtaGtTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4050      | TAGGCGAAATCCCC<br>GCGCGCCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGTAGCTTTTCGC<br>CTA | 702             |
| 1771      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2531      | GGCGCGC<br>GatGtTTTC<br>GCCTA | 3291      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCCTGTTCTGGCAATACC<br>TGGGCGCGCGGatGtTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4051      | TAGGCGAAATCCCC<br>GCGCGCCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGATGTTTTCGC<br>CTA  | 702             |
| 1772      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2532      | GGCGCGC<br>GacGtTTTC<br>GCCTA | 3292      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCCTGTTCTGGCAATACC<br>TGGGCGCGCGacGtTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4052      | TAGGCGAAATCCCC<br>GCGCGCCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGACGTTTTCGC<br>CTA  | 702             |
| 1773      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2533      | GGCGCGC<br>GaaGcTTT<br>CGCCTA | 3293      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCCTGTTCTGGCAATACC<br>TGGGCGCGCGaaGcTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4053      | TAGGCGAAATCCCC<br>GCGCGCCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGAAGCTTTTCGC<br>CTA | 702             |
| 1774      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2534      | GGCGCGC<br>GtaGcTTTC<br>GCCTA | 3294      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCCTGTTCTGGCAATACC<br>TGGGCGCGCGtaGcTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4054      | TAGGCGAAATCCCC<br>GCGCGCCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGTAGCTTTTCGC<br>CTA | 702             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1775      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2535      | GGCGCGC<br>GttGcTTTC<br>GCCTA | 3295      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCGCTGTTCTGGCAATACC<br>TGGGCGCGCGttGcTTTCGCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4055      | TAGGCGAAATCCCC<br>GCGCGCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGTTGCTTTCGC<br>CTA   | 702             |
| 1776      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2536      | GGCGCGC<br>GacGcTTT<br>CGCCTA | 3296      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCGCTGTTCTGGCAATACC<br>TGGGCGCGCGacGcTTTCGCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4056      | TAGGCGAAATCCCC<br>GCGCGCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGACGCTTTCGC<br>CTA   | 702             |
| 1777      | TAGGCGA<br>AATCCCC<br>GCGCGCC | 2537      | GGCGCGC<br>GCCGgTTT<br>CGCCTA | 3297      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTA<br>GGCGAAATCCCCCGCGCGCTGTTCTGGCAATACC<br>TGGGCGCGCGCGgTTTCGCCTACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT   | 4057      | TAGGCGAAATCCCC<br>GCGCGCTGTTC TG<br>GCAATACCTGGGCG<br>CGCGCGGTTTTCGC<br>CTA   | 702             |
| 1778      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2538      | GGCGCGC<br>GacAaTTC<br>GCCTAC | 3298      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCCCGCGCGCTGTTCTGGCAATACC<br>TGGCGCGCGGacAaTTTCGCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4058      | GTAGGCGAAATCCCC<br>CGCGCGTGTTC TG<br>GCAATACCTGGGCG<br>GCGGACAAATTCGCC<br>TAC | 703             |
| 1779      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2539      | GGCGCGC<br>GcaAaTTC<br>GCCTAC | 3299      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCCCGCGCGCTGTTCTGGCAATACC<br>TGGCGCGCGGcaAaTTTCGCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4059      | GTAGGCGAAATCCCC<br>CGCGCGTGTTC TG<br>GCAATACCTGGGCG<br>GCGGCAACTTCGCC<br>TAC  | 703             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                                | SEQ ID NO | full                                                                                                                                           | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1780      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2540      | GCGCGCG<br>GacA <sup>TTT</sup><br>GCCTAC | 3300      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGGacA <sup>TTT</sup> CGGCTACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4060      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGATACTTCGCC<br>TAC | 703             |
| 1781      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2541      | GCGCGCG<br>GacA <sup>TTT</sup><br>GCCTAC | 3301      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGGacA <sup>TTT</sup> CGGCTACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4061      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGCTACTTCGCC<br>TAC | 703             |
| 1782      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2542      | GCGCGCG<br>GacA <sup>TTT</sup><br>GCCTAC | 3302      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGGacA <sup>TTT</sup> CGGCTACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4062      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGACACTTCGCC<br>TAC | 703             |
| 1783      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2543      | GCGCGCG<br>GacA <sup>TTT</sup><br>GCCTAC | 3303      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGGacA <sup>TTT</sup> CGGCTACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4063      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGTACTTCGCC<br>TAC  | 703             |
| 1784      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2544      | GCGCGCG<br>GacA <sup>TTT</sup><br>GCCTAC | 3304      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGGacA <sup>TTT</sup> CGGCTACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 4064      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGCCACTTCGCC<br>TAC | 703             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1785      | GTAGGCG<br>AAATCCC<br>CGCGCGC | 2545      | GCGCGCG<br>GttAgTTTCG<br>CCTAC | 3305      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>AGGCGAAATCCCGCGCGCTGTCTGGCAATACC<br>TGGCGCGGGttAgTTTCGCCCTACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4065      | GTAGGCGAAATCCC<br>CGCGCGCTGTCTG<br>GCAATACCTGGCGC<br>GCGGTAGTTTCGCC<br>TAC | 703             |
| 1786      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2546      | CACCCTC<br>AaaCaCCT<br>CGGTGG  | 3306      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCCTGAGGGTGTCTGGCAATACC<br>TGCACCCCTCaCaCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 4066      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCAACACCTCGG<br>TGG  | 757             |
| 1787      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2547      | CACCCTC<br>AtaCaCCTC<br>GGTGG  | 3307      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCCTGAGGGTGTCTGGCAATACC<br>TGCACCCCTCaCaCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 4067      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCATACACCTCGG<br>TGG | 757             |
| 1788      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2548      | CACCCTC<br>AatCaCCTC<br>GGTGG  | 3308      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCCTGAGGGTGTCTGGCAATACC<br>TGCACCCCTCaatCaCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4068      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCAATCACCTCGG<br>TGG | 757             |
| 1789      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2549      | CACCCTC<br>AccCaCCT<br>CGGTGG  | 3309      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCCTGAGGGTGTCTGGCAATACC<br>TGCACCCCTAccCaCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4069      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCACCCCCCTCGG<br>TGG | 757             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                      | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1790      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2550      | CACCCTC<br>AaaCgCCT<br>CGGTGG  | 3310      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCTGAGGGTGTCTTCTGGCAATACC<br>TGCACCCCTCaaCgCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT     | 4070      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCAAACGCCTCGG<br>TGG   | 757             |
| 1791      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2551      | CACCCTC<br>AttCgCCTC<br>GGTGG  | 3311      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCTGAGGGTGTCTTCTGGCAATACC<br>TGCACCCCTCattCgCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 4071      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCATTCGCCCTCGG<br>TGG  | 757             |
| 1792      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2552      | CACCCTC<br>AetCgCCT<br>CGGTGG  | 3312      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCTGAGGGTGTCTTCTGGCAATACC<br>TGCACCCCTCaeCgCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT     | 4072      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCACTCGCCCTCGG<br>TGG  | 757             |
| 1793      | CCACCGA<br>GGAGCCT<br>GAGGGTG | 2553      | CACCCTC<br>AceCgCCT<br>CGGTGG  | 3313      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCGAGGAGCCTGAGGGTGTCTTCTGGCAATACC<br>TGCACCCCTAceCgCCTCGGTGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT     | 4073      | CCACCGAGGAGCCT<br>GAGGGTGTGTCTG<br>GCAATACCTGCACC<br>CTCACCCCGCCCTCGG<br>TGG | 757             |
| 1794      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2554      | GGCTCCT<br>CaaTaaGCC<br>TCCGCA | 3314      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGGAGCCTGTCTTCTGGCAATACC<br>TGGGCTCCTCaaTaaGCCCTCCGCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4074      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCAATAGCCTC<br>CGCA   | 765             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1795      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2555      | GGCTCCT<br>CtaTtAGCCT<br>CCGCA | 3315      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCTGTCTTGCAATACC<br>TGGGCTCCTCtaTtAGCCTCCGCACACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4075      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCTATAGCCTC<br>CGCA | 765             |
| 1796      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2556      | GGCTCCT<br>CcaTtAGCC<br>TCCGCA | 3316      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCTGTCTTGCAATACC<br>TGGGCTCCTCcaTtAGCCTCCGCACACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4076      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCCATAGCCTC<br>CGCA | 765             |
| 1797      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2557      | GGCTCCT<br>CatTtAGCCT<br>CCGCA | 3317      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCTGTCTTGCAATACC<br>TGGGCTCCTCatTtAGCCTCCGCACACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4077      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCATTAGCCTC<br>CGCA | 765             |
| 1798      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2558      | GGCTCCT<br>CttTtAGCCT<br>CCGCA | 3318      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCTGTCTTGCAATACC<br>TGGGCTCCTCttTtAGCCTCCGCACACGGAGGCCTGC<br>CCCTGACTGCCACCGT | 4078      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCTTTAGCCTC<br>CGCA | 765             |
| 1799      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2559      | GGCTCCT<br>CetTtAGCCT<br>CCGCA | 3319      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCTGTCTTGCAATACC<br>TGGGCTCCTCetTtAGCCTCCGCACACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4079      | TGCGGAGGCCACC<br>GAGGAGCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCCTTAGCCTC<br>CGCA | 765             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1800      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2560      | GGCTCCT<br>CccTaGCC<br>TCCGCA  | 3320      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCGTGTCTGGCAATACC<br>TGGGCTCCTCccTaGCCCTCCGCACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4080      | TGCGGAGGCCACC<br>GAGGAGCCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCCCTAGCCTC<br>CGCA   | 765             |
| 1801      | TGCGGAG<br>GCCACCG<br>AGGAGCC | 2561      | GGCTCCT<br>CttThGCCCT<br>CCGCA | 3321      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGTG<br>CGGAGGCCACCGAGAGCCGTGTCTGGCAATACC<br>TGGGCTCCTCttThGCCCTCCGCACACGGAGGCCCTGC<br>CCTGACTGCCACCGGT  | 4081      | TGCGGAGGCCACC<br>GAGGAGCCCTGTCT<br>GGCAATACCTGGGC<br>TCCTCTTTTGGCCTCC<br>GCA  | 765             |
| 1802      | TCCCGGT<br>CCTCCCG<br>GCTTTTG | 2562      | CAAAAGC<br>CaaGtGGA<br>CCGGGA  | 3322      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGTG<br>CCGGTCTCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GC AAAAGCCaaGtGGACCGGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4082      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGC AAA<br>AGCCAAAGTGGACC<br>GGGA | 792             |
| 1803      | TCCCGGT<br>CCTCCCG<br>GCTTTTG | 2563      | CAAAAGC<br>CtaGtGGA<br>CCGGGA  | 3323      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGTG<br>CCGGTCTCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GC AAAAGCCtaGtGGACCGGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4083      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGC AAA<br>AGCTAGTGGACCG<br>GGA   | 792             |
| 1804      | TCCCGGT<br>CCTCCCG<br>GCTTTTG | 2564      | CAAAAGC<br>CcaGtGGA<br>CCGGGA  | 3324      | GCCGGCTGCACACCTCCTCGCGGGGCAGCTGTGTG<br>CCGGTCTCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GC AAAAGCCcaGtGGACCGGGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4084      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGC AAA<br>AGCCAGTGGACC<br>GGGA   | 792             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1805      | TCCCGGT<br>CTCCCCG<br>GCTTTTG | 2565      | CAAAAGC<br>CatGtGGA<br>CCGGGA | 3325      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CCGGTCCCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GCAAAAGCCatGtGGACCGGGACACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4085      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGCAAA<br>AGCCATGTGGACCG<br>GGA | 792             |
| 1806      | TCCCGGT<br>CTCCCCG<br>GCTTTTG | 2566      | CAAAAGC<br>CttGtGGAC<br>CGGGA | 3326      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CCGGTCCCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GCAAAAGCCttGtGGACCGGGACACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4086      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGCAAA<br>AGCCTGTGGACCG<br>GGA  | 792             |
| 1807      | TCCCGGT<br>CTCCCCG<br>GCTTTTG | 2567      | CAAAAGC<br>CetGtGGA<br>CCGGGA | 3327      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CCGGTCCCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GCAAAAGCCetGtGGACCGGGACACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4087      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGCAAA<br>AGCCTGTGGACCG<br>GGA  | 792             |
| 1808      | TCCCGGT<br>CTCCCCG<br>GCTTTTG | 2568      | CAAAAGC<br>CccGtGGA<br>CCGGGA | 3328      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CCGGTCCCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GCAAAAGCCccGtGGACCGGGACACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4088      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGCAAA<br>AGCCCCGTGGACCG<br>GGA | 792             |
| 1809      | TCCCGGT<br>CTCCCCG<br>GCTTTTG | 2569      | CAAAAGC<br>CCCgGG<br>ACCGGA   | 3329      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTC<br>CCGGTCCCTCCCGGCTTTTGTGTCTGGCAATACCT<br>GCAAAAGCCCgGGACCGGGACACGGAGGCCT<br>GCCCTGACTGCCACCGT   | 4089      | TCCCGGTCTCTCCCG<br>GCTTTTGTGTCTG<br>GCAATACCTGCAAA<br>AGCCCCGGGGACC<br>GGGA | 792             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1810      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2570      | CACAGCC<br>TaaGaCCG<br>CTCAAG | 3330      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGCACAGCCTTaaGaCCGCTCAAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4090      | CTTGAGCGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTAAGACCGCTC<br>AAG | 851             |
| 1811      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2571      | CACAGCC<br>TaaGaCCG<br>CTCAAG | 3331      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGCACAGCCTTaaGaCCGCTCAAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4091      | CTTGAGCGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTAAGACCGCTC<br>AAG | 851             |
| 1812      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2572      | CACAGCC<br>TaaGaCCG<br>CTCAAG | 3332      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGCACAGCCTTaaGaCCGCTCAAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4092      | CTTGAGCGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTAAGACCGCTC<br>AAG | 851             |
| 1813      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2573      | CACAGCC<br>TaaGaCCG<br>CTCAAG | 3333      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGCACAGCCTTaaGaCCGCTCAAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4093      | CTTGAGCGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTAAGACCGCTC<br>AAG | 851             |
| 1814      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2574      | CACAGCC<br>TaaGaCCG<br>CTCAAG | 3334      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGCACAGCCTTaaGaCCGCTCAAGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4094      | CTTGAGCGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTAAGACCGCTC<br>AAG | 851             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1815      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2575      | CACAGCC<br>TetGaaCCG<br>CTCAAG | 3335      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGACAGCCTTetGaaCCGCTCAAGCACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 4095      | CTTGAGCGGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTCTGACCGCTC<br>AAG | 851             |
| 1816      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2576      | CACAGCC<br>TaaGaaCCG<br>CTCAAG | 3336      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGACAGCCTTaaGaaCCGCTCAAGCACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 4096      | CTTGAGCGGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTACGACCGCTC<br>AAG | 851             |
| 1817      | CTTGAGC<br>GGGCCCA<br>GGCTGTG | 2577      | CACAGCC<br>TCCGtCCG<br>CTCAAG  | 3337      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TGAGCGGGGCCCAAGGCTGTGTGTCTGGCAATACC<br>TGACAGCCTTCCGtCCGCTCAAGCACGGAGGCGCT<br>GCCCTGACTGCCACCGGT  | 4097      | CTTGAGCGGGGCCCA<br>GGCTGTGTGTCTG<br>GCAATACCTGCACA<br>GCCTCCGTCGCTC<br>AAG  | 851             |
| 1818      | TGGCCCT<br>GCGGCC<br>CGCTGA   | 2578      | TCAAGCG<br>GaaCaGCA<br>GGGCCA  | 3338      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTCTGGCAATACC<br>TGTCAAGCGGaaCaGCGAGGGCCACACGGAGGCGCT<br>GCCCTGACTGCCACCGGT | 4098      | TGGCCCTGCGGGCCC<br>CGCTGATGTCTG<br>GCAATACCTGTCAA<br>GCGGAACAGCAGG<br>GCCA  | 867             |
| 1819      | TGGCCCT<br>GCGGCC<br>CGCTGA   | 2579      | TCAAGCG<br>GtaCaGCA<br>GGGCCA  | 3339      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTCTGGCAATACC<br>TGTCAAGCGGtaCaGCGAGGGCCACACGGAGGCGCTG<br>CCCTGACTGCCACCGGT | 4099      | TGGCCCTGCGGGCCC<br>CGCTGATGTCTG<br>GCAATACCTGTCAA<br>GCGGTACAGCAGG<br>GCCA  | 867             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                      | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1820      | TGGCCCT<br>GCGGCC<br>CGCTTGA | 2580      | TCAAGCG<br>GacCaGCA<br>GGGCCA | 3340      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTTCTGGCAATACC<br>TGTCGAAGCGGGacCaGCAGGGCCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4100      | TGGCCCTGCGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGCACAGCAGG<br>GCCA  | 867             |
| 1821      | TGGCCCT<br>GCGGCC<br>CGCTTGA | 2581      | TCAAGCG<br>GatCaGCA<br>GGGCCA | 3341      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTTCTGGCAATACC<br>TGTCGAAGCGGatCaGCAGGGCCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4101      | TGGCCCTGCGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGATCAGCAGG<br>GCCA  | 867             |
| 1822      | TGGCCCT<br>GCGGCC<br>CGCTTGA | 2582      | TCAAGCG<br>GttCaGCA<br>GGGCCA | 3342      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTTCTGGCAATACC<br>TGTCGAAGCGGttCaGCAGGGCCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4102      | TGGCCCTGCGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGTTACAGCAGG<br>GCCA | 867             |
| 1823      | TGGCCCT<br>GCGGCC<br>CGCTTGA | 2583      | TCAAGCG<br>GctCaGCA<br>GGGCCA | 3343      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTTCTGGCAATACC<br>TGTCGAAGCGGctCaGCAGGGCCACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4103      | TGGCCCTGCGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGCTACAGCAGG<br>GCCA | 867             |
| 1824      | TGGCCCT<br>GCGGCC<br>CGCTTGA | 2584      | TCAAGCG<br>GacCaGCA<br>GGGCCA | 3344      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTG<br>GCCCTGCGGGCCCCGCTTGAATGTTCTGGCAATACC<br>TGTCGAAGCGGacCaGCAGGGCCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4104      | TGGCCCTGCGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGCACAGCAGG<br>GCCA  | 867             |



| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                      | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1825      | TGGCCCT<br>GCGGCC<br>CGCTGA    | 2585      | TCAAGCG<br>GCCCGCA<br>GGGCCA  | 3345      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCGCTGGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>TGTCAGGGGCCCGGACAGGGCCACACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4105      | TGGCCCTGGGGCCC<br>CGCTTGATGTTCTG<br>GCAATACCTGTCAA<br>GCGGCCCTGCAGG<br>GCCA | 867             |
| 1826      | TGCCCTGG<br>CCCTTCG<br>ATTCTGA | 2586      | TCAGAAT<br>CctAaGGC<br>CAGGCA | 3346      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCctAaGGCCAGGCACACGGAGGCCCTGC<br>CCTGACTGCCCCACGGT   | 4106      | TGCCTGGCCCTTCG<br>ATTCTGATGTTCTG<br>GCAATACCTGTGAG<br>AATCATAAGGCCA<br>GGCA | 426             |
| 1827      | TGCCCTGG<br>CCCTTCG<br>ATTCTGA | 2587      | TCAGAAT<br>CctAaGGCC<br>AGGCA | 3347      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCctAaGGCCAGGCACACGGAGGCCCTGC<br>CCTGACTGCCCCACGGT   | 4107      | TGCCTGGCCCTTCG<br>ATTCTGATGTTCTG<br>GCAATACCTGTGAG<br>AATCTTAAGGCCAG<br>GCA | 426             |
| 1828      | TGCCCTGG<br>CCCTTCG<br>ATTCTGA | 2588      | TCAGAAT<br>CctAaGGC<br>CAGGCA | 3348      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCctAaGGCCAGGCACACGGAGGCCCTGC<br>CCTGACTGCCCCACGGT   | 4108      | TGCCTGGCCCTTCG<br>ATTCTGATGTTCTG<br>GCAATACCTGTGAG<br>AATCTTAAGGCCAG<br>GCA | 426             |
| 1829      | TGCCCTGG<br>CCCTTCG<br>ATTCTGA | 2589      | TCAGAAT<br>CacAaGGC<br>CAGGCA | 3349      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCacAaGGCCAGGCACACGGAGGCCCTGC<br>CCCTGACTGCCCCACGGT  | 4109      | TGCCTGGCCCTTCG<br>ATTCTGATGTTCTG<br>GCAATACCTGTGAG<br>AATCACAAGGCCA<br>GGCA | 426             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1830      | TGCTGG<br>CCCTCG<br>ATTCTGA  | 2590      | TCAGAAT<br>CtcAaGGC<br>CAGGCA | 3350      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCtcAaGGCCAGGCACACGGAGGCCTGC<br>CCTGACTGCCCCACGGT | 4110      | TGCCTGGCCCTTCG<br>ATTCTGATGTCTG<br>GCAATACCTGTCTG<br>AAATCAAGGCCAG<br>GCA   | 426             |
| 1831      | TGCTGG<br>CCCTCG<br>ATTCTGA  | 2591      | TCAGAAT<br>CccAaGGC<br>CAGGCA | 3351      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCccAaGGCCAGGCACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 4111      | TGCCTGGCCCTTCG<br>ATTCTGATGTCTG<br>GCAATACCTGTCTG<br>AAATCCAAAGGCCA<br>GGCA | 426             |
| 1832      | TGCTGG<br>CCCTCG<br>ATTCTGA  | 2592      | TCAGAAT<br>CatAtGGCC<br>AGGCA | 3352      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCatAtGGCCAGGCACACGGAGGCCTGC<br>CCTGACTGCCCCACGGT | 4112      | TGCCTGGCCCTTCG<br>ATTCTGATGTCTG<br>GCAATACCTGTCTG<br>AAATCATATGGCCAG<br>GCA | 426             |
| 1833      | TGCTGG<br>CCCTCG<br>ATTCTGA  | 2593      | TCAGAAT<br>CttAtGGCC<br>AGGCA | 3353      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCTGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GTCAGAAATCttAtGGCCAGGCACACGGAGGCCTGC<br>CCTGACTGCCCCACGGT | 4113      | TGCCTGGCCCTTCG<br>ATTCTGATGTCTG<br>GCAATACCTGTCTG<br>AAATCTTATGGCCAG<br>GCA | 426             |
| 1834      | GTGCTG<br>GCCCTTC<br>GATTCTG | 2594      | CAGAATC<br>GttGaGCC<br>AGGCAC | 3354      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>GCTGGCCCTTCGATTCTGATGTCTGGCAATACCT<br>GCAGAAATCttGaGCCAGGCACACGGAGGCCTGC<br>CCTGACTGCCCCACGGT   | 4114      | GTGCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGTTGAGCCAGG<br>CAC   | 427             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1835      | GTGCCTG<br>GCCCTTC<br>GATTCTG | 2595      | CAGAATC<br>GctGaGCC<br>AGGCAC | 3355      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGctGaGCCAGGCCACCGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 4115      | GTGCCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGCTGAGCCAGG<br>CAC | 427             |
| 1836      | GTGCCTG<br>GCCCTTC<br>GATTCTG | 2596      | CAGAATC<br>GtcGaGCC<br>AGGCAC | 3356      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGctGaGCCAGGCCACCGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 4116      | GTGCCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGCTGAGCCAGG<br>CAC | 427             |
| 1837      | GTGCCTG<br>GCCCTTC<br>GATTCTG | 2597      | CAGAATC<br>GccGaGCC<br>AGGCAC | 3357      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGccGaGCCAGGCCACCGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 4117      | GTGCCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGCTGAGCCAG<br>GCAC | 427             |
| 1838      | GTGCCTG<br>GCCCTTC<br>GATTCTG | 2598      | CAGAATC<br>GttGtGCCA<br>GGCAC | 3358      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGGttGtGCCAGGCCACCGGAGGCCTGC<br>CCCTGACTGCCACCGGT | 4118      | GTGCCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGTTGTGCCAGG<br>CAC | 427             |
| 1839      | GTGCCTG<br>GCCCTTC<br>GATTCTG | 2599      | CAGAATC<br>GctGtGCC<br>AGGCAC | 3359      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGctGtGCCAGGCCACCGGAGGCCTGC<br>CCCTGACTGCCACCGGT  | 4119      | GTGCCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGCTGTGCCAGG<br>CAC | 427             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1840      | GTGCTG<br>GCCCTC<br>GATTCTG   | 2600      | CAGAAATC<br>GtcGtGCC<br>AGGCAC | 3360      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGtcGtGCCAGGCACCCACGGAGGCCTGC<br>CCTGACTGCCACCGGT | 4120      | GTGCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGTCGTGCCAGG<br>CAC    | 427             |
| 1841      | GTGCTG<br>GCCCTC<br>GATTCTG   | 2601      | CAGAAATC<br>GccGtGCC<br>AGGCAC | 3361      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>GCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GCAGAAATCGccGtGCCAGGCACCCACGGAGGCCTG<br>CCTGACTGCCACCGGT  | 4121      | GTGCTGGCCCTTC<br>GATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGCCGTGCCAGG<br>CAC    | 427             |
| 1842      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2602      | AGAAATCG<br>AtaGaCCA<br>GGCACC | 3362      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>TGCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GAGAAATCGAtaGaCCAGGCACCCACGGAGGCCTG<br>CCTGACTGCCACCGGT  | 4122      | GGTGCCTGGCCCTT<br>CGATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGATAGACCAG<br>GCACC | 428             |
| 1843      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2603      | AGAAATCG<br>AcaGaCCA<br>GGCACC | 3363      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>TGCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GAGAAATCGAcaGaCCAGGCACCCACGGAGGCCTG<br>CCTGACTGCCACCGGT  | 4123      | GGTGCCTGGCCCTT<br>CGATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGACAGACCAG<br>GCACC | 428             |
| 1844      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2604      | AGAAATCG<br>AttGaCCA<br>GGCACC | 3364      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>TGCTTGGCCCTTCGATTCTGTGTCTGGCAATACCT<br>GAGAAATCGAttGaCCAGGCACCCACGGAGGCCTGC<br>CCTGACTGCCACCGGT | 4124      | GGTGCCTGGCCCTT<br>CGATTCTGTGTCTG<br>GCAATACCTGCAGA<br>ATCGATTGACCAGG<br>CACC | 428             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1845      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2605      | AGAATCG<br>AcaGACCA<br>GGCACC | 3365      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGGG<br>TGCCCTGGCCCTTCGATTCTTGTCTGGCAATACCT<br>GAGAAATCGAaGACGAGGACCCACGAGGACCTG<br>CCCTGACTGCCACCGGT | 4125      | GGTGCCCTGGCCCTT<br>CGATTCTTGTCTG<br>GCAATACCTGAGA<br>ATCGACTGACCAGG<br>CACC | 428             |
| 1846      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2606      | AGAATCG<br>AcaGACCA<br>GGCACC | 3366      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGGG<br>TGCCCTGGCCCTTCGATTCTTGTCTGGCAATACCT<br>GAGAAATCGAaGACGAGGACCCACGAGGACCTG<br>CCCTGACTGCCACCGGT | 4126      | GGTGCCCTGGCCCTT<br>CGATTCTTGTCTG<br>GCAATACCTGAGA<br>ATCGACTGACCAGG<br>CACC | 428             |
| 1847      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2607      | AGAATCG<br>AcaGACCA<br>GGCACC | 3367      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGGG<br>TGCCCTGGCCCTTCGATTCTTGTCTGGCAATACCT<br>GAGAAATCGAaGACGAGGACCCACGAGGACCTG<br>CCCTGACTGCCACCGGT | 4127      | GGTGCCCTGGCCCTT<br>CGATTCTTGTCTG<br>GCAATACCTGAGA<br>ATCGACTGACCAG<br>GCACC | 428             |
| 1848      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2608      | AGAATCG<br>AcaGACCA<br>GGCACC | 3368      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGGG<br>TGCCCTGGCCCTTCGATTCTTGTCTGGCAATACCT<br>GAGAAATCGAaGACGAGGACCCACGAGGACCTG<br>CCCTGACTGCCACCGGT | 4128      | GGTGCCCTGGCCCTT<br>CGATTCTTGTCTG<br>GCAATACCTGAGA<br>ATCGATAGTCCAGG<br>CACC | 428             |
| 1849      | GGTGCCT<br>GGCCCTT<br>CGATTCT | 2609      | AGAATCG<br>AcaGACCA<br>GGCACC | 3369      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGGG<br>TGCCCTGGCCCTTCGATTCTTGTCTGGCAATACCT<br>GAGAAATCGAaGACGAGGACCCACGAGGACCTG<br>CCCTGACTGCCACCGGT | 4129      | GGTGCCCTGGCCCTT<br>CGATTCTTGTCTG<br>GCAATACCTGAGA<br>ATCGACTGACCAGG<br>CACC | 428             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1850      | GGGTGCC<br>TGGCCCT<br>TCGATTC | 2610      | GAATCGA<br>AaaGaCAG<br>GCACCC | 3370      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCCCTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAaaGaCAGGCACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4130      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAAAGACAGGC<br>ACCC  | 429             |
| 1851      | GGGTGCC<br>TGGCCCT<br>TCGATTC | 2611      | GAATCGA<br>AtaGaCAG<br>GCACCC | 3371      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCCCTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAtaGaCAGGCACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4131      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAATAGACAGGC<br>ACCC | 429             |
| 1852      | GGGTGCC<br>TGGCCCT<br>TCGATTC | 2612      | GAATCGA<br>AcaGaCAG<br>GCACCC | 3372      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCCCTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAcaGaCAGGCACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4132      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAACAGACAGGC<br>ACCC | 429             |
| 1853      | GGGTGCC<br>TGGCCCT<br>TCGATTC | 2613      | GAATCGA<br>AatGaCAG<br>GCACCC | 3373      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCCCTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAatGaCAGGCACCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4133      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAAATGACAGGC<br>ACCC | 429             |
| 1854      | GGGTGCC<br>TGGCCCT<br>TCGATTC | 2614      | GAATCGA<br>AttGaCAG<br>GCACCC | 3374      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCCCTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAttGaCAGGCACCCACGGAGGCCCTGC<br>CCCTGACTGCCACCGGT | 4134      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAATGACAGGC<br>ACCC  | 429             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                              | SEQ ID NO | SenLoopAnti                                                                    | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------|-----------------|
| 1855      | GGGTGCC<br>TGGCCCT<br>TCGATT  | 2615      | GAATCGA<br>AacGaCAG<br>GCACCC | 3375      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCTTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAacGaCAGGCACCCACGAGGACCTG<br>CCCTGACTGCCACCGT | 4135      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAACTGACAGGC<br>ACCC    | 429             |
| 1856      | GGGTGCC<br>TGGCCCT<br>TCGATT  | 2616      | GAATCGA<br>AacGaCAG<br>GCACCC | 3376      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCTTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAacGaCAGGCACCCACGAGGACCTG<br>CCCTGACTGCCACCGT | 4136      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAACTGACAGGC<br>ACCC    | 429             |
| 1857      | GGGTGCC<br>TGGCCCT<br>TCGATT  | 2617      | GAATCGA<br>AacGaCAG<br>GCACCC | 3377      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>GTGCTTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GGAATCGAAacGaCAGGCACCCACGAGGACCTG<br>CCCTGACTGCCACCGT | 4137      | GGGTGCCCTGGCCCT<br>TCGATTCTGTCTG<br>GCAATACCTTGAAT<br>CGAACTGACAGGC<br>ACCC    | 429             |
| 1858      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2618      | AATCGAA<br>GaaCaAGG<br>CACCCG | 3378      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>GGTGCTTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GAAATCGAAaCaAGGCACCCGACGAGGACCTG<br>CCCTGACTGCCACCGT | 4138      | CGGGTGCCCTGGCCC<br>TTCGATTCTGTCTG<br>GCAATACCTTGAATC<br>GAAGAACAAAGGCA<br>CCCC | 430             |
| 1859      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2619      | AATCGAA<br>GaaCaAGG<br>CACCCG | 3379      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>GGTGCTTGGCCCTTCGATTCTGTCTGGCAATACCT<br>GAAATCGAAaCaAGGCACCCGACGAGGACCTG<br>CCCTGACTGCCACCGT | 4139      | CGGGTGCCCTGGCCC<br>TTCGATTCTGTCTG<br>GCAATACCTTGAATC<br>GAAGTACAAAGGCA<br>CCCC | 430             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                               | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------|-----------------|
| 1860      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2620      | AATCGAA<br>GacCaAGG<br>CACCCG | 3380      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCG<br>GGTGCCCTGGCCCTTCGATTGTGTCGGCAATACCT<br>GAATCGAAAGacCaAGGCACCCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 4140      | CGGGTGCCTGGCCC<br>TTCGATTGTTCG<br>GCAATACCTGAATC<br>GAAGCACAAGGCA<br>CCCC | 430             |
| 1861      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2621      | AATCGAA<br>GatCaAGG<br>CACCCG | 3381      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCG<br>GGTGCCCTGGCCCTTCGATTGTGTCGGCAATACCT<br>GAATCGAAAGatCaAGGCACCCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 4141      | CGGGTGCCTGGCCC<br>TTCGATTGTTCG<br>GCAATACCTGAATC<br>GAAGATCAAGGCA<br>CCCC | 430             |
| 1862      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2622      | AATCGAA<br>GttCaAGG<br>CACCCG | 3382      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCG<br>GGTGCCCTGGCCCTTCGATTGTGTCGGCAATACCT<br>GAATCGAAAGttCaAGGCACCCGCACGGAGGCCCTGC<br>CCTGACTGCCACCGT | 4142      | CGGGTGCCTGGCCC<br>TTCGATTGTTCG<br>GCAATACCTGAATC<br>GAAGTTCAAGGCA<br>CCCC | 430             |
| 1863      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2623      | AATCGAA<br>GetCaAGG<br>CACCCG | 3383      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCG<br>GGTGCCCTGGCCCTTCGATTGTGTCGGCAATACCT<br>GAATCGAAAGetCaAGGCACCCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 4143      | CGGGTGCCTGGCCC<br>TTCGATTGTTCG<br>GCAATACCTGAATC<br>GAAGCTCAAGGCA<br>CCCC | 430             |
| 1864      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2624      | AATCGAA<br>GacCaAGG<br>CACCCG | 3384      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCG<br>GGTGCCCTGGCCCTTCGATTGTGTCGGCAATACCT<br>GAATCGAAAGacCaAGGCACCCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGT | 4144      | CGGGTGCCTGGCCC<br>TTCGATTGTTCG<br>GCAATACCTGAATC<br>GAAGACCAAGGCA<br>CCCC | 430             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1865      | CGGGTGC<br>CTGGCCC<br>TTCGATT | 2625      | AATCGAA<br>GtcCaAGG<br>CACCCG | 3385      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGTGCCCTGGCCCTTCGATTGTCTGGCAATACCT<br>GAATCGAAGtcCaAGGCACCCGCACGGAGGCCTG<br>CCCTGACTGCCACCGT  | 4145      | CCGGTGCCTGGCCC<br>TTCGATTGTCTG<br>GCAATACCTGAATC<br>GAAGTCCAAAGCA<br>CCCG   | 430             |
| 1866      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2626      | ATCGAAG<br>GaaCtGGC<br>ACCCGG | 3386      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGTGCCCTGGCCCTTCGATTGTCTGGCAATACCT<br>TGATCGAAGGaaCtGGCACCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4146      | CCGGTGCCTGGCCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGAACCTGGCAC<br>CCCG | 431             |
| 1867      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2627      | ATCGAAG<br>GtaCtGGC<br>ACCCGG | 3387      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGTGCCCTGGCCCTTCGATTGTCTGGCAATACCT<br>TGATCGAAGGtaCtGGCACCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4147      | CCGGTGCCTGGCCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGTACTGGCACCC<br>CGG  | 431             |
| 1868      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2628      | ATCGAAG<br>GaaCtGGC<br>ACCCGG | 3388      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGTGCCCTGGCCCTTCGATTGTCTGGCAATACCT<br>TGATCGAAGGaaCtGGCACCCGGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4148      | CCGGTGCCTGGCCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGCACCTGGCAC<br>CCCG | 431             |
| 1869      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2629      | ATCGAAG<br>GagCtGGC<br>ACCCGG | 3389      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGTGCCCTGGCCCTTCGATTGTCTGGCAATACCT<br>TGATCGAAGGagCtGGCACCCGGCACGGAGGCCT<br>GCCCTGACTGCCACCGT | 4149      | CCGGTGCCTGGCCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGAGCTGGCAC<br>CCCG  | 431             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------|-----------------|
| 1870      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2630      | ATCGAAG<br>GtgCtGGC<br>ACCCGG | 3390      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGGTGCCCTGGCCCTTCGATTGTCTGGCAATACC<br>TGATCGAAGGtgCtGGCACCCGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4150      | CCGGGTGCCTGGCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGTGCTGGCAC<br>CCG  | 431             |
| 1871      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2631      | ATCGAAG<br>GtgCtGGC<br>ACCCGG | 3391      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGGTGCCCTGGCCCTTCGATTGTCTGGCAATACC<br>TGATCGAAGGtgCtGGCACCCGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT  | 4151      | CCGGGTGCCTGGCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGTGCTGGCAC<br>CCGG | 431             |
| 1872      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2632      | ATCGAAG<br>GaaCcGGC<br>ACCCGG | 3392      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGGTGCCCTGGCCCTTCGATTGTCTGGCAATACC<br>TGATCGAAGGaaCcGGCACCCGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT  | 4152      | CCGGGTGCCTGGCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGAACCGGCAC<br>CCGG | 431             |
| 1873      | CCGGGTG<br>CCTGGCC<br>CTTCGAT | 2633      | ATCGAAG<br>GtaCcGGC<br>ACCCGG | 3393      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>GGGTGCCCTGGCCCTTCGATTGTCTGGCAATACC<br>TGATCGAAGGtaCcGGCACCCGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 4153      | CCGGGTGCCTGGCC<br>CTTCGATTGTCTG<br>GCAATACCTGATCG<br>AAGGTACCGGCAC<br>CCGG | 431             |
| 1874      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2634      | TCGAAGG<br>GaaAaGCA<br>CCCGGG | 3394      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCCCTGGCCCTTCGATTGTCTGGCAATACC<br>TGTCGAAGGGaaAaGCACCCGGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4154      | CCCGGGTGCCTGGC<br>CCTTCGATTGTCTG<br>GCAATACCTGTGGA<br>AGGGAAGGCACC<br>CCGG | 432             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1875      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2635      | TCGAAGG<br>GgaAaGCA<br>CCCGGG | 3395      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCTTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sup>gaa</sup> AaGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4155      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTCTGA<br>AGGGGAAAGCACC<br>CGGG  | 432             |
| 1876      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2636      | TCGAAGG<br>GagAaGCA<br>CCCGGG | 3396      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCTTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sup>gag</sup> AaGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4156      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTCTGA<br>AGGGGAAAGCACC<br>CGGG  | 432             |
| 1877      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2637      | TCGAAGG<br>GggAaGCA<br>CCCGGG | 3397      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCTTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sup>gg</sup> AaGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCACGGT  | 4157      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTCTGA<br>AGGGGAAAGCACC<br>CGGG  | 432             |
| 1878      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2638      | TCGAAGG<br>GaaAtGCA<br>CCCGGG | 3398      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCTTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sup>gaa</sup> AtGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4158      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTCTGA<br>AGGGAAATGCACC<br>CGGG  | 432             |
| 1879      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2639      | TCGAAGG<br>GgaAtGCA<br>CCCGGG | 3399      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCTTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sup>gaa</sup> AtGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4159      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTCTGA<br>AGGGGAAATGCACC<br>CGGG | 432             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                                | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1880      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2640      | TCGAAGG<br>GagAIGCA<br>CCCGGG | 3400      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCCTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sub>ag</sub> AIGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4160      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTGCA<br>AGGGAGATGCACC<br>CGGG | 432             |
| 1881      | CCCGGGT<br>GCCTGGC<br>CCTTCGA | 2641      | TCGAAGG<br>GggAIGCA<br>CCCGGG | 3401      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGCC<br>CGGGTGCCTGGCCCTTCGATGTTCTGGCAATACC<br>TGTGGAAGGG <sub>gg</sub> AIGCACCCGGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4161      | CCCGGGTGCCTGGC<br>CCTTCGATGTTCTG<br>GCAATACCTGTGCA<br>AGGGGATGCACC<br>CGGG  | 432             |
| 1882      | TCCCGGG<br>TGCTGG<br>CCCTTCG  | 2642      | CGAAGGG<br>CatGaCAC<br>CCGGGA | 3402      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGTGCCTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGG <sub>cat</sub> GaCACCCGGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 4162      | TCCCGGGTGCCTGG<br>CCCTTCGTGTTCTG<br>GCAATACCTGCGAA<br>GGGCATGACACCC<br>GGGA | 433             |
| 1883      | TCCCGGG<br>TGCTGG<br>CCCTTCG  | 2643      | CGAAGGG<br>CgtGaCAC<br>CCGGGA | 3403      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGTGCCTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGG <sub>gt</sub> GaCACCCGGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 4163      | TCCCGGGTGCCTGG<br>CCCTTCGTGTTCTG<br>GCAATACCTGCGAA<br>GGGCTGACACCC<br>GGGA  | 433             |
| 1884      | TCCCGGG<br>TGCTGG<br>CCCTTCG  | 2644      | CGAAGGG<br>CacGaCAC<br>CCGGGA | 3404      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGTGCCTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGG <sub>cac</sub> GaCACCCGGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 4164      | TCCCGGGTGCCTGG<br>CCCTTCGTGTTCTG<br>GCAATACCTGCGAA<br>GGGCACGACACCC<br>GGGA | 433             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1885      | TCCCGGG<br>TGCTGG<br>CCCTTCG | 2645      | CGAAGGG<br>CgcGtCAC<br>CCGGGA | 3405      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGGTGCTTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGGC <sub>gc</sub> GtCACCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4165      | TCCCGGGTGCCTGG<br>CCCTTCGTGTCTG<br>GCAATACCTGCGAA<br>GGGCGGACACCC<br>GGA    | 433             |
| 1886      | TCCCGGG<br>TGCTGG<br>CCCTTCG | 2646      | CGAAGGG<br>CatGtCAC<br>CCGGGA | 3406      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGGTGCTTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGGC <sub>at</sub> GtCACCCCGGACACGGAGGCCTG<br>CCCTGACTGCCCACGGT | 4166      | TCCCGGGTGCCTGG<br>CCCTTCGTGTCTG<br>GCAATACCTGCGAA<br>GGGCAATGTCACCCG<br>GGA | 433             |
| 1887      | TCCCGGG<br>TGCTGG<br>CCCTTCG | 2647      | CGAAGGG<br>CgtGtCAC<br>CCGGGA | 3407      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGGTGCTTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGGC <sub>gt</sub> GtCACCCCGGACACGGAGGCCTG<br>CCCTGACTGCCCACGGT | 4167      | TCCCGGGTGCCTGG<br>CCCTTCGTGTCTG<br>GCAATACCTGCGAA<br>GGGCGTGTACCCG<br>GGA   | 433             |
| 1888      | TCCCGGG<br>TGCTGG<br>CCCTTCG | 2648      | CGAAGGG<br>CacGtCAC<br>CCGGGA | 3408      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGGTGCTTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGGC <sub>ac</sub> GtCACCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4168      | TCCCGGGTGCCTGG<br>CCCTTCGTGTCTG<br>GCAATACCTGCGAA<br>GGGCACTACCCG<br>GGA    | 433             |
| 1889      | TCCCGGG<br>TGCTGG<br>CCCTTCG | 2649      | CGAAGGG<br>CgcGtCAC<br>CCGGGA | 3409      | GCCGGCTGCACACCTCCTCTGGCGGGCAGCTGTGTC<br>CCGGGTGCTTGGCCCTTCGTGTCTGGCAATACC<br>TGCGAAGGGC <sub>gc</sub> GtCACCCCGGACACGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4169      | TCCCGGGTGCCTGG<br>CCCTTCGTGTCTG<br>GCAATACCTGCGAA<br>GGGCGCTACCCG<br>GGA    | 433             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1890      | GTCCCCG<br>GTGGCTG<br>GCCCTTC | 2650      | GAAGGGC<br>CtaGaACC<br>CGGGAC | 3410      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCtaGaACCCGGGACCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4170      | GTCCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCTTAGAACCC<br>GGGAC | 434             |
| 1891      | GTCCCCG<br>GTGGCTG<br>GCCCTTC | 2651      | GAAGGGC<br>CcaGaACC<br>CGGGAC | 3411      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCcaGaACCCGGGACCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4171      | GTCCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCCAGAACCC<br>GGGAC  | 434             |
| 1892      | GTCCCCG<br>GTGGCTG<br>GCCCTTC | 2652      | GAAGGGC<br>CttGaACCC<br>GGGAC | 3412      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCttGaACCCGGGACCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 4172      | GTCCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCTTAGAACCCG<br>GGAC | 434             |
| 1893      | GTCCCCG<br>GTGGCTG<br>GCCCTTC | 2653      | GAAGGGC<br>CctGaACC<br>CGGGAC | 3413      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCctGaACCCGGGACCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4173      | GTCCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCCCTGAACCCG<br>GGAC | 434             |
| 1894      | GTCCCCG<br>GTGGCTG<br>GCCCTTC | 2654      | GAAGGGC<br>CtcGaACC<br>CGGGAC | 3414      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCtcGaACCCGGGACCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4174      | GTCCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCCCTGAACCCG<br>GGAC | 434             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1895      | GTCCCGG<br>GTGGCTG<br>GCCCTTC | 2655      | GAAGGGC<br>CccGaACC<br>CGGGAC | 3415      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCcGaACCCGGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 4175      | GTCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCCCGGAACCC<br>GGGAC  | 434             |
| 1896      | GTCCCGG<br>GTGGCTG<br>GCCCTTC | 2656      | GAAGGGC<br>CtaGgACC<br>CGGGAC | 3416      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCtaGgACCCGGGACACCGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4176      | GTCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCC'TAGGACCC<br>GGGAC | 434             |
| 1897      | GTCCCGG<br>GTGGCTG<br>GCCCTTC | 2657      | GAAGGGC<br>CcaGgACC<br>CGGGAC | 3417      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGT<br>CCCCGGTGGCTGGCCCTTCTGTTC'TGGCAATACC<br>TGGAAGGGCCcaGgACCCGGGACACCGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4177      | GTCCCGGGTGCCTG<br>GCCCTTCTGTTCG<br>GCAATACCTGGAA<br>GGGCC'AGGACCC<br>GGGAC  | 434             |
| 1898      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2658      | AAGGGCC<br>AaaCtCCC<br>GGGACA | 3418      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGGCTGGCCCTTGTTC'TGGCAATACCT<br>GAAGGGCCAaaCtCCCGGACACACCGAGGCCTG<br>CCCTGACTGCCACCGGT   | 4178      | TGTCCCGGGTGCCT<br>GGCCCTTGTTCG<br>GCAATACCTGAAG<br>GGCCAAC'TCCCCG<br>GACA   | 435             |
| 1899      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2659      | AAGGGCC<br>AtaCtCCCC<br>GGACA | 3419      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGGCTGGCCCTTGTTC'TGGCAATACCT<br>GAAGGGCCAAtaCtCCCGGACACACCGAGGCCTGC<br>CCCTGACTGCCACCGGT | 4179      | TGTCCCGGGTGCCT<br>GGCCCTTGTTCG<br>GCAATACCTGAAG<br>GGCCAT'ACTCCCCG<br>GACA  | 435             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1900      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2660      | AAGGGCC<br>AacCtCCC<br>GGGACA | 3420      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCCTGGCCCTTTGTCTGGCAATACCT<br>GAAGGGCCAacCtCCCCGGGACACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4180      | TGTCCCGGGTGCCT<br>GGCCCTTTGTCTG<br>GCAATACCTGAAG<br>GGCCACTCTCCCGG<br>GACA   | 435             |
| 1901      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2661      | AAGGGCC<br>AatCtCCCC<br>GGACA | 3421      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCCTGGCCCTTTGTCTGGCAATACCT<br>GAAGGGCCAatCtCCCCGGGACACACGGAGGCCTGC<br>CCTGACTGCCACCGGT  | 4181      | TGTCCCGGGTGCCT<br>GGCCCTTTGTCTG<br>GCAATACCTGAAG<br>GGCAATCTCCCGG<br>GACA    | 435             |
| 1902      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2662      | AAGGGCC<br>AttCtCCCC<br>GGACA | 3422      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCCTGGCCCTTTGTCTGGCAATACCT<br>GAAGGGCCAAttCtCCCCGGGACACACGGAGGCCTGC<br>CCTGACTGCCACCGGT | 4182      | TGTCCCGGGTGCCT<br>GGCCCTTTGTCTG<br>GCAATACCTGAAG<br>GGCAATCTCTCCCGG<br>GACA  | 435             |
| 1903      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2663      | AAGGGCC<br>AetCtCCCC<br>GGACA | 3423      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCCTGGCCCTTTGTCTGGCAATACCT<br>GAAGGGCCAetCtCCCCGGGACACACGGAGGCCTGC<br>CCTGACTGCCACCGGT  | 4183      | TGTCCCGGGTGCCT<br>GGCCCTTTGTCTG<br>GCAATACCTGAAG<br>GGCCACTCTCTCCCGG<br>GACA | 435             |
| 1904      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2664      | AAGGGCC<br>AacCtCCC<br>GGGACA | 3424      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCCTGGCCCTTTGTCTGGCAATACCT<br>GAAGGGCCAacCtCCCCGGGACACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4184      | TGTCCCGGGTGCCT<br>GGCCCTTTGTCTG<br>GCAATACCTGAAG<br>GGCCAACCTCTCCCGG<br>GACA | 435             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1905      | TGTCCCG<br>GGTGGCT<br>GGCCCTT | 2665      | AAGGGCC<br>AtcCtCCCCG<br>GGACA | 3425      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TCCCGGGTGCCTGGCCCTTGTGTCTGGCAATACCT<br>GAAGGGCCAtcCtCCCCGGACACACGGAGGCTGC<br>CCTGACTGCCCCACGGT   | 4185      | TGTCCCGGGTGCCT<br>GGCCCTTGTGTCTG<br>GCAATACCTGAAG<br>GGCATCCTCCCGG<br>GACA   | 435             |
| 1906      | CCTGTCC<br>CGGGTGC<br>CTGGCCC | 2666      | GGGCCAG<br>GatCaCGG<br>GACAGG  | 3426      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TGTCCCGGGTGCCTGGCCCTTGTGTCTGGCAATACC<br>TGGGGCCAGGatCaCGGGACAGGCACGGAGGCT<br>GCCCTGACTGCCCCACGGT | 4186      | CCTGTCCCGGGTGC<br>CTGGCCCTGTGTCTG<br>GCAATACCTGGGGC<br>CAGGATCACGGGA<br>CAGG | 437             |
| 1907      | CCTGTCC<br>CGGGTGC<br>CTGGCCC | 2667      | GGGCCAG<br>GgtCaCGG<br>GACAGG  | 3427      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TGTCCCGGGTGCCTGGCCCTTGTGTCTGGCAATACC<br>TGGGGCCAGGgtCaCGGGACAGGCACGGAGGCT<br>GCCCTGACTGCCCCACGGT | 4187      | CCTGTCCCGGGTGC<br>CTGGCCCTGTGTCTG<br>GCAATACCTGGGGC<br>CAGGATCACGGGA<br>CAGG | 437             |
| 1908      | CCTGTCC<br>CGGGTGC<br>CTGGCCC | 2668      | GGGCCAG<br>GacCaCGG<br>GACAGG  | 3428      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TGTCCCGGGTGCCTGGCCCTTGTGTCTGGCAATACC<br>TGGGGCCAGGacCaCGGGACAGGCACGGAGGCT<br>GCCCTGACTGCCCCACGGT | 4188      | CCTGTCCCGGGTGC<br>CTGGCCCTGTGTCTG<br>GCAATACCTGGGGC<br>CAGGATCACGGGA<br>CAGG | 437             |
| 1909      | CCTGTCC<br>CGGGTGC<br>CTGGCCC | 2669      | GGGCCAG<br>GgcCaCGG<br>GACAGG  | 3429      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>TGTCCCGGGTGCCTGGCCCTTGTGTCTGGCAATACC<br>TGGGGCCAGGgcCaCGGGACAGGCACGGAGGCT<br>GCCCTGACTGCCCCACGGT | 4189      | CCTGTCCCGGGTGC<br>CTGGCCCTGTGTCTG<br>GCAATACCTGGGGC<br>CAGGATCACGGGA<br>CAGG | 437             |

| SEQ ID NO | guide                            | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|----------------------------------|-----------|--------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1910      | CCTGTCC<br>CGGGTGC<br>CTGGCCC    | 2670      | GGGCCAG<br>GatCgCGG<br>GACAGG  | 3430      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGTTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGGCCAGGatCgCGGGACAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4190      | CCTGTCCCGGGTGC<br>CTGGCCCTGTCTG<br>GCAATACCTGGGGC<br>CAGGATCGCGGGA<br>CAGG  | 437             |
| 1911      | CCTGTCC<br>CGGGTGC<br>CTGGCCC    | 2671      | GGGCCAG<br>GgtCgCGG<br>GACAGG  | 3431      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGTTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGGCCAGGatCgCGGGACAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4191      | CCTGTCCCGGGTGC<br>CTGGCCCTGTCTG<br>GCAATACCTGGGGC<br>CAGGTCGCGGGA<br>CAGG   | 437             |
| 1912      | CCTGTCC<br>CGGGTGC<br>CTGGCCC    | 2672      | GGGCCAG<br>GacCgCGG<br>GACAGG  | 3432      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGTTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGGCCAGGacCgCGGGACAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4192      | CCTGTCCCGGGTGC<br>CTGGCCCTGTCTG<br>GCAATACCTGGGGC<br>CAGGACCGCGGGA<br>CAGG  | 437             |
| 1913      | CCTGTCC<br>CGGGTGC<br>CTGGCCC    | 2673      | GGGCCAG<br>GgcCgCGG<br>GACAGG  | 3433      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGTTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGGCCAGGgcCgCGGGACAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4193      | CCTGTCCCGGGTGC<br>CTGGCCCTGTCTG<br>GCAATACCTGGGGC<br>CAGGGCCGCGGGA<br>CAGG  | 437             |
| 1914      | CCCTGTGTC<br>CCGGGTG<br>CCCTGGCC | 2674      | GGGCCAGG<br>CtaCaGGG<br>ACAGGG | 3434      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGGCCAGGCtaCaGGGACAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4194      | CCCTGTCCCGGGTGC<br>CTGGCCCTGTCTG<br>GCAATACCTGGGGC<br>AGGCTACAGGGAC<br>AGGG | 438             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1915      | CCCTGTC<br>CCGGGTG<br>CCTGGCC | 2675      | GGCCAGG<br>CcaCaGGG<br>ACAGGG | 3435      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGCcaCaGGGACAGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4195      | CCCTGTCCCCGGGTG<br>CCTGGCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCCACAGGGAC<br>AGGG | 438             |
| 1916      | CCCTGTC<br>CCGGGTG<br>CCTGGCC | 2676      | GGCCAGG<br>CtgCaGGG<br>ACAGGG | 3436      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGCcgCaGGGACAGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4196      | CCCTGTCCCCGGGTG<br>CCTGGCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCTGCAGGGAC<br>AGGG | 438             |
| 1917      | CCCTGTC<br>CCGGGTG<br>CCTGGCC | 2677      | GGCCAGG<br>CcgCaGGG<br>ACAGGG | 3437      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGCcgCaGGGACAGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4197      | CCCTGTCCCCGGGTG<br>CCTGGCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCCGCAGGGAC<br>AGGG | 438             |
| 1918      | CCCTGTC<br>CCGGGTG<br>CCTGGCC | 2678      | GGCCAGG<br>CtaCgGGG<br>ACAGGG | 3438      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGCtaCgGGGACAGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4198      | CCCTGTCCCCGGGTG<br>CCTGGCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCTACGGGGAC<br>AGGG | 438             |
| 1919      | CCCTGTC<br>CCGGGTG<br>CCTGGCC | 2679      | GGCCAGG<br>CcaCgGGG<br>ACAGGG | 3439      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGCcaCgGGGACAGGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4199      | CCCTGTCCCCGGGTG<br>CCTGGCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCCACGGGGAC<br>AGGG | 438             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                                               | SEQ ID NO | full                                                                                                                                                              | SEQ ID NO | SenLoopAnti                                                                      | target position |
|-----------|--------------------------------|-----------|---------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------|-----------------|
| 1920      | CCCTGTC<br>CCGGGTG<br>CCTGGCC  | 2680      | GGCCAGG<br>C <sub>1</sub> gC <sub>2</sub> GGG<br>ACAGGG | 3440      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGACC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGC <sub>1</sub> gC <sub>2</sub> GGGACAGGGACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4200      | CCCTGTCCCCGGGTG<br>CCTGGCCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCTGCGGGGAC<br>AGGG     | 438             |
| 1921      | CCCTGTC<br>CCGGGTG<br>CCTGGCC  | 2681      | GGCCAGG<br>C <sub>1</sub> gC <sub>2</sub> GGG<br>ACAGGG | 3441      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGACC<br>CTGTCCCGGGTGCCCTGGCCCTGTCTGGCAATACC<br>TGGGCCAGGC <sub>1</sub> gC <sub>2</sub> GGGACAGGGACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4201      | CCCTGTCCCCGGGTG<br>CCTGGCCCTGTCTG<br>GCAATACCTGGGCC<br>AGGCCGCGGGGAC<br>AGGG     | 438             |
| 1922      | ACCCCTGT<br>CCCGGGT<br>GCCTGGC | 2682      | GCCAGGC<br>AaaCaGGA<br>CAGGGT                           | 3442      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGACC<br>CC'TGTCCCGGGTGCC'TGGCTGTCTGGCAATACC<br>TGGCCAGGC'AaaCaGGA'ACAGGGT'ACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT                       | 4202      | ACCC'TGT'CCCCGGGT<br>GCC'TGGCT'GTCTG<br>GCAATACCTGGCCA<br>GGCAAACAGGACA<br>GGGT  | 439             |
| 1923      | ACCCCTGT<br>CCCGGGT<br>GCCTGGC | 2683      | GCCAGGC<br>AgaCaGGA<br>CAGGGT                           | 3443      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGACC<br>CC'TGTCCCGGGTGCC'TGGCTGTCTGGCAATACC<br>TGGCCAGGC'AgaCaGGA'ACAGGGT'ACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT                       | 4203      | ACCC'TGT'CCCCGGGT<br>GCC'TGGCT'GTCTG<br>GCAATACCTGGCCA<br>GGCAGACAGGACA<br>GGGT  | 439             |
| 1924      | ACCCCTGT<br>CCCGGGT<br>GCCTGGC | 2684      | GCCAGGC<br>AagCaGGA<br>CAGGGT                           | 3444      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGACC<br>CC'TGTCCCGGGTGCC'TGGCTGTCTGGCAATACC<br>TGGCCAGGC'AagCaGGA'ACAGGGT'ACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT                       | 4204      | ACCC'TGT'CCCCGGGT<br>GCC'TGGCT'GTCTG<br>GCAATACCTGGCCA<br>GGCAAAGCAGGACA<br>GGGT | 439             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1925      | ACCCTGT<br>CCCGGGT<br>GCCTGGC | 2685      | GCCAGGC<br>AagCtGGA<br>CAGGGT | 3445      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAC<br>CCCTGTCCCGGGTGCCCTGGCTGTCTGGCAATACC<br>TGGCCAGGCAgCtGGAACAGGGTTCACGGAGGCCT<br>GCCCTGACTGCCCAACGGT  | 4205      | ACCCTGTCCCGGGT<br>GCCCTGGCTGTCTG<br>GCAATACCTGGCCA<br>GGCAGGCTGGACA<br>GGGT | 439             |
| 1926      | ACCCTGT<br>CCCGGGT<br>GCCTGGC | 2686      | GCCAGGC<br>AaaCtGGA<br>CAGGGT | 3446      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAC<br>CCCTGTCCCGGGTGCCCTGGCTGTCTGGCAATACC<br>TGGCCAGGCAaaCtGGAACAGGGTTCACGGAGGCCT<br>GCCCTGACTGCCCAACGGT | 4206      | ACCCTGTCCCGGGT<br>GCCCTGGCTGTCTG<br>GCAATACCTGGCCA<br>GGCAAACTGGACA<br>GGGT | 439             |
| 1927      | ACCCTGT<br>CCCGGGT<br>GCCTGGC | 2687      | GCCAGGC<br>AgaCtGGA<br>CAGGGT | 3447      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAC<br>CCCTGTCCCGGGTGCCCTGGCTGTCTGGCAATACC<br>TGGCCAGGCAgaCtGGAACAGGGTTCACGGAGGCCT<br>GCCCTGACTGCCCAACGGT | 4207      | ACCCTGTCCCGGGT<br>GCCCTGGCTGTCTG<br>GCAATACCTGGCCA<br>GGCAGACTGGACA<br>GGGT | 439             |
| 1928      | ACCCTGT<br>CCCGGGT<br>GCCTGGC | 2688      | GCCAGGC<br>AagCtGGA<br>CAGGGT | 3448      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAC<br>CCCTGTCCCGGGTGCCCTGGCTGTCTGGCAATACC<br>TGGCCAGGCAagCtGGAACAGGGTTCACGGAGGCCT<br>GCCCTGACTGCCCAACGGT | 4208      | ACCCTGTCCCGGGT<br>GCCCTGGCTGTCTG<br>GCAATACCTGGCCA<br>GGCAAGCTGGACA<br>GGGT | 439             |
| 1929      | ACCCTGT<br>CCCGGGT<br>GCCTGGC | 2689      | GCCAGGC<br>AagCtGGA<br>CAGGGT | 3449      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGAC<br>CCCTGTCCCGGGTGCCCTGGCTGTCTGGCAATACC<br>TGGCCAGGCAagCtGGAACAGGGTTCACGGAGGCCT<br>GCCCTGACTGCCCAACGGT | 4209      | ACCCTGTCCCGGGT<br>GCCCTGGCTGTCTG<br>GCAATACCTGGCCA<br>GGCAGGCTGGACA<br>GGGT | 439             |

| SEQ ID NO | guide                           | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|---------------------------------|-----------|--------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1930      | CACCCCTG<br>TCCCGGG<br>TGCCCTGG | 2690      | CCAGGGCA<br>CaaGaGAC<br>AGGGTG | 3450      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCA<br>CCCTGTCCCGGGTGCCCTGGTGTCTGGCAATACC<br>TGCCAGGCACaaGaGACAGGCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4210      | CACCCCTGTCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACAGGAGACAG<br>GGTG | 440             |
| 1931      | CACCCCTG<br>TCCCGGG<br>TGCCCTGG | 2691      | CCAGGGCA<br>CgaGaGAC<br>AGGGTG | 3451      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCA<br>CCCTGTCCCGGGTGCCCTGGTGTCTGGCAATACC<br>TGCCAGGCACgaGaGACAGGCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4211      | CACCCCTGTCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACAGGAGACAG<br>GGTG | 440             |
| 1932      | CACCCCTG<br>TCCCGGG<br>TGCCCTGG | 2692      | CCAGGGCA<br>CagGaGAC<br>AGGGTG | 3452      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCA<br>CCCTGTCCCGGGTGCCCTGGTGTCTGGCAATACC<br>TGCCAGGCACagGaGACAGGCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4212      | CACCCCTGTCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACAGGAGACAG<br>GGTG | 440             |
| 1933      | CACCCCTG<br>TCCCGGG<br>TGCCCTGG | 2693      | CCAGGGCA<br>CggGaGAC<br>AGGGTG | 3453      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCA<br>CCCTGTCCCGGGTGCCCTGGTGTCTGGCAATACC<br>TGCCAGGCACggGaGACAGGCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4213      | CACCCCTGTCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACGGGAGACAG<br>GGTG | 440             |
| 1934      | CACCCCTG<br>TCCCGGG<br>TGCCCTGG | 2694      | CCAGGGCA<br>CaaGtGAC<br>AGGGTG | 3454      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCA<br>CCCTGTCCCGGGTGCCCTGGTGTCTGGCAATACC<br>TGCCAGGCACaaGtGACAGGCTGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4214      | CACCCCTGTCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACAAGTGACAG<br>GGTG | 440             |

| SEQ ID NO | guide                            | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|----------------------------------|-----------|--------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1935      | CACCCCTG<br>TCCCCGGG<br>TGCCCTGG | 2695      | CCAGGGCA<br>CgaGtGAC<br>AGGGTG | 3455      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CCCTGTCCCCGGGTGCCGTGGTGTCTGGCAATACC<br>TGCCAGGCAC <sub>ga</sub> GGACAGGGTGCACGGAGGCCCT<br>GCCCTGACTGCCCACGGT    | 4215      | CACCCCTGTCCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACGAGTGACAG<br>GGTG  | 440             |
| 1936      | CACCCCTG<br>TCCCCGGG<br>TGCCCTGG | 2696      | CCAGGGCA<br>CagGtGAC<br>AGGGTG | 3456      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CCCTGTCCCCGGGTGCCGTGGTGTCTGGCAATACC<br>TGCCAGGCAC <sub>ag</sub> GGACAGGGTGCACGGAGGCCCT<br>GCCCTGACTGCCCACGGT    | 4216      | CACCCCTGTCCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACAGGTGACAG<br>GGTG  | 440             |
| 1937      | CACCCCTG<br>TCCCCGGG<br>TGCCCTGG | 2697      | CCAGGGCA<br>CggGtGAC<br>AGGGTG | 3457      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCA<br>CCCTGTCCCCGGGTGCCGTGGTGTCTGGCAATACC<br>TGCCAGGCAC <sub>gg</sub> GtGACAGGGTGCACGGAGGCCCT<br>GCCCTGACTGCCCACGGT   | 4217      | CACCCCTGTCCCCGGG<br>TGCCTGGTGTCTG<br>GCAATACCTGCCAG<br>GCACGGGTGACAG<br>GGTG  | 440             |
| 1938      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2698      | CAGGCAC<br>CaaGaaACA<br>GGGTGG | 3458      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCCGTCCCCGGGTGCCGTGGTGTCTGGCAATACC<br>TGCAAGGCAC <sub>caa</sub> GaaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCACGGT | 4218      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCAAGAACAGG<br>GTGG | 441             |
| 1939      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2699      | CAGGCAC<br>CgaGaaACA<br>GGGTGG | 3459      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>ACCCGTCCCCGGGTGCCGTGGTGTCTGGCAATACC<br>TGCAAGGCAC <sub>ga</sub> GaaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCACGGT  | 4219      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCGAGAACAGG<br>GTGG | 441             |

| SEQ ID NO | guide                            | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                         | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|----------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1940      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2700      | CAGGCAC<br>CgtGaACA<br>GGGTGG | 3460      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCC<br>ACCCCTGTCCCCGGGTGCCCTGTGTCTGGCAATAACC<br>TGCAGGCACCaGaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT    | 4220      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCATGAACAGG<br>GTGG | 441             |
| 1941      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2701      | CAGGCAC<br>CgtGaACA<br>GGGTGG | 3461      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCC<br>ACCCCTGTCCCCGGGTGCCCTGTGTCTGGCAATAACC<br>TGCAGGCACCaGaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT    | 4221      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCCTGAACAGG<br>GTGG | 441             |
| 1942      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2702      | CAGGCAC<br>CacGaACA<br>GGGTGG | 3462      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCC<br>ACCCCTGTCCCCGGGTGCCCTGTGTCTGGCAATAACC<br>TGCAGGCACCaGacGaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4222      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCACGAACAGG<br>GTGG | 441             |
| 1943      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2703      | CAGGCAC<br>CgcGaACA<br>GGGTGG | 3463      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCC<br>ACCCCTGTCCCCGGGTGCCCTGTGTCTGGCAATAACC<br>TGCAGGCACCaGcGaACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT  | 4223      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCCTGAACAGG<br>GTGG | 441             |
| 1944      | CCACCCCT<br>GTCCCCGG<br>GTGCCCTG | 2704      | CAGGCAC<br>CaaGtACA<br>GGGTGG | 3464      | GCCGGCTGCACACCTCCTGGCGGGGCAGCTGTGCC<br>ACCCCTGTCCCCGGGTGCCCTGTGTCTGGCAATAACC<br>TGCAGGCACCaGaaGtACAGGGTGGCACGGAGGCCCT<br>GCCCTGACTGCCCCACGGT | 4224      | CCACCCCTGTCCCCGG<br>GTGCCCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCAGTACAGG<br>GTGG  | 441             |



| SEQ ID NO | guide                 | SEQ ID NO | passenger                    | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                           | target position |
|-----------|-----------------------|-----------|------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------|-----------------|
| 1945      | CCACCCCTGTCCCGGTGCTG  | 2705      | CAGGCAC<br>CgaGtACA<br>GGTGG | 3465      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>ACCCCTGTCCCGGGTGCCCTGTGTCTGGCAATACC<br>TGACGGCACCCgaGtACAGGGTGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4225      | CCACCCCTGTCCCGGTGCTGTGTCTG<br>GCAATACCTGCAGG<br>CACCGAGTACAGG<br>GTGG | 441             |
| 1946      | GCCACCCGTGTCCCGGTGCTG | 2706      | AGGCACC<br>CaaGtCAG<br>GGTGG | 3466      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTGTGTCTGGCAATACC<br>TGAGGCACCCaaGtCAGGGTGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4226      | GCCACCCCTGTCCCGGTGCTGTGTCTG<br>GCAATACCTGCAGG<br>ACCCAGTCAGGGT<br>GGC | 442             |
| 1947      | GCCACCCGTGTCCCGGTGCTG | 2707      | AGGCACC<br>CtaGtCAG<br>GGTGG | 3467      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTGTGTCTGGCAATACC<br>TGAGGCACCCtaGtCAGGGTGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4227      | GCCACCCCTGTCCCGGTGCTGTGTCTG<br>GCAATACCTGCAGG<br>ACCCAGTCAGGGT<br>GGC | 442             |
| 1948      | GCCACCCGTGTCCCGGTGCTG | 2708      | AGGCACC<br>CeaGtCAG<br>GGTGG | 3468      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTGTGTCTGGCAATACC<br>TGAGGCACCCeaGtCAGGGTGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 4228      | GCCACCCCTGTCCCGGTGCTGTGTCTG<br>GCAATACCTGCAGG<br>ACCCAGTCAGGGT<br>GGC | 442             |
| 1949      | GCCACCCGTGTCCCGGTGCTG | 2709      | AGGCACC<br>CatGtCAG<br>GGTGG | 3469      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTGTGTCTGGCAATACC<br>TGAGGCACCCCatGtCAGGGTGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4229      | GCCACCCCTGTCCCGGTGCTGTGTCTG<br>GCAATACCTGCAGG<br>ACCCAGTCAGGGT<br>GGC | 442             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1950      | GCCACCC<br>TGTCCCG<br>GGTGCCCT | 2710      | AGGCACC<br>CttGtCAGG<br>GTGGC | 3470      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTTGTCTGGCAATACC<br>TGAGGCACCCtGtCAGGGTGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 4230      | GCCACCCCTGTCCCG<br>GGTGCCCTGTCTG<br>GCAATACCTGAGGC<br>ACCCCTGTACGGGT<br>GGC  | 442             |
| 1951      | GCCACCC<br>TGTCCCG<br>GGTGCCCT | 2711      | AGGCACC<br>CctGtCAG<br>GGTGGC | 3471      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTTGTCTGGCAATACC<br>TGAGGCACCCcGtCAGGGTGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 4231      | GCCACCCCTGTCCCG<br>GGTGCCCTGTCTG<br>GCAATACCTGAGGC<br>ACCCCTGTACGGGT<br>GGC  | 442             |
| 1952      | GCCACCC<br>TGTCCCG<br>GGTGCCCT | 2712      | AGGCACC<br>CacGtCAG<br>GGTGGC | 3472      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTTGTCTGGCAATACC<br>TGAGGCACCCcGtCAGGGTGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 4232      | GCCACCCCTGTCCCG<br>GGTGCCCTGTCTG<br>GCAATACCTGAGGC<br>ACCCACGTACGGGT<br>GGC  | 442             |
| 1953      | GCCACCC<br>TGTCCCG<br>GGTGCCCT | 2713      | AGGCACC<br>CtGtCAG<br>GGTGGC  | 3473      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CACCCCTGTCCCGGGTGCCCTTGTCTGGCAATACC<br>TGAGGCACCCtGtCAGGGTGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 4233      | GCCACCCCTGTCCCG<br>GGTGCCCTGTCTG<br>GCAATACCTGAGGC<br>ACCCCTGTACGGGT<br>GGC  | 442             |
| 1954      | TGCCACC<br>CTGTCCC<br>GGGTGCC  | 2714      | GGCACCC<br>GaaAaAGG<br>GTGGCA | 3474      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTTGTCTGGCAATACC<br>TGAGGCACCCGaaAaAGGGTGGCACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4234      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGAAAAAGGGT<br>GGCA | 443             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1955      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2715      | GGCACCC<br>GtaAaAGG<br>GTGGCA | 3475      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTGTCTGGCAATACC<br>TGGGCACCCGtaAaAGGGTGGCACACCGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4235      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTAAAGGGT<br>GGCA | 443             |
| 1956      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2716      | GGCACCC<br>GtaAaAGG<br>GTGGCA | 3476      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTGTCTGGCAATACC<br>TGGGCACCCGtaAaAGGGTGGCACACCGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4236      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTAAAGGGT<br>GGCA | 443             |
| 1957      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2717      | GGCACCC<br>GtaAaAGG<br>GTGGCA | 3477      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTGTCTGGCAATACC<br>TGGGCACCCGtaAaAGGGTGGCACACCGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4237      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTAAAGGGT<br>GGCA | 443             |
| 1958      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2718      | GGCACCC<br>GtaAaAGG<br>GTGGCA | 3478      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTGTCTGGCAATACC<br>TGGGCACCCGtaAaAGGGTGGCACACCGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4238      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTAAAGGGT<br>GCA  | 443             |
| 1959      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2719      | GGCACCC<br>GtaAaAGG<br>GTGGCA | 3479      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCGGGTGCCCTGTCTGGCAATACC<br>TGGGCACCCGtaAaAGGGTGGCACACCGGAGGCCT<br>GCCCTGACTGCCCACGGT | 4239      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTAAAGGGT<br>GCA  | 443             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1960      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2720      | GGCACCC<br>GacAaAGG<br>GTGGCA | 3480      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCCTGTGCTGTCTGGCAATACC<br>TGGGCACCCGacAaAGGTGGCACACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4240      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGACAAAGGGT<br>GGCA | 443             |
| 1961      | TGCCACC<br>CTGTCCC<br>GGGTGCC | 2721      | GGCACCC<br>GtcAaAGG<br>GTGGCA | 3481      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTG<br>CCACCCCTGTCCCCTGTGCTGTCTGGCAATACC<br>TGGGCACCCGtcAaAGGTGGCACACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4241      | TGCCACCCCTGTCCC<br>GGGTGCCCTGTCTG<br>GCAATACCTGGGCA<br>CCCGTCAAAGGGT<br>GCA  | 443             |
| 1962      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2722      | GCACCCG<br>GatCtGGGT<br>GGCAG | 3482      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTGCT<br>GCCACCCCTGTCCCCTGTGCTGTCTGGCAATACC<br>TGGCACCCGGatCtGGGTGGCAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4242      | CTGCCACCCCTGTCC<br>CGGGTGCCTGTCTG<br>GCAATACCTGGCAC<br>CCGGATCTGGGTGG<br>CAG | 444             |
| 1963      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2723      | GCACCCG<br>GttCtGGGT<br>GGCAG | 3483      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTGCT<br>GCCACCCCTGTCCCCTGTGCTGTCTGGCAATACC<br>TGGCACCCGGttCtGGGTGGCAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4243      | CTGCCACCCCTGTCC<br>CGGGTGCCTGTCTG<br>GCAATACCTGGCAC<br>CCGGTCTGGGTGG<br>CAG  | 444             |
| 1964      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2724      | GCACCCG<br>GctCtGGGT<br>GGCAG | 3484      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGTGCT<br>GCCACCCCTGTCCCCTGTGCTGTCTGGCAATACC<br>TGGCACCCGGctCtGGGTGGCAGCACGGAGGCCTG<br>CCCTGACTGCCACCGT | 4244      | CTGCCACCCCTGTCC<br>CGGGTGCCTGTCTG<br>GCAATACCTGGCAC<br>CCGGCTCTGGGTGG<br>CAG | 444             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                 | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1965      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2725      | GCACCCG<br>GacCtGGG<br>TGGCAG | 3485      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>GCCACCTGTCCCGGGTGTCTTCTGGCAATACC<br>TGGCACCCGGGacCtGGGTGGCAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4245      | CTGCCACCCCTGTCC<br>CGGGTGTCTCTG<br>GCAATACCTTGGCAC<br>CCGACCTGGGTGG<br>CAG  | 444             |
| 1966      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2726      | GCACCCG<br>GtcCtGGGT<br>GGCAG | 3486      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>GCCACCTGTCCCGGGTGTCTTCTGGCAATACC<br>TGGCACCCGGGtcCtGGGTGGCAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4246      | CTGCCACCCCTGTCC<br>CGGGTGTCTCTG<br>GCAATACCTTGGCAC<br>CCGGTCTGGGTGG<br>CAG  | 444             |
| 1967      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2727      | GCACCCG<br>GccCtGGG<br>TGGCAG | 3487      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>GCCACCTGTCCCGGGTGTCTTCTGGCAATACC<br>TGGCACCCGGGccCtGGGTGGCAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4247      | CTGCCACCCCTGTCC<br>CGGGTGTCTCTG<br>GCAATACCTTGGCAC<br>CCGGCCCTGGGTGG<br>CAG | 444             |
| 1968      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2728      | GCACCCG<br>GatCcGGG<br>TGGCAG | 3488      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>GCCACCTGTCCCGGGTGTCTTCTGGCAATACC<br>TGGCACCCGGGatCcGGGTGGCAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4248      | CTGCCACCCCTGTCC<br>CGGGTGTCTCTG<br>GCAATACCTTGGCAC<br>CCGGATCCGGGTGG<br>CAG | 444             |
| 1969      | CTGCCAC<br>CCTGTCC<br>CGGGTGC | 2729      | GCACCCG<br>GttCcGGGT<br>GGCAG | 3489      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>GCCACCTGTCCCGGGTGTCTTCTGGCAATACC<br>TGGCACCCGGGttCcGGGTGGCAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4249      | CTGCCACCCCTGTCC<br>CGGGTGTCTCTG<br>GCAATACCTTGGCAC<br>CCGGTTCGGGTGG<br>CAG  | 444             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                   | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1970      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2730      | CACCCGG<br>GtaAaGGT<br>GGCAGG | 3490      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATAACC<br>TGCACCCGGGtaAaGGTGGCAGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4250      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGTAAAGGTGG<br>CAGG | 445             |
| 1971      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2731      | CACCCGG<br>GtaAaGGT<br>GGCAGG | 3491      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATAACC<br>TGCACCCGGGtaAaGGTGGCAGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4251      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGCAAGGTGG<br>CAGG  | 445             |
| 1972      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2732      | CACCCGG<br>GtgAaGGT<br>GGCAGG | 3492      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATAACC<br>TGCACCCGGGtgAaGGTGGCAGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4252      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGTGAAGGTGG<br>CAGG | 445             |
| 1973      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2733      | CACCCGG<br>GegAaGGT<br>GGCAGG | 3493      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATAACC<br>TGCACCCGGGegAaGGTGGCAGGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4253      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGCGAAGGTGG<br>CAGG | 445             |
| 1974      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2734      | CACCCGG<br>GtaAaGGT<br>GGCAGG | 3494      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATAACC<br>TGCACCCGGGtaAaGGTGGCAGGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4254      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGTAATGGTGGC<br>AGG | 445             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 1975      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2735      | CACCCGG<br>GcaAtGGT<br>GGCAGG | 3495      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATACC<br>TGCACCCGGGcaAtGGTGGCAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT    | 4255      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGCAATGGTGG<br>CAGG   | 445             |
| 1976      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2736      | CACCCGG<br>GtgAtGGT<br>GGCAGG | 3496      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATACC<br>TGCACCCGGGtgAtGGTGGCAGGCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT    | 4256      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGTGTGTGGC<br>AGG     | 445             |
| 1977      | CCTGCCA<br>CCCTGTC<br>CCGGGTG | 2737      | CACCCGG<br>GegAtGGT<br>GGCAGG | 3497      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCC<br>TGCCACCCCTGTCCCGGGTGTGTCTGGCAATACC<br>TGCACCCGGGegAtGGTGGCAGGCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT    | 4257      | CCTGCCACCCCTGTC<br>CCGGGTGTGTCTG<br>GCAATACCTGCACC<br>CGGGCGATGGTGG<br>CAGG   | 445             |
| 1978      | GCCCTGC<br>CACCTG<br>TCCCCGG  | 2738      | CCCGGGA<br>CtaGaTGG<br>CAGGGC | 3498      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTTGCCACCCCTGTCCCGGGTGTGTCTGGCAATACC<br>TGCCCGGGA CtaGaTGGCAGGGCCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 4258      | GCCCTGCCACCCCTG<br>TCCCCGGGTGTCTG<br>GCAATACCTGCCCCG<br>GGACTAGATGGCA<br>GGGC | 447             |
| 1979      | GCCCTGC<br>CACCTG<br>TCCCCGG  | 2739      | CCCGGGA<br>CcaGaTGG<br>CAGGGC | 3499      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CTTGCCACCCCTGTCCCGGGTGTGTCTGGCAATACC<br>TGCCCGGGA CcaGaTGGCAGGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4259      | GCCCTGCCACCCCTG<br>TCCCCGGGTGTCTG<br>GCAATACCTGCCCCG<br>GGACCAGATGGCA<br>GGGC | 447             |

| SEQ ID NO | guide                        | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1980      | GCCCTGC<br>CACCTG<br>TCCCGGG | 2740      | CCCGGGA<br>CttGaTGGC<br>AGGGC | 3500      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGCCACCCCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACttGaTGGCAGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4260      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACTGATGGCAG<br>GGC  | 447             |
| 1981      | GCCCTGC<br>CACCTG<br>TCCCGGG | 2741      | CCCGGGA<br>CctGaTGG<br>CAGGGC | 3501      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGCCACCCCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACctGaTGGCAGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4261      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACTGATGGCA<br>GGGC  | 447             |
| 1982      | GCCCTGC<br>CACCTG<br>TCCCGGG | 2742      | CCCGGGA<br>CtcGaTGG<br>CAGGGC | 3502      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGCCACCCCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACtcGaTGGCAGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4262      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACTGATGGCA<br>GGGC  | 447             |
| 1983      | GCCCTGC<br>CACCTG<br>TCCCGGG | 2743      | CCCGGGA<br>CccGaTGG<br>CAGGGC | 3503      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGCCACCCCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACccGaTGGCAGGGCCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 4263      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACCCGATGGCA<br>GGGC | 447             |
| 1984      | GCCCTGC<br>CACCTG<br>TCCCGGG | 2744      | CCCGGGA<br>CtaGtTGGC<br>AGGGC | 3504      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGCCACCCCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACtaGtTGGCAGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4264      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACTAGTGGCAG<br>GGC  | 447             |



| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                               | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1985      | GCCCTGC<br>CACCTTG<br>TCCCGGG | 2745      | CCCGGGA<br>CeaGtTGG<br>CAGGGC | 3505      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTGGCCACCTGTCCCGGGTGTCTGGCAATACC<br>TGCCCGGGACaaGTGGCAGGGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4265      | GCCCTGCCACCCCTG<br>TCCCGGGTGTCTG<br>GCAATACCTGCCCG<br>GGACAGTTGGCA<br>GGCG  | 447             |
| 1986      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2746      | CCCGGAC<br>AaaGaGGC<br>AGGGCG | 3506      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTTGCCACCTGTCCCGGTGTCTGGCAATACC<br>TGCCCGGGACAaaGaGGCAGGGCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4266      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCCG<br>GACAAAGAGGCAG<br>GGCG | 448             |
| 1987      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2747      | CCCGGAC<br>AaaGaGGC<br>AGGGCG | 3507      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTTGCCACCTGTCCCGGTGTCTGGCAATACC<br>TGCCCGGGACaaaGaGGCAGGGCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4267      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCCG<br>GACATAGAGGCAG<br>GGCG | 448             |
| 1988      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2748      | CCCGGAC<br>AaaGaGGC<br>AGGGCG | 3508      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTTGCCACCTGTCCCGGTGTCTGGCAATACC<br>TGCCCGGGACaaaGaGGCAGGGCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4268      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCCG<br>GACACAGAGGCAG<br>GGCG | 448             |
| 1989      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2749      | CCCGGAC<br>AaaGaGGC<br>AGGGCG | 3509      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>CCTTGCCACCTGTCCCGGTGTCTGGCAATACC<br>TGCCCGGGACaaaGaGGCAGGGCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4269      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCCG<br>GACAAAGAGGCAG<br>GGCG | 448             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                      | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|--------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 1990      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2750      | CCGGGAC<br>AttGaGGC<br>AGGGCG  | 3510      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCCTGCCACCCCTGTCCCGGTGTCTGGCAATACC<br>TGCCGGGACAttGaGGCAGGGCGCACGGAGGCCTG<br>CCCTGACTGCCACCGGT    | 4270      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GACATCGAGGCAG<br>GGCG  | 448             |
| 1991      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2751      | CCGGGAC<br>AetGaGGC<br>AGGGCG  | 3511      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCCTGCCACCCCTGTCCCGGTGTCTGGCAATACC<br>TGCCGGGACActGaGGCAGGGCGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 4271      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GACATCGAGGCAG<br>GGCG  | 448             |
| 1992      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2752      | CCGGGAC<br>AacGaGGC<br>AGGGCG  | 3512      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCCTGCCACCCCTGTCCCGGTGTCTGGCAATACC<br>TGCCGGGACAacGaGGCAGGGCGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 4272      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GACAACGAGGCAG<br>GGCG  | 448             |
| 1993      | CGCCCTG<br>CCACCTT<br>GTCCCGG | 2753      | CCGGGAC<br>AteGaGGC<br>AGGGCG  | 3513      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>CCCTGCCACCCCTGTCCCGGTGTCTGGCAATACC<br>TGCCGGGACAtcGaGGCAGGGCGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 4273      | CGCCCTGCCACCCCT<br>GTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>GACATCGAGGCAG<br>GGCG  | 448             |
| 1994      | GCGCCCT<br>GCCACCC<br>TGTCCCG | 2754      | CCGGGACA<br>GaaTaGCA<br>GGGCGC | 3514      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>GCCCTGCCACCCCTGTCCCGGTGTCTGGCAATACC<br>TGCCGGGACAGaaTaGCAAGGGCGCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 4274      | GCGCCCTGCCACCC<br>TGTCCCGGTGTCTG<br>GCAATACCTGCCGG<br>ACAGAAATAGCAGG<br>GGCG | 449             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                       | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|---------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 1995      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2755      | CGGGACA<br>GtaTaaGCA<br>GGGCGC  | 3515      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGtaTaaGcAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4275      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGTTAGCAGG<br>GCGC  | 449             |
| 1996      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2756      | CGGGACA<br>GcaTaaGCA<br>GGGCGC  | 3516      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGcaTaaGcAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4276      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGCATAGCAGG<br>GCGC | 449             |
| 1997      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2757      | CGGGACA<br>GatTaaGCA<br>GGGCGC  | 3517      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGatTaaGcAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4277      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGATTAGCAGG<br>GCGC | 449             |
| 1998      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2758      | CGGGACA<br>GttTaaGcAG<br>GGGCGC | 3518      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGttTaaGcAGGGGCCACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 4278      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGTTTAGCAGGG<br>CGC | 449             |
| 1999      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2759      | CGGGACA<br>GctTaaGCA<br>GGGCGC  | 3519      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGctTaaGcAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 4279      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGCTTAGCAGG<br>GCGC | 449             |

| SEQ ID NO | guide                          | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|--------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 2000      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2760      | CGGGACA<br>GacTaGCA<br>GGCGGC | 3520      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGacTaGACAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4280      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGACTAGCAGG<br>GCGC | 449             |
| 2001      | GCGCCCT<br>GCCACCC<br>TGTCCTCG | 2761      | CGGGACA<br>GtcTaGCA<br>GGCGGC | 3521      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGC<br>GCCCTGCCACCCCTGTCCCGTGTCTGGCAATACC<br>TGCGGGACAGtcTaGACAGGGGCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 4281      | GCGCCCTGCCACCC<br>TGTCCTCGTGTCTG<br>GCAATACCTGCGGG<br>ACAGTCTAGCAGG<br>GCGC | 449             |
| 2002      | GGCGCCC<br>TGCCACC<br>CTGTCCC  | 2762      | GGGACAG<br>GaaGaCAG<br>GGCGCC | 3522      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGaaGaCAGGGGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4282      | GCGCCCTGCCACCC<br>CTGTCCCTGTCTG<br>GCAATACCTGCGG<br>ACAGGAAGACAGG<br>GCGCC  | 450             |
| 2003      | GGCGCCC<br>TGCCACC<br>CTGTCCC  | 2763      | GGGACAG<br>GtaGaCAG<br>GGCGCC | 3523      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGtaGaCAGGGGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4283      | GCGCCCTGCCACCC<br>CTGTCCCTGTCTG<br>GCAATACCTGCGG<br>ACAGGTAGACAGG<br>GCGCC  | 450             |
| 2004      | GGCGCCC<br>TGCCACC<br>CTGTCCC  | 2764      | GGGACAG<br>GcaGaCAG<br>GGCGCC | 3524      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGcaGaCAGGGGCCGCCACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 4284      | GCGCCCTGCCACCC<br>CTGTCCCTGTCTG<br>GCAATACCTGCGG<br>ACAGGCAGACAGG<br>GCGCC  | 450             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                  | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 2005      | GGCGCCC<br>TGCCACC<br>CTGTCCC | 2765      | GGGACAG<br>GacGaCAG<br>GGCGCC | 3525      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGacGaCAGGGGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4285      | GGCGCCCTGCCACC<br>CTGTCCCCTGTCTG<br>GCAATACCTGGGG<br>ACAGGACGACAGG<br>GCGCC | 450             |
| 2006      | GGCGCCC<br>TGCCACC<br>CTGTCCC | 2766      | GGGACAG<br>GtcGaCAG<br>GGCGCC | 3526      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGtcGaCAGGGGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4286      | GGCGCCCTGCCACC<br>CTGTCCCCTGTCTG<br>GCAATACCTGGGG<br>ACAGGTCGACAGG<br>GCGCC | 450             |
| 2007      | GGCGCCC<br>TGCCACC<br>CTGTCCC | 2767      | GGGACAG<br>GccGaCAG<br>GGCGCC | 3527      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGccGaCAGGGGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4287      | GGCGCCCTGCCACC<br>CTGTCCCCTGTCTG<br>GCAATACCTGGGG<br>ACAGGCCGACAGG<br>GCGCC | 450             |
| 2008      | GGCGCCC<br>TGCCACC<br>CTGTCCC | 2768      | GGGACAG<br>GagGaCAG<br>GGCGCC | 3528      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGagGaCAGGGGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4288      | GGCGCCCTGCCACC<br>CTGTCCCCTGTCTG<br>GCAATACCTGGGG<br>ACAGGAGGACAGG<br>GCGCC | 450             |
| 2009      | GGCGCCC<br>TGCCACC<br>CTGTCCC | 2769      | GGGACAG<br>GtgGaCAG<br>GGCGCC | 3529      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGG<br>CGCCCTGCCACCCCTGTCCCTGTCTGGCAATACCT<br>GGGGACAGGtgGaCAGGGGGGCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 4289      | GGCGCCCTGCCACC<br>CTGTCCCCTGTCTG<br>GCAATACCTGGGG<br>ACAGGTGGACAGG<br>GCGCC | 450             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                      | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 6687      | TCGATTC<br>TGAAACC<br>AGATCTG | 6729      | CAGATCT<br>GacTcCAG<br>AATCGA | 6771      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>GATTCTGAAACCAGATCTGTGTCTTGGCAATACC<br>TGCAGATCTGacTcCAGAAATCGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 6813      | TCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGACTACAGAAT<br>CGA   | 415             |
| 6688      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6730      | AGATCTG<br>GagTcAGA<br>ATCGAA | 6772      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>CGATTCTGAAACCAGATCTGTGTCTTGGCAATACC<br>TGAGATCTGGagTcAGAAATCGAAACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT  | 6814      | TTCGATTCTGAAAC<br>CAGATCTGTGTCTG<br>GCAATACCTGCAGAT<br>CTGGAGTAAGAATC<br>GAA | 416             |
| 6689      | TTCTGAA<br>ACCGAT<br>CTGAAATC | 6731      | GATTCAG<br>AgaTcGTT<br>TCAGAA | 6773      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>CTGAAACCAGATCTGAATCTGTGTCTTGGCAATACC<br>TGGATTTCAGAGaTcGTTTCAGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6815      | TTCTGAAACCAGAT<br>CTGAAATCTGTCTG<br>GCAATACCTGGATT<br>CAGAGATCGTTTCA<br>GAA  | 411             |
| 6690      | TCGATTC<br>TGAAACC<br>AGATCTG | 6732      | CAGATCT<br>GagTcCAG<br>AATCGA | 6774      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>GATTCTGAAACCAGATCTGTGTCTTGGCAATACC<br>TGCAGATCTGagTcCAGAAATCGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 6816      | TCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGAAATCCAGAAT<br>CGA  | 415             |
| 6691      | TCGATTC<br>TGAAACC<br>AGATCTG | 6733      | CAGATCT<br>GacTcCAG<br>AATCGA | 6775      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>GATTCTGAAACCAGATCTGTGTCTTGGCAATACC<br>TGCAGATCTGacTcCAGAAATCGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT    | 6817      | TCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGACTCCAGAAT<br>CGA   | 415             |
| 6692      | TTCTGAA<br>ACCGAT<br>CTGAAATC | 6734      | GATTCAG<br>AgaTcGTT<br>TCAGAA | 6776      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>CTGAAACCAGATCTGAATCTGTGTCTTGGCAATACC<br>TGGATTTCAGAGgTcGTTTCAGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6818      | TTCTGAAACCAGAT<br>CTGAAATCTGTCTG<br>GCAATACCTGGATT<br>CAGAGGTGCTTCA<br>GAA   | 411             |
| 6693      | TTCTGAA<br>ACCGAT<br>CTGAAATC | 6735      | GATTCAG<br>AgaTcGTT<br>TCAGAA | 6777      | GCCGGCTGCACACCTCCTCGGGGGCAGCTGTGTG<br>CTGAAACCAGATCTGAATCTGTGTCTTGGCAATACC<br>TGGATTTCAGAGaTcGTTTCAGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6819      | TTCTGAAACCAGAT<br>CTGAAATCTGTCTG<br>GCAATACCTGGATT<br>CAGAGATAGTTTCA<br>GAA  | 411             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 6694      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6736      | AGATCTG<br>GegTgAGA<br>ATCGAA | 6778      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGAGATCTGGegTgAGAAATCGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 6820      | TTCGATTCTGAAAC<br>CAGATCTGTCTG<br>GCAATACCTGAGAT<br>CTGGCGTGAAGATC<br>GAA    | 416             |
| 6695      | TTCGAA<br>ACCGAT<br>CTGAATC   | 6737      | GATTCAG<br>AegTgTGT<br>CAGAA  | 6779      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CTGAAACCCAGATCTGAATCTGTCTGGCAATACC<br>TGGATTCTGAAegTgTGTTCAGAAACACGGAGGCCTG<br>CCCTGACTGCCACCGGT   | 6821      | TTCGAAACCCAGAT<br>CTGAATCTGTCTG<br>GCAATACCTGAGAT<br>CAGACGTGTGTTCA<br>GAA   | 411             |
| 6696      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6738      | AGATCTG<br>GaaTgAGA<br>ATCGAA | 6780      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGAGATCTGGaaTgAGAAATCGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 6822      | TTCGATTCTGAAAC<br>CAGATCTGTCTG<br>GCAATACCTGAGAT<br>CTGGAATGAAGATC<br>GAA    | 416             |
| 6697      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6739      | AGATCTG<br>GaaTgAGA<br>ATCGAA | 6781      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGAGATCTGGaaTgAGAAATCGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 6823      | TTCGATTCTGAAAC<br>CAGATCTGTCTG<br>GCAATACCTGAGAT<br>CTGGCAATGAAGATC<br>GAA   | 416             |
| 6698      | TCGATTC<br>TGAAACC<br>AGATCTG | 6740      | CAGATCT<br>GtgTcCAG<br>AATCGA | 6782      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>GATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGCAGATCTGtgTcCAGAAATCGAAACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 6824      | TCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGTGTCCAGAAAT<br>CGA  | 415             |
| 6699      | TCGATTC<br>TGAAACC<br>AGATCTG | 6741      | CAGATCT<br>GaaTgCAG<br>AATCGA | 6783      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>GATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGCAGATCTGaaTgCAGAAATCGAAACACGGAGGCCTG<br>CCCTGACTGCCACCGGT  | 6825      | TTCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGCATGCAGAAAT<br>CGA | 415             |
| 6700      | CGATTCT<br>GAAACCA<br>GATCTGA | 6742      | TCAGATC<br>TtcTtTCAG<br>AATCG | 6784      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGT<br>ATTCTGAAACCCAGATCTGTGTCTGGCAATACC<br>TGTTCAGATCTtcTtTCAGAAATCGAAACACGGAGGCCTG<br>CCCTGACTGCCACCGGT | 6826      | CGATTCTGAAACCA<br>GATTCTGTGTCTG<br>GCAATACCTGTGAG<br>ATCTTCTATCAGAA<br>TCG   | 414             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                    | SEQ ID NO | SenLoopAnti                                                                  | target position |
|-----------|-------------------------------|-----------|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| 6701      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6743      | AGATCTG<br>GacTgAGA<br>ATCGAA | 6785      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCAGATCTTGTCTTGGCAATACC<br>TGAGATCTGGacTgAGAAATCGAACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 6827      | TTCGATTCTGAAAC<br>CAGATCTGTCTG<br>GCAATACCTGAGAT<br>CTGGACTAAGAAATC<br>GAA   | 416             |
| 6702      | TCGATTC<br>TGAAACC<br>AGATCTG | 6744      | CAGATCT<br>GtaTgCAG<br>AATCGA | 6786      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>GATTCTGAAACCAGATCTGTGTCTTGGCAATACC<br>TGCAGATCTGtaTgCAGAAATCGAACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 6828      | TCGATTCTGAAACC<br>AGATCTGTGTCTG<br>GCAATACCTGCAGA<br>TCTGTATGCAGAAAT<br>CGA  | 415             |
| 6703      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6745      | AGATCTG<br>GaaTgAGA<br>ATCGAA | 6787      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCAGATCTTGTCTTGGCAATACC<br>TGAGATCTGGaaTgAGAAATCGAACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 6829      | TTCGATTCTGAAAC<br>CAGATCTGTGTCTG<br>GCAATACCTGAGAT<br>CTGGAATAAGAAATC<br>GAA | 416             |
| 6704      | TTCGAA<br>ACCGAT<br>CTGAAATC  | 6746      | GATTCAG<br>AagTgGT<br>TCAGAA  | 6788      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>CTGAAACCAGATCTGAATCTGTCTTGGCAATACC<br>TGGATTCAGAAgTgGTTCAGAACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT    | 6830      | TTCGAAACCAGAT<br>CTGAAATCTGTCTG<br>GCAATACCTGGATT<br>CAGAAATAGTTTCA<br>GAA   | 411             |
| 6705      | TTCGAA<br>ACCGAT<br>CTGAAATC  | 6747      | GATTCAG<br>AaaTgGT<br>CAGAA   | 6789      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>CTGAAACCAGATCTGAATCTGTCTTGGCAATACC<br>TGGATTCAGAAaTgGTTCAGAACACGGAGGCCTG<br>CCCTGACTGCCCCACGGT    | 6831      | TTCGAAACCAGAT<br>CTGAAATCTGTCTG<br>GCAATACCTGGATT<br>CAGAAATGTGTTC<br>GAA    | 411             |
| 6706      | TTCGATT<br>CTGAAAC<br>CAGATCT | 6748      | AGATCTG<br>GaaTgAGA<br>ATCGAA | 6790      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGT<br>CGATTCTGAAACCAGATCTTGTCTTGGCAATACC<br>TGAGATCTGGaaTgAGAAATCGAACACGGAGGCCT<br>GCCCTGACTGCCCCACGGT  | 6832      | TTCGATTCTGAAAC<br>CAGATCTGTGTCTG<br>GCAATACCTGAGAT<br>CTGGCATGAGAAATC<br>GAA | 416             |
| 6707      | CGATTCT<br>GAAACCA<br>GATCTGA | 6749      | TCAGATC<br>TatTgTCAG<br>AATCG | 6791      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAGATCTGATGTCTTGGCAATACC<br>TGTGAGATCTatTgTCAGAAATCGAACGGAGGCCTG<br>CCCTGACTGCCCCACGGT | 6833      | CGATTCTGAAACCA<br>GATCTGATGTCTG<br>GCAATACCTGTGAG<br>ATCTATTATCAGAA<br>TCG   | 414             |



| SEQ ID NO | guide                           | SEQ ID NO | passenger                     | SEQ ID NO | full                                                                                                                                       | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|---------------------------------|-----------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 6708      | TCGATTC<br>TGAAACC<br>AGATCTG   | 6750      | CAGATCT<br>GaaTcCAG<br>AATCGA | 6792      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTC<br>GATTCGAAACCAGATCTGTGTCTTCTGGCAATACC<br>TGCAGATCTGaaTcCAGAAATCGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 6834      | TCGATTCGAAACC<br>AGATCTGTGTTCTG<br>GCAATACCTGCAG<br>TCTGAATACAGAAT<br>CGA     | 415             |
| 6709      | CGATTCT<br>GAAACCA<br>GATCTGA   | 6751      | TCAGATC<br>TatTgTCAG<br>AATCG | 6793      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAGATCTGATGTCTTCTGGCAATACC<br>TGTGAGATCTatTgTCAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 6835      | CGATTCTGAAACCA<br>GATCTGATGTTCTG<br>GCAATACCTGTGAG<br>ATCTATTGTGAGAA<br>TCG   | 414             |
| 6710      | CGATTCT<br>GAAACCA<br>GATCTGA   | 6752      | TCAGATC<br>TetTcTCAG<br>AATCG | 6794      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAGATCTGATGTCTTCTGGCAATACC<br>TGTGAGATCTetTcTCAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 6836      | CGATTCTGAAACCA<br>GATCTGATGTTCTG<br>GCAATACCTGTGAG<br>ATCTCTTCTCAGAA<br>TCG   | 414             |
| 6711      | TTCTGAA<br>ACCGAGAT<br>CTGAAATC | 6753      | GATTCAG<br>AagTcGTT<br>TCAGAA | 6795      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTT<br>CTGAAACCAGATCTGAATCTGTCTTCTGGCAATACC<br>TGGATTCAGAAgTcGTTTCAGAAACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 6837      | TTCTGAAACCAGAT<br>CTGAAATCTGTTCTG<br>GCAATACCTGGATT<br>CAGAAAGTCGTTTCA<br>GAA | 411             |
| 6712      | TCGATTC<br>TGAAACC<br>AGATCTG   | 6754      | CAGATCT<br>GtcTcCAG<br>AATCGA | 6796      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGTC<br>GATTCGAAACCAGATCTGTGTCTTCTGGCAATACC<br>TGCAGATCTGtcTcCAGAAATCGACACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 6838      | TCGATTCGAAACC<br>AGATCTGTGTTCTG<br>GCAATACCTGCAG<br>TCTGTCTCCAGAAT<br>CGA     | 415             |
| 6713      | CGATTCT<br>GAAACCA<br>GATCTGA   | 6755      | TCAGATC<br>TatTcTCAG<br>AATCG | 6797      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAGATCTGATGTCTTCTGGCAATACC<br>TGTGAGATCTatTcTCAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT  | 6839      | CGATTCTGAAACCA<br>GATCTGATGTTCTG<br>GCAATACCTGTGAG<br>ATCTATTCTCAGAA<br>TCG   | 414             |
| 6714      | CTTCGAT<br>TCTGAAA<br>CCAGATC   | 6756      | GATCTGG<br>TgaCtGAA<br>TCGAAG | 6798      | GCCGGCTGCACACCTCTCTGGCGGGCAGCTGTGCT<br>TCCGATTCGAAACCAGATCTGTGTCTTCTGGCAATACC<br>TGGATCTGGTgaCtGAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6840      | CTTCGATTCGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTGACTGAATCG<br>AAG     | 417             |

| SEQ ID NO | guide                         | SEQ ID NO | passenger                       | SEQ ID NO | full                                                                                                                                     | SEQ ID NO | SenLoopAnti                                                                 | target position |
|-----------|-------------------------------|-----------|---------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------|-----------------|
| 6715      | CTTCGAT<br>TCTGAAA<br>CCAGATC | 6757      | GATCTGG<br>TaaCtGAA<br>TCGAAG   | 6799      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TCGATCTGAAACCAAGATCTGTCTTGGCAATACC<br>TGGATCTGGTaaCtGAAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 6841      | CTTCGATTCIGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTAGCTGAATCG<br>AAG  | 417             |
| 6716      | CGATTCT<br>GAAACCA<br>GATCTGA | 6758      | TCAGATC<br>TaaTgTCA<br>GAATCG   | 6800      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAAGATCTGATGTCTTGGCAATACC<br>TGTGAGATCTaaTgTCAAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6842      | CGATTCTGAAAACCA<br>GATCTGATGTCTG<br>GCAATACCTGTGAG<br>ATCTCATGTGAGAA<br>TCG | 414             |
| 6717      | CGATTCT<br>GAAACCA<br>GATCTGA | 6759      | TCAGATC<br>TaaTgTCA<br>GAATCG   | 6801      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCG<br>ATTCTGAAACCAAGATCTGATGTCTTGGCAATACC<br>TGTGAGATCTaaTgTCAAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6843      | CGATTCTGAAAACCA<br>GATCTGATGTCTG<br>GCAATACCTGTGAG<br>ATCTAATATCAGAA<br>TCG | 414             |
| 6718      | GATTCTG<br>AAACCA<br>ATCTGAA  | 6760      | TTCAGAT<br>CgcGatTTC<br>AGAAATC | 6802      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGGA<br>TTCTGAAACCAAGATCTGAATGTCTTGGCAATACC<br>TGTGAGATCTgcGatTTCAGAAATCCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT | 6844      | GATTCTGAAAACCA<br>ATCTGAATGTCTG<br>GCAATACCTGTGCA<br>GATCGGATTCAGA<br>ATC   | 413             |
| 6719      | CTTCGAT<br>TCTGAAA<br>CCAGATC | 6761      | GATCTGG<br>TaaCtGAA<br>TCGAAG   | 6803      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TCGATCTGAAACCAAGATCTGTCTTGGCAATACC<br>TGGATCTGGTaaCtGAAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 6845      | CTTCGATTCIGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTAACCTGAATCG<br>AAG | 417             |
| 6720      | CTTCGAT<br>TCTGAAA<br>CCAGATC | 6762      | GATCTGG<br>TaaCtGAA<br>TCGAAG   | 6804      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TCGATCTGAAACCAAGATCTGTCTTGGCAATACC<br>TGGATCTGGTaaCtGAAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACCGGT   | 6846      | CTTCGATTCIGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTAGCTGAATCG<br>AAG  | 417             |
| 6721      | CTTCGAT<br>TCTGAAA<br>CCAGATC | 6763      | GATCTGG<br>TgcCtGAA<br>TCGAAG   | 6805      | GCCGGCTGCACACCTCCTGGCGGGCAGCTGTGCT<br>TCGATCTGAAACCAAGATCTGTCTTGGCAATACC<br>TGGATCTGGTgcCtGAAATCGAAGCACGGAGGCCCT<br>GCCCTGACTGCCACCGGT   | 6847      | CTTCGATTCIGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTCGCCGAATCG<br>AAG  | 417             |

| SEQ ID NO | guide               | SEQ ID NO | passenger            | SEQ ID NO | full                                                                                                                                           | SEQ ID NO | SenLoopAnti                                                                   | target position |
|-----------|---------------------|-----------|----------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------|-----------------|
| 6722      | CTTCGAT             | 6764      | GATCTGG<br>TccCgAA   | 6806      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGCT<br>TCGATTCTGAAACAGATCTGTCTTCTGGCAATACC<br>TGGATCTGGTccGAAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT         | 6848      | CTTCGATTCTGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTCCCCGGAATCG<br>AAG   | 417             |
|           | CCAGATC             |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6723      | CGATTCT             | 6765      | TCAGATC<br>TaccTgTCA | 6807      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGCG<br>ATTCTGAAACAGATCTGATGTCTTCTGGCAATACC<br>TGTTCAGATCTaccTgTCAGAAATCGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT     | 6849      | CGATTCTGAAAACCA<br>GATCTGATGTCTG<br>GCAATACCTGTTCAG<br>ATCTACTGTTCAGAA<br>TCG | 414             |
|           | GAAACCA<br>GATCTGA  |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6724      | TGGCCCT             | 6766      | GGTTTCA<br>GtcTgGAA  | 6808      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGTG<br>GCCCTTCGATTCTGAAACCTGTGTCTTCTGGCAATACC<br>TGGGTTTCAGTcTgGAAATCGAAGCCACACGGAGGCCCTG<br>CCCTGACTGCCACGGT | 6850      | TGGCCCTTCGATTCT<br>TGAAACCTGTCTG<br>GCAATACCTGGGTT<br>TCAGTCTAGAAAGGG<br>CCA  | 422             |
|           | TCGATTTC<br>TGAAACC |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6725      | CTTCGAT             | 6767      | GATCTGG<br>TccCtGAA  | 6809      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGCT<br>TCGATTCTGAAACAGATCTGTCTTCTGGCAATACC<br>TGGATCTGGTggCgAAATCGAAGCACGGAGGCCCTG<br>CCCTGACTGCCACGGT        | 6851      | CTTCGATTCTGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTCCCIGAAATCG<br>AAG   | 417             |
|           | TCTGAAA<br>CCAGATC  |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6726      | CTTCGAT             | 6768      | GATCTGG<br>TggCgGAA  | 6810      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGCT<br>TCGATTCTGAAACAGATCTGTCTTCTGGCAATACC<br>TGGATCTGGTggCgAAATCGAAGCACGGAGGCCCT<br>GCCCTGACTGCCACGGT        | 6852      | CTTCGATTCTGAAA<br>CCAGATCTGTCTG<br>GCAATACCTGGATC<br>TGGTGGCCGGAATCG<br>AAG   | 417             |
|           | TCTGAAA<br>CCAGATC  |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6727      | GATTCTG             | 6769      | TTCAGAT<br>CctGaTTCA | 6811      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGGA<br>TTCGAAACAGATCTGAATGTCTTCTGGCAATACC<br>TGTTCAGATCctGaTTTCAGAAATCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT       | 6853      | GATTCTGAAAACCCAG<br>ATCTGAATGTCTG<br>GCAATACCTGTTC<br>GATCTGATTTCAG<br>ATC    | 413             |
|           | AAACCAG<br>ATCTGAA  |           |                      |           |                                                                                                                                                |           |                                                                               |                 |
| 6728      | GATTCTG             | 6770      | TTCAGAT<br>CgaGaTTC  | 6812      | GCCGGCTGCACACCTCTCTGGGGGCGCAGCTGTGGA<br>TTCGAAACAGATCTGAATGTCTTCTGGCAATACC<br>TGTTCAGATCgaGaTTCAGAAATCCACGGAGGCCCTG<br>CCCTGACTGCCACGGT        | 6854      | GATTCTGAAAACCCAG<br>ATCTGAATGTCTG<br>GCAATACCTGTTC<br>GATCGAGATTTCAG<br>ATC   | 413             |
|           | AAACCAG<br>ATCTGAA  |           |                      |           |                                                                                                                                                |           |                                                                               |                 |

Table 7: Top 110 exemplary miRNA sequences

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                          | SEQ ID NO: | SenLoopAnti.                                                               | targetID |
|------------|-------------------------------|------------|-------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------|----------|
| 6855       | TGAAACCA<br>GATCTGAAT<br>CCTG | 6964       | CAGGATTCT<br>cAcCTGGTT<br>TCA | 7073       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCTGAAACCA<br>GATCTGAATCCTGTGTCTG<br>GCAATACCTGCAGGATTCTcA<br>cCTGGTTTCAACGGAGGCCT<br>GCCCTGACTGCCCCACGGT | 7182       | TGAAACCAAGATCTGAATC<br>TGTTCTTGCGCAATACCTG<br>CAGGATTCTCACCTGGTTT<br>CA    | 408      |
| 6856       | TCTGAAACC<br>AGATCTGA<br>ATCC | 6965       | GGATTCAGc<br>cCaGGTTTC<br>AGA | 7074       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCTGAAAC<br>CAGATCTGAATCCTGTCTG<br>GCAATACCTGGGATTCAGcc<br>aGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCCCACGGT   | 7183       | TCTGAAACCAAGATCTGAAT<br>CCTGTCTTGCGCAATACCTG<br>GGATTACAGCCACGGTTTCA<br>GA | 410      |
| 6857       | TCTGAAACC<br>AGATCTGA<br>ATCC | 6966       | GGATTCAGc<br>aCcGGTTTC<br>AGA | 7075       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCTGAAAC<br>CAGATCTGAATCCTGTCTG<br>GCAATACCTGGGATTCAGcaC<br>cGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCCCACGGT  | 7184       | TCTGAAACCAAGATCTGAAT<br>CCTGTCTTGCGCAATACCTG<br>GGATTACAGCCACGGTTTCA<br>GA | 410      |
| 6858       | TCTGAAACC<br>AGATCTGA<br>ATCC | 6967       | GGATTCAGt<br>aCaGGTTTC<br>AGA | 7076       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCA<br>CAGATCTGAATCCTGTCTG<br>GCAATACCTGGGATTCAGtaC<br>aGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCCCACGGT  | 7185       | TCTGAAACCAAGATCTGAAT<br>CCTGTCTTGCGCAATACCTG<br>GGATTACAGTACAGGTTTCA<br>GA | 410      |
| 6859       | TGAAACCA<br>GATCTGAAT<br>CCTG | 6968       | CAGGATTCC<br>cAaCTGGTT<br>TCA | 7077       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCA<br>GATCTGAATCCTGTGTCTG<br>GCAATACCTGCAGGATTCccA<br>aCTGGTTTCAACGGAGGCCT<br>GCCCTGACTGCCCCACGGT   | 7186       | TGAAACCAAGATCTGAATC<br>TGTTCTTGCGCAATACCTG<br>CAGGATTCCCAACTGGTTT<br>CA    | 408      |

| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                       | SEQ ID NO: | full                                                                                                                                         | SEQ ID NO: | SenLoopAnti.                                                            | targetID |
|------------|--------------------------------|------------|---------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|----------|
| 6860       | TCTGAAACC<br>AGATCTGA<br>ATCC  | 6969       | GGATTcAGt<br>gCaGGTTTC<br>AGA   | 7078       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTCTGAAAC<br>CAGATCTGAATCCTGTCTG<br>GCAATACCTGGGATTCAGtC<br>aGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT    | 7187       | TCTGAAACCAGATCTGGAAT<br>CCTGTCTGGCAATACCTG<br>GGATTcAGTGCAGGTTTCA<br>GA | 410      |
| 6861       | TCTGATTCTG<br>AAACCAGA<br>TCTG | 6970       | CAGATCTGa<br>cTaCAGAAAT<br>CGA  | 7079       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTCTGATCT<br>GAAACCAGATCTGTGTCTG<br>GCAATACCTGCAGATCTGacT<br>aCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7188       | TCTGATTCTGAAACCAGATC<br>TGTGTCTGGCAATACCTG<br>CAGATCTGACTACAGAATC<br>GA | 415      |
| 6862       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 6971       | CCAGGATTa<br>cGcTCTGGT<br>TTC   | 7080       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTGAAACCA<br>ATCTGAATCCTGTGTCTG<br>GCAATACCTGCCAGGATTacG<br>cTCTGGTTTCCACGGAGGCT<br>GCCCTGACTGCCACCGGT     | 7189       | GAAACCAGATCTGAATCCT<br>GGTGTCTGGCAATACCTG<br>CCAGGATTACGCTCTGGTT<br>TC  | 407      |
| 6863       | TGAAACCA<br>GATCTGAAT<br>CCTG  | 6972       | CAGGATTcC<br>tAaCTGGTTT<br>CA   | 7081       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTGAAACCA<br>GATCTGAATCCTGTGTCTG<br>GCAATACCTGCAGGATTCcTa<br>aCTGGTTTCACACGGAGGCT<br>GCCCTGACTGCCACCGGT    | 7190       | TGAAACCAGATCTGAATCC<br>TGTGTCTGGCAATACCTG<br>CAGGATTCTTAACTGGTTT<br>CA  | 408      |
| 6864       | TTCGATTCT<br>GAAACCAG<br>ATCT  | 6973       | AGATCTGGa<br>gTaaAGAAATC<br>GAA | 7082       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTCTGAAAC<br>TGAAACCAGATCTGTGTCTG<br>GCAATACCTGAGATCTGGagT<br>aAGAAATCGAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7191       | TTCGATTCTGAAACCAGAT<br>CTGTCTGGCAATACCTG<br>AGATCTGGAGTAAGAAATCG<br>AA  | 416      |
| 6865       | TCTGAAACC<br>AGATCTGA<br>ATCC  | 6974       | GGATTcAGc<br>aCaGGTTTC<br>AGA   | 7083       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTCTGAAAC<br>CAGATCTGAATCCTGTGTCTG<br>GCAATACCTGGGATTCAGeAc<br>aGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7192       | TCTGAAACCAGATCTGGAAT<br>CCTGTCTGGCAATACCTG<br>GGATTcAGcACAGGTTTCA<br>GA | 410      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                           | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|-------------------------------|------------|--------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6866       | TTCTGAAAC<br>CAGATCTG<br>AATC | 6975       | GATTCAGag<br>aTcGTTTCA<br>GAA  | 7084       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGagaT<br>cGTTTCAGAAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7193       | TTCTGAAACCAGATCTTGAA<br>TCTGTCTTGCCAATACCTG<br>GATTCAGAGATCGTTTCAG<br>AA  | 411      |
| 6867       | TCGATTCTG<br>AAACCAGA<br>TCTG | 6976       | CAGATCTGa<br>aTcCAGAAAT<br>CGA | 7085       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAAC<br>GAAACCAGATCTGTGTCTG<br>GCAATACCTGCAGATCTGaaT<br>cCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7194       | TCGATTCTGAAACCAGATC<br>TGTGTCTTGCCAATACCTG<br>CAGATCTGAATCCAGAATC<br>GA   | 415      |
| 6868       | TCTGAAACC<br>AGATCTGA<br>ATCC | 6977       | GGATTCAgt<br>aCcGGTTTC<br>AGA  | 7086       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAAC<br>CAGATCTGAAATCTGTGTCTG<br>GCAATACCTGGGATTCAGtaC<br>cGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7195       | TCTGAAACCAGATCTTGAAAT<br>CCTGTCTTGCCAATACCTG<br>GGATTCAgTACCGGTTTCA<br>GA | 410      |
| 6869       | TCGATTCTG<br>AAACCAGA<br>TCTG | 6978       | CAGATCTGa<br>cTcCAGAAAT<br>CGA | 7087       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAAC<br>GAAACCAGATCTGTGTCTG<br>GCAATACCTGCAGATCTGacT<br>cCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7196       | TCGATTCTGAAACCAGATC<br>TGTGTCTTGCCAATACCTG<br>CAGATCTGACTCCAGAATC<br>GA   | 415      |
| 6870       | TTCTGAAAC<br>CAGATCTG<br>AATC | 6979       | GATTCAGag<br>gTcGTTTCA<br>GAA  | 7088       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAAACCA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGaggT<br>cGTTTCAGAAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7197       | TTCTGAAACCAGATCTTGAA<br>TCTGTCTTGCCAATACCTG<br>GATTCAGAGGTCGTTTCAG<br>AA  | 411      |
| 6871       | TGAAACCA<br>GATCTGAAT<br>CCTG | 6980       | CAGGATTct<br>aAcCTGGTT<br>TCA  | 7089       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAAACCA<br>GATCTGAAATCTGTGTCTG<br>GCAATACCTGCAGGATTCaa<br>cCTGTTTCACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT    | 7198       | TGAAACCAGATCTGAAATCC<br>TGTGTCTTGCCAATACCTG<br>CAGGATTCTAACCTGGTTT<br>CA  | 408      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                           | SEQ ID NO: | SenLoopAnti.                                                           | targetID |
|------------|-------------------------------|------------|--------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------|----------|
| 6872       | TTCGAAAC<br>CAGATCTG<br>AATC  | 6981       | GATTCAGag<br>aTaGTTTCA<br>GAA  | 7090       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGagaT<br>aGTTTCAGAAACCGGAGGCC<br>TGCCCTGACTGCCACCGGT   | 7199       | TTCGAAACCAGATCTGAA<br>TCTGTCTGGCAATACCTG<br>GATTCAGAGATAGTTTCAG<br>AA  | 411      |
| 6873       | TTCGATTCT<br>GAAACCAG<br>ATCT | 6982       | AGATCTGGc<br>gTgAGAAATC<br>GAA | 7091       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAATC<br>TGAAACCAGATCTGTCTG<br>GCAATACCTGAGATCTGGegT<br>gAGAAATCGAAACCGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7200       | TTCGATTCTGAAACCAGAT<br>CTGTCTGGCAATACCTG<br>AGATCTGGCGTGAGAAATCG<br>AA | 416      |
| 6874       | TCTGAAACC<br>AGATCTGA<br>ATCC | 6983       | GGATTCAGc<br>gCaGGTTTC<br>AGA  | 7092       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>CAGATCTGAAATCTGTCTG<br>GCAATACCTGGGATTCAGegC<br>aGGTTTCAGAACCGGAGGCC<br>TGCCCTGACTGCCACCGGT    | 7201       | TCTGAAACCAGATCTGAA<br>TCTGTCTGGCAATACCTG<br>GGATTCAGCGCAGGTTTCA<br>GA  | 410      |
| 6875       | TTCGAAAC<br>CAGATCTG<br>AATC  | 6984       | GATTCAGac<br>gTgTTCAG<br>AA    | 7093       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAAACCA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGaegT<br>tGTTTCAGAAACCGGAGGCC<br>GCCCTGACTGCCACCGGT   | 7202       | TTCGAAACCAGATCTGAA<br>TCTGTCTGGCAATACCTG<br>GATTCAGACGTTGTTCAG<br>AA   | 411      |
| 6876       | TGAAACCA<br>GATCTGAAT<br>CCTG | 6985       | CAGGATTc<br>aAaCTGGTT<br>TCA   | 7094       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAAATTC<br>GATCTGAAATCTGTGTCTG<br>GCAATACCTGCAGGATTCaaA<br>aCTGGTTTCACACCGGAGGCC<br>GCCCTGACTGCCACCGGT   | 7203       | TGAAACCAGATCTGAATCC<br>TGTTCTGGCAATACCTG<br>CAGGATTCCAAACTGGTTT<br>CA  | 408      |
| 6877       | TTCGATTCT<br>GAAACCAG<br>ATCT | 6986       | AGATCTGGa<br>aTgAGAAATC<br>GAA | 7095       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAAATTC<br>TGAAACCAGATCTGTGTCTG<br>GCAATACCTGAGATCTGGaaT<br>gAGAAATCGAAACCGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7204       | TTCGATTCTGAAACCAGAT<br>CTGTCTGGCAATACCTG<br>AGATCTGGAATGAGAAATCG<br>AA | 416      |

| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                           | SEQ ID NO: | SenLoopAnti.                                                               | targetID |
|------------|--------------------------------|------------|--------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------|----------|
| 6878       | TTCGATTCT<br>GAAACCAG<br>A1CT  | 6987       | AGATCTGGc<br>aTaAGAAATC<br>GAA | 7096       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCT<br>TGAAACCAGATCTTGTTCCTG<br>GCAATACCTGAGATCTGGcaT<br>aAGAATCGAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7205       | TTCGATTCTGAAACCAGAT<br>CTTGTCTCTGGCAATACCTG<br>AGATCTGGCATAAGAAATCG<br>AA  | 416      |
| 6879       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 6988       | CCAGGATTa<br>tGcTCTGGTT<br>TC  | 7097       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCT<br>ATCTGAATCTCTGGTGTTCCTG<br>GCAATACCTGCCAGGATTaTg<br>cTCTGGTTTCCACGGAGGCC<br>GCCCTGACTGCCACCGGT  | 7206       | GAAACCAGATCTGAATCCT<br>GGTGTCTCTGGCAATACCTG<br>CCAGGATTATGCTCTGGTT<br>TC   | 407      |
| 6880       | TTCGATTCTG<br>AAACCAGA<br>TCTG | 6989       | CAGATCTGt<br>gTcCAGAAAT<br>CGA | 7098       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCT<br>GAAACCAGATCTGTGTTCCTG<br>GCAATACCTGCAGATCTGgT<br>cCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7207       | TTCGATTCTGAAACCAGATC<br>TGTGTCTCTGGCAATACCTG<br>CAGATCTGTCTCCAGAAATC<br>GA | 415      |
| 6881       | TTCGATTCTG<br>AAACCAGA<br>TCTG | 6990       | CAGATCTGc<br>aTgCAGAAAT<br>CGA | 7099       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCT<br>GAAACCAGATCTGTGTTCCTG<br>GCAATACCTGCAGATCTGcaT<br>gCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7208       | TTCGATTCTGAAACCAGATC<br>TGTGTCTCTGGCAATACCTG<br>CAGATCTGCATGCAGAAATC<br>GA | 415      |
| 6882       | CGATTCTGA<br>AACCAGAT<br>CTGA  | 6991       | TCAGATCTtc<br>TaTCAGAAAT<br>CG | 7100       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCTG<br>AAACCAGATCTGTGTTCCTG<br>GCAATACCTGTGAGATCTtcTa<br>TCAGAAATCGACACGGAGGCC<br>GCCCTGACTGCCACCGGT | 7209       | CGATTCTGAAACCAGATCT<br>GATGTCTCTGGCAATACCTG<br>TCAGATCTTCTATCAGAAAT<br>CG  | 414      |
| 6883       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 6992       | CCAGGATTa<br>cGrTCTGGTT<br>TC  | 7101       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGTTCGATTCTG<br>ATCTGAATCTCTGGTGTTCCTG<br>GCAATACCTGCCAGGATTacG<br>tTCTGGTTTCCACGGAGGCC<br>GCCCTGACTGCCACCGGT | 7210       | GAAACCAGATCTGAATCCT<br>GGTGTCTCTGGCAATACCTG<br>CCAGGATTACGTCTCTGGTT<br>TC  | 407      |



| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                         | SEQ ID NO: | SenLoopAnti.                                                            | targetID |
|------------|--------------------------------|------------|--------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|----------|
| 6884       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 6993       | CCAGGATTg<br>tGcTCTGGTT<br>TC  | 7102       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCAG<br>ATCTGAATCCTGGTGTCTG<br>GCAATACCTGCCAGGATTgT<br>cTCTGGTTTCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7211       | GAAACCAGATCTGAATCCT<br>GGTGTCTGGCAATACCTG<br>CCAGGATTGTGCTCTGGTT<br>TC  | 407      |
| 6885       | TCTGAAACC<br>AGATCTGA<br>ATCC  | 6994       | GGATTcAGt<br>cCaGGTTTC<br>AGA  | 7103       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAAC<br>CAGATCTGAATCCTGTCTG<br>GCAATACCTGGGATTCAGtcC<br>aGGTTTCAGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT    | 7212       | TCTGAAACCAGATCTGAAT<br>CCTGTCTGGCAATACCTG<br>GGATTcAGTCCAGGTTTCA<br>GA  | 410      |
| 6886       | TTCGATTCT<br>GAAACCAG<br>ATCT  | 6995       | AGATCTGGa<br>cTaAGAAATC<br>GAA | 7104       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAATTC<br>TGAAACCAGATCTGTGTCTG<br>GCAATACCTGAGATCTGGaet<br>aAGAATCGAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7213       | TTCGATTCTGAAACCAGAT<br>CTGTCTGGCAATACCTG<br>AGATCTGGACTAAGAAATCG<br>AA  | 416      |
| 6887       | TTCGATTCTG<br>AAACCAGA<br>TCTG | 6996       | CAGATCTGt<br>aTgCAGAAAT<br>CGA | 7105       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAATTC<br>GAAACCAGATCTGTGTCTG<br>GCAATACCTGCAGATCTGtaT<br>gCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7214       | TTCGATTCTGAAACCAGATC<br>TGTTCTGGCAATACCTG<br>CAGATCTGTATGCAGAAATC<br>GA | 415      |
| 6888       | TTCGATTCT<br>GAAACCAG<br>ATCT  | 6997       | AGATCTGGa<br>aTaAGAAATC<br>GAA | 7106       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCA<br>TGAAACCAGATCTGTGTCTG<br>GCAATACCTGAGATCTGGaaT<br>aAGAATCGAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7215       | TTCGATTCTGAAACCAGAT<br>CTGTCTGGCAATACCTG<br>AGATCTGGAATAAGAAATCG<br>AA  | 416      |
| 6889       | TGAAACCA<br>GATCTGAAT<br>CCTG  | 6998       | CAGGATTct<br>aAaCTGGTT<br>TCA  | 7107       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCA<br>GATCTGAATCCTGTGTCTG<br>GCAATACCTGCAGGATTCaa<br>aCTGGTTTCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 7216       | TGAAACCAGATCTGAATCC<br>TGTTCTGGCAATACCTG<br>CAGGATTCTAAACTGGTTT<br>CA   | 408      |

| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                       | SEQ ID NO: | full                                                                                                                                          | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|--------------------------------|------------|---------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6890       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 6999       | CCAGGATTg<br>tGtTCTGGTT<br>TC   | 7108       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGGAAACCAG<br>ATCTGAATCTCTGGTGTCTG<br>GCAATACCTGCCAGGATTgG<br>tTCTGGTTTCCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7217       | GAAACCAGATCTGAATCCT<br>GGTGTCTGGCAATACCTG<br>CCAGGATTGTGTCTGGTTT<br>C     | 407      |
| 6891       | GAAACCAG<br>ATCTGAATC<br>CTGG  | 7000       | CCAGGATT<br>GTGtTCTGG<br>TTTC   | 7109       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>ATCTGAATCTCTGGTGTCTG<br>GCAATACCTGCCAGGATTGT<br>GgTCTGGTTTCCACGGAGGC<br>CTGCCCTGACTGCCACCGGT  | 7218       | GAAACCAGATCTGAATCCT<br>GGTGTCTGGCAATACCTG<br>CCAGGATTGTGGTCTGGTT<br>TC    | 407      |
| 6892       | TTCTGAAAC<br>CAGATCTG<br>AATC  | 7001       | GATTCAGaa<br>gTaaGTTCa<br>GAA   | 7110       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGaaT<br>aGTTTCAGAAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7219       | TTCTGAAACCAGATCTGAA<br>TCTGTCTGGCAATACCTG<br>GATTCAGAAATGTGTTCAG<br>AA    | 411      |
| 6893       | TTCTGAAAC<br>CAGATCTG<br>AATC  | 7002       | GATTCAGaa<br>aTtGTTCAG<br>AA    | 7111       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAA<br>CCAGATCTGAAATCTGTCTG<br>GCAATACCTGGATTCAGaaT<br>tGTTTCAGAAACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 7220       | TTCTGAAACCAGATCTGAA<br>TCTGTCTGGCAATACCTG<br>GATTCAGAAATGTGTTCAG<br>AA    | 411      |
| 6894       | TTTCGATTCT<br>GAAACCAG<br>ATCT | 7003       | AGATCTGgc<br>aTgAGAAATC<br>GAA  | 7112       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAA<br>TGAAACCAGATCTGTGTCTG<br>GCAATACCTGAGATCTGgeaT<br>gAGAAATCGAAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7221       | TTTCGATTCTGAAACCAGAT<br>CTGTGTCTGGCAATACCTG<br>AGATCTGGCATGAGAAATCG<br>AA | 416      |
| 6895       | CGATTCTGA<br>AACCAGAT<br>CTGA  | 7004       | TCAGATCTat<br>TaTTCAGAAAT<br>CG | 7113       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAA<br>AAACCAGATCTGTGTCTG<br>GCAATACCTGTGAGATCTatTa<br>TCAGAAATCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT     | 7222       | CGATTCTGAAACCAGATCT<br>GATGTCTGGCAATACCTG<br>TCAGATCTATTATCAGAAAT<br>CG   | 414      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                                | SEQ ID NO: | SenLoopAnti.                                                               | targetID |
|------------|-------------------------------|------------|--------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------|----------|
| 6896       | TCGATTCTG<br>AAACCAGA<br>TCG  | 7005       | CAGATCTGa<br>aTaCAGAAAT<br>CGA | 7114       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGATCTCT<br>GAAACCAGATCTGTGTCTCTG<br>GCAATACCTGCAGATCTGaaT<br>aCAGAAATCGACACGGAGGCC<br>TGCCCTGACTGCCACCGGT   | 7223       | TCGATTCTGAAACCAGATC<br>TGTTCTGTGGCAATACCTG<br>CAGATCTGAATACAGAATC<br>GA    | 415      |
| 6897       | CGATTCTGA<br>AACCAGAT<br>CTGA | 7006       | TCAGATCTat<br>TgTCAGAAAT<br>CG | 7115       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTCTG<br>GCAATACCTGCGGAGTCTCTC<br>GgTTCAGATCTCACGGAGGC<br>CTGCCCTGACTGCCACCGGT    | 7224       | CGATTCTGAAACCAGATCT<br>GATGTTCTGGCAATACCTG<br>TCAGATCTATGTTCAGAAAT<br>CG   | 414      |
| 6898       | AGATCTGA<br>ATCTGGAC<br>TCCG  | 7007       | CGGAGTCTCT<br>CGgTTCAGA<br>TCT | 7116       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTGCGATCTCTG<br>AAACCAGATCTGATGTCTCTG<br>GCAATACCTGTCTGATCTetTc<br>TCAGAAATCGACACGGAGGCT<br>TGCCCTGACTGCCACCGGT | 7225       | AGATCTGAATCTCTGGACTC<br>CGTGTCTGTGGCAATACCTG<br>CGGAGTCTCTCGGTTCAGAT<br>CT | 401      |
| 6899       | CGATTCTGA<br>AACCAGAT<br>CTGA | 7008       | TCAGATCTet<br>TeTCAGAAAT<br>CG | 7117       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGTCTGAAA<br>CCAGATCTGAAATCTGTCTCTG<br>GCAATACCTGGATTCAGAAgT<br>cGTTTCAGAAACACGGAGGCC<br>TGCCCTGACTGCCACCGGT     | 7226       | CGATTCTGAAACCAGATCT<br>GATGTTCTGGCAATACCTG<br>TCAGATCTCTCTTCAGAAAT<br>CG   | 414      |
| 6900       | TTCTGAAAC<br>CAGATCTG<br>AATC | 7009       | GATTCAGAA<br>gTcGTTTCA<br>GAA  | 7118       | GCCGGCTGCACACCTCTCTGG<br>CGGGCAGCTGTGGAAACCAG<br>ATCTGAAATCTGTGTCTCTG<br>GCAATACCTGCCAGGATatGt<br>TCTGGTTTCCACGGAGGCT<br>GCCCTGACTGCCACCGGT         | 7227       | TTCTGAAACCAGATCTGAA<br>TCTGTCTGTGGCAATACCTG<br>GATTCAGAAAGTCGTTCAG<br>AA   | 411      |
| 6901       | GAAACCAG<br>ATCTGAATC<br>CTGG | 7010       | CCAGGATTa<br>tGtTCTGGTT<br>TC  | 7119       | GCCCTGACTGCCACCGGT                                                                                                                                  | 7228       | GAAACCAGATCTGAATCCT<br>GGTGTCTGTGGCAATACCTG<br>CCAGGATTATGTCTCTGGTTT<br>C  | 407      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                             | SEQ ID NO: | SenLoopAnti.                                                             | targetID |
|------------|-------------------------------|------------|--------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------|----------|
| 6902       | CAGATCTG<br>AATCCTGG<br>AC'CC | 7011       | GGAGTCCac<br>cAcTCAGAT<br>CTG  | 7120       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>AATCTGGACTCCTGTGTCTG<br>GCAATACCTGGGAGTCCacA<br>cTCAGATCTGCACGGAGGCC<br>TGCCCT'GACTGCCACCGGI    | 7229       | CAGATCTGAATCCTGGACT<br>CCTGTCTTGCCAATACCTG<br>GGAGTCCACCACTCAGATC<br>TG  | 402      |
| 6903       | TCGATTCTG<br>AAACCAGA<br>TCTG | 7012       | CAGATCTGt<br>cTcCAGAAAT<br>CGA | 7121       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCT<br>GAAACCAGATCTGTGTCTG<br>GCAATACCTGCAGATCTGtT<br>cCAGAAATCGACACGGAGGCC<br>TGCCCT'GACTGCCACCGGI     | 7230       | TCGATTCTGAAACCAGATC<br>TGTGTCTTGCCAATACCTG<br>CAGATCTGTCTCCAGAAATC<br>GA | 415      |
| 6904       | GAAACCAG<br>ATCTGAATC<br>CTGG | 7013       | CCAGGATTg<br>cGrTCTGGTT<br>TC  | 7122       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGAATCTCTGGTGTCTG<br>GCAATACCTGCCAGGATTgcG<br>fTCTGGTTTCCACGGAGGCCCT<br>GCCCT'GACTGCCACCGGI | 7231       | GAAACCAGATCTGAATCCT<br>GGTGTCTTGCCAATACCTG<br>CCAGGATTGCGTTCCTGGTT<br>TC | 407      |
| 6905       | AGATCTGA<br>ATCCTGGAC<br>TCCG | 7014       | CGGAGTCCt<br>cGrTTCAGAT<br>CT  | 7123       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTG<br>GCAATACCTGCGGAGTCCtG<br>fTTCAGATCTCACGGAGGCCCT<br>GCCCT'GACTGCCACCGGI    | 7232       | AGATCTGAATCCTGGACTC<br>CGTGTCTTGCCAATACCTG<br>CGGAGTCCCTCGTTCAGAT<br>CT  | 401      |
| 6906       | AGATCTGA<br>ATCCTGGAC<br>TCCG | 7015       | CGGAGTCCtt<br>GrTTCAGAT<br>CT  | 7124       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTG<br>GCAATACCTGCGGAGTCCtGt<br>TTCAGATCTCACGGAGGCCCT<br>GCCCT'GACTGCCACCGGI    | 7233       | AGATCTGAATCCTGGACTC<br>CGTGTCTTGCCAATACCTG<br>CGGAGTCCCTGTTCAGAT<br>CT   | 401      |
| 6907       | AGATCTGA<br>ATCCTGGAC<br>TCCG | 7016       | CGGAGTCCc<br>cGrTTCAGAT<br>CT  | 7125       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTG<br>GCAATACCTGCGGAGTCCcG<br>fTTCAGATCTCACGGAGGCCCT<br>GCCCT'GACTGCCACCGGI    | 7234       | AGATCTGAATCCTGGACTC<br>CGTGTCTTGCCAATACCTG<br>CGGAGTCCCCCGTTCAGAT<br>CT  | 401      |

| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                                 | SEQ ID NO: | full                                                                                                                                             | SEQ ID NO: | SenLoopAnti.                                                             | targetID |
|------------|--------------------------------|------------|-------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------|----------|
| 6908       | TGAAACCA<br>GATCTGAAT<br>CTTG  | 7017       | CAGGATTcTt<br>AaCTGGTTT<br>CA             | 7126       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACCA<br>GATCTGAATCCTGTGTCTTG<br>GCAATACCTGCAGGATCTtAa<br>CTGGTTTCACACGGAGGCCT<br>GCCCTGACTGCCACCGGT      | 7235       | TGAAACCAAGATCTGAATCC<br>TGTTCTTGGAATACCTG<br>CAGGATTCTTAACCTGGTTT<br>CA  | 408      |
| 6909       | CGATTCTGA<br>AACCAGAT<br>CTGA  | 7018       | TCAGATCTat<br>TeTCAGAAAT<br>CG            | 7127       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTTG<br>AAACCAAGATCTGTGTCTTG<br>GCAATACCTGTGAGATCTatTc<br>TCAGAAATCGACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 7236       | CGATTCTGAAACCAAGATCTT<br>GATGTCTTGGAATACCTG<br>TCAGATCTATTCAGAAAT<br>CG  | 414      |
| 6910       | AGATCTGA<br>ATCTGGAC<br>TCCG   | 7019       | CGGAGTCCc<br>tGTTTCAGAT<br>CT             | 7128       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTTG<br>GCAATACCTGCGGAGTCCcG<br>tTTCAGATCTACGGAGGCCT<br>GCCCTGACTGCCACCGGT      | 7237       | AGATCTGAATCCTGGAGCTC<br>CGTTCTTGGAATACCTG<br>CGGAGTCCCTGTTCAGAT<br>CT    | 401      |
| 6911       | CTTCGATTTC<br>TGAAACCA<br>GATC | 7020       | GATCTGGTg<br>aCtGAATCG<br>AAG             | 7129       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCTTCGATT<br>CTGAAACCAAGATCTGTCTTG<br>GCAATACCTGGATCTGGTgaC<br>tGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7238       | CTTCGATTCTGAAACCAAGAT<br>TCTGTCTTGGAATACCTG<br>GATCTGGTACTGAAATCGA<br>AG | 417      |
| 6912       | TCCAAACG<br>AGTCTCCGT<br>CGCC  | 7021       | GGCGACGG<br>TCATTCGTTT<br>GGA             | 7130       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCTTCGATT<br>AGTCTCCGTGCTGTCTTG<br>CAATACCTGGCGACGGTCA<br>tTCGTTTGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT        | 7239       | TCCAAACGAGTCTCCGTTCG<br>CCTGTCTTGGAATACCTG<br>GGCGACGGTCAATTCGTTTG<br>GA | 59       |
| 6913       | CTTCGATTTC<br>TGAAACCA<br>GATC | 7022       | GATCTGGT <sup>a</sup><br>gCtGAATCG<br>AAG | 7131       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCTTCGATT<br>CTGAAACCAAGATCTGTCTTG<br>GCAATACCTGGATCTGGTgagC<br>tGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7240       | CTTCGATTCTGAAACCAAGAT<br>TCTGTCTTGGAATACCTG<br>GATCTGGTACTGAAATCGA<br>AG | 417      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                         | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
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| 6914       | CGATTCTGA<br>AACCAGAT<br>CTGA | 7023       | TCAGATCTc<br>aJgTCAGAA<br>TCG | 7132       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCGATCTCG<br>AAACCAGATCTGATGTTCTG<br>GCAATACCTGTGAGATCTcaT<br>gTCAGAATCGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7241       | CGATTCTGAAACCAGATCTT<br>GATGTTCTGGCAATACCTG<br>TCAGATCTCATGTCAGAAT<br>CG  | 414      |
| 6915       | CGATTCTGA<br>AACCAGAT<br>CTGA | 7024       | TCAGATCTa<br>aJaTCAGAA<br>TCG | 7133       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCGATCTCG<br>AAACCAGATCTGATGTTCTG<br>GCAATACCTGTGAGATCTaaT<br>aTCAGAATCGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7242       | CGATTCTGAAACCAGATCTT<br>GATGTTCTGGCAATACCTG<br>TCAGATCTAAATATCAGAAT<br>CG | 414      |
| 6916       | AGATCTGA<br>ATCTGGAC<br>TCCG  | 7025       | CGGAGTCCc<br>aGrTTCAGAT<br>CT | 7134       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAGATCTGA<br>ATCTGGACTCCGTGTTCTG<br>GCAATACCTGCGGAGTCCcaG<br>fTTCAGATCTCACGGAGGCT<br>GCCCTGACTGCCACCGGT   | 7243       | AGATCTGAATCCTGGACTC<br>CGTGTCTGGCAATACCTG<br>CGGAGTCCCAGTTTCAGAT<br>CT    | 401      |
| 6917       | GATTCTGAA<br>ACCAGATCT<br>GAA | 7026       | TTCAGATCg<br>cGaTTCAGA<br>ATC | 7135       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGGATCTGA<br>AACAGATCTGAATGTTCTG<br>GCAATACCTGTTCAGATCcgG<br>aTTCAGAATCCACGGAGGCC<br>TGCCCTGACTGCCACCGGT   | 7244       | GATTCTGAAACCAGATCTG<br>AATGTTCTGGCAATACCTG<br>TTCAGATCGCGATTTCAGAA<br>TC  | 413      |
| 6918       | CTTCGATTC<br>TGAAACCA<br>GATC | 7027       | GATCTGGTa<br>aCtGAATCG<br>AAG | 7136       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGGTCCAAAC<br>CTGAACCAGATCTGTTCTG<br>GCAATACCTGGATCTGGTaaC<br>tGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7245       | CTTCGATTTCTGAAACCAGA<br>TCTGTCTGGCAATACCTG<br>GATCTGGTAACTGAATCGA<br>AG   | 417      |
| 6919       | GTCCAAAC<br>GAGTCTCCG<br>TCGC | 7028       | GCGACGGaa<br>tCaCGTTTGG<br>AC | 7137       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGGTCCAAAC<br>GAGTCTCCGTGCTGTTCTG<br>GCAATACCTGGCGACGGaaTc<br>aCGTTTGGACCCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7246       | GTCCAAACGAGTCTCCGTc<br>GCTGTCTGGCAATACCTG<br>GCGACGGAATCACGTTTGG<br>AC    | 60       |

| SEQ ID NO: | guide                           | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                           | SEQ ID NO: | SenLoopAnti.                                                            | targetID |
|------------|---------------------------------|------------|--------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|----------|
| 6920       | AGATCTGA<br>ATCTGGAC<br>TCCG    | 7029       | CGGAGTCCt<br>aGcTTCAGA<br>TCT  | 7138       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTGA<br>ATCTGGACTCCGTGTCTG<br>GCAATACCTGGGAGTCCtaG<br>cTTCAGATCTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT    | 7247       | AGATCTGAATCCTGGACTC<br>CGTGTCTGGCAATACCTG<br>CGGAGTCCTAGCTTCAGAT<br>CT  | 401      |
| 6921       | CTTCGATTCTG<br>TGAAACCA<br>GATC | 7030       | GATCTGGTc<br>aCtGAATCG<br>AAG  | 7139       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>CTGAAACCAAGATCTGTCTG<br>GCAATACCTGGATCTGGTcaC<br>tGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCCCACGGT | 7248       | CTTCGATTCTGAAACCAGA<br>TCTGTCTGGCAATACCTG<br>GATCTGGTCACTGAATCGA<br>AG  | 417      |
| 6922       | CAGATCTG<br>AATCCTGG<br>ACTCC   | 7031       | GGAGTCCAa<br>aAaTTCAGAT<br>CTG | 7140       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>AATCTGGACTCTGTCTG<br>GCAATACCTGGGAGTCCAaaA<br>aTCAGATCTGCACGGAGGCC<br>TGCCCTGACTGCCCCACGGT    | 7249       | CAGATCTGAATCCTGGACT<br>CCTGTCTGGCAATACCTG<br>GGAGTCCAAAAATCAGATC<br>TG  | 402      |
| 6923       | CTTCGATTCTG<br>TGAAACCA<br>GATC | 7032       | GATCTGGTc<br>gCcGAATCG<br>AAG  | 7141       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>CTGAAACCAAGATCTGTCTG<br>GCAATACCTGGATCTGGTgC<br>cGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCCCACGGT  | 7250       | CTTCGATTCTGAAACCAGA<br>TCTGTCTGGCAATACCTG<br>GATCTGGTCCCGAAATCGA<br>AG  | 417      |
| 6924       | GTCCAAAC<br>GAGTCTCCG<br>TCGC   | 7033       | GCGACGGaa<br>tCcCGTTTGG<br>AC  | 7142       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>GAGTCTCCGTCTGTCTG<br>GCAATACCTGGGACGGaaTc<br>gCGTTGGACCCACGGAGGCC<br>TGCCCTGACTGCCCCACGGT     | 7251       | GTCCAAACGAGTCTCCGTc<br>GCTGTCTGGCAATACCTG<br>GCGACGGAATCGCGTTTGG<br>AC  | 60       |
| 6925       | CAGATCTG<br>AATCCTGG<br>ACTCC   | 7034       | GGAGTCCAa<br>cAaTTCAGAT<br>CTG | 7143       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAGATCTG<br>AATCTGGACTCTGTCTG<br>GCAATACCTGGGAGTCCAaaA<br>aTCAGATCTGCACGGAGGCC<br>TGCCCTGACTGCCCCACGGT    | 7252       | CAGATCTGAATCCTGGACT<br>CCTGTCTGGCAATACCTG<br>GGAGTCCAAACAATCAGATC<br>TG | 402      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                          | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|-------------------------------|------------|--------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6926       | CAGATCTG<br>AATCCTGG<br>ACTCC | 7035       | GGAGTCCac<br>aAaTTCAGAT<br>CTG | 7144       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCAGATCTG<br>AATCTGGACTCTCTGTTCTG<br>GCAATACCTGGGAGTCCaAa<br>aTCAGATCTGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7253       | CAGATCTGAATCCTGGACT<br>CCTGTTCTGGCAATACCTG<br>GGAGTCCACAAATCAGATC<br>TG   | 402      |
| 6927       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7036       | TCCAGGATc<br>aAaATCTGG<br>TTT  | 7145       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCAGATCTG<br>TCTGAATCCTGGATGTTCTG<br>GCAATACCTGTCCAGGATaA<br>aATCTGGTTTTCACGGAGGCC<br>GCCCTGACTGCCACCGGT | 7254       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATCAAAATCTGGT<br>TT   | 406      |
| 6928       | CAGATCTG<br>AATCCTGG<br>ACTCC | 7037       | GGAGTCCaA<br>tAaTTCAGAT<br>CTG | 7146       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCAGATCTG<br>AATCTGGACTCTCTGTTCTG<br>GCAATACCTGGGAGTCCaAa<br>aTCAGATCTGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7255       | CAGATCTGAATCCTGGACT<br>CCTGTTCTGGCAATACCTG<br>GGAGTCCAAATATCAGATC<br>TG   | 402      |
| 6929       | AGATCTGA<br>ATCCTGGAC<br>TCCG | 7038       | CGGAGTCCt<br>aGrTTCAGAT<br>CT  | 7147       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCAGATCTGA<br>ATCTGGACTCCGTGTTCTG<br>GCAATACCTGGGAGTCCtaG<br>tTTCAGATCTCACGGAGGCC<br>GCCCTGACTGCCACCGGT  | 7256       | AGATCTGAATCCTGGACTC<br>CGTGTCTGGCAATACCTG<br>CGGAGTCCCTAGTTTCAGAT<br>CT   | 401      |
| 6930       | TCCAAACG<br>AGTCTCCGT<br>CGCC | 7039       | GGCGACGGt<br>cAgTCTTT<br>GGA   | 7148       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAAACG<br>AGTCTCCGTCCCTGTTCTGG<br>CAATACCTGGCGACGGtaAg<br>TCGTTGGACACGGAGGCC<br>GCCCTGACTGCCACCGGT      | 7257       | TCCAAACGAGTCTCCGTCCG<br>CCTGTTCTGGCAATACCTG<br>GGCGACGGTCAGTCTGTTTG<br>GA | 59       |
| 6931       | CCAGATCTG<br>AATCCTGG<br>ACTC | 7040       | GAGTCCAGa<br>cTaCAGATC<br>TGG  | 7149       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAGATCT<br>GAATCTGGACTCTGTTCTG<br>GCAATACCTGGAGTCCAGaA<br>aCAGATCTGGCAGGGGCC<br>TGCCCTGACTGCCACCGGT     | 7258       | CCAGATCTGAATCCTGGAC<br>TCTGTTCTGGCAATACCTG<br>GAGTCCAGACTACAGATCT<br>GG   | 403      |



| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                              | SEQ ID NO: | SenLoopAnti.                                                               | targetID |
|------------|--------------------------------|------------|-------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------------------------------------------------------------|----------|
| 6932       | CAGATCTG<br>AATCCTGG<br>AC'CC  | 7041       | GGAGTCCac<br>tAaTCAGAT<br>C'G | 7150       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCAGATCTG<br>AATCTGGACTCCTGTTC'G<br>GCAATACCTGGGAGTCCAcT<br>aTCAGATCTGCACGGAGGCC<br>TGCCCT'GACTGCCACACGGI'   | 7259       | CAGATCTGAATCCTGGACT<br>CCTGTTCCTGGCAATACCTG<br>GGAGTCCACTAATCAGATC<br>TG   | 402      |
| 6933       | TCCAAACG<br>AGTCTCCGT<br>CGCC  | 7042       | GGCGACGGt<br>tAgTCGTTTG<br>GA | 7151       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGCCAAACG<br>AGTCTCCGTGGCCTGTTC'G<br>CAATACCTGGGCGACGGttAg<br>TCGTTTGGACACGGAGGCCCT<br>GCCCT'GACTGCCACACGGI'  | 7260       | TCCAAACGAGTCTCCGTGG<br>CCTGTTCCTGGCAATACCTG<br>GGCGACGGTTAGTCGTTTG<br>GA   | 59       |
| 6934       | CTTCGATTTC<br>TGAAACCA<br>GATC | 7043       | GATCTGGTc<br>cCaGAATCG<br>AAG | 7152       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACAG<br>CTGAAACAGATCTGTTC'G<br>GCAATACCTGGATCTGGTccC<br>cGAATCGAAGCACGGAGGCC<br>TGCCCT'GACTGCCACACGGI'    | 7261       | CTTCGATTCTGAAACAG<br>TCTGTTCCTGGCAATACCTG<br>GATCTGGTCCCCGAAATCGA<br>AG    | 417      |
| 6935       | AAACCAGA<br>TCTGAATCC<br>TGGA  | 7044       | TCCAGGATg<br>aAaATCTGG<br>TTT | 7153       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGAAACAG<br>TCTGAAATCCTGGATGTTC'G<br>GCAATACCTGTCCAGGATgaA<br>aATCTGGTTTCACGGAGGCCCT<br>GCCCT'GACTGCCACACGGI' | 7262       | AAACCAGATCTGAATCCTG<br>GATGTTCCTGGCAATACCTG<br>TCCAGGATGAAATCTGGT<br>TT    | 406      |
| 6936       | CGATTCTGA<br>AACCAGAT<br>CTGA  | 7045       | TCAGATCTa<br>cTgTCAGAA<br>TCG | 7154       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGGCCCTT<br>AAACCAGATCTGTGTTC'G<br>GCAATACCTGTCTAGATCTacT<br>gTCAGAAATCGCACGGAGGCC<br>TGCCCT'GACTGCCACACGGI'  | 7263       | CGATTCTGAAACAGATCTT<br>GATGTTCCTGGCAATACCTG<br>TCAGATCTACTGTTCAGAAAT<br>CG | 414      |
| 6937       | TGGCCCTTC<br>GATTCTGAA<br>ACC  | 7046       | GGTTTCAGtc<br>TaGAAGGGC<br>CA | 7155       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTGGCCCTT<br>CGAATCTGAAACCTGTTC'G<br>GCAATACCTGGGTTTCAGtcTa<br>GAAGGGCCACACGGAGGCCCT<br>GCCCT'GACTGCCACACGGI'  | 7264       | TGGCCCTTCGATTCTGAAA<br>CCTGTTCCTGGCAATACCTG<br>GGTTTCAGTCTAGAAAGGGC<br>CA  | 422      |

| SEQ ID NO: | guide                          | SEQ ID NO: | passenger                      | SEQ ID NO: | full                                                                                                                                         | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|--------------------------------|------------|--------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6938       | CCACCGAG<br>GAGCCTGA<br>GGGTG  | 7047       | CACCCTCAtt<br>CgCCTCGGT<br>GG  | 7156       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCCACCGAG<br>GAGCCTGAGGGTGTGTCTG<br>GCAATACCTGCACCTCAHcG<br>CCTCGGTGGCAGGAGGCTT<br>GCCCTGACTGCCACCGGT     | 7265       | CCACCGAGGAGCCTGAGGG<br>TGTGTCTTGCCAATACCTG<br>CACCCCTCAITCGCCTCGGT<br>GG  | 757      |
| 6939       | CCACCGAG<br>GAGCCTGA<br>GGGTG  | 7048       | CACCCTCAct<br>cCgCCTCGG<br>TGG | 7157       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCCACCGAG<br>GAGCCTGAGGGTGTGTCTG<br>GCAATACCTGCACCTCAcC<br>gCCTCGGTGGCAGGAGGCC<br>TGCCCTGACTGCCACCGGT     | 7266       | CCACCGAGGAGCCTGAGGG<br>TGTGTCTTGCCAATACCTG<br>CACCCCTCACCCGCCCTCGGT<br>GG | 757      |
| 6940       | CTTCGATTCT<br>TGAAACCA<br>GATC | 7049       | GATCTGGTc<br>cCtGAATCG<br>AAG  | 7158       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCCAGATCT<br>CTGAAACAGATCTGTCTG<br>GCAATACCTGGATCTGGTcC<br>tGAATCGAAGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT    | 7267       | CTTCGATTCTGAAACCCAGA<br>TCTGTCTTGCCAATACCTG<br>GATCTGGTCCCTGGAATCGA<br>AG | 417      |
| 6941       | CCAGATCTG<br>AATCCTGG<br>ACTC  | 7050       | GAGTCCAGa<br>tFaCAGATCT<br>GG  | 7159       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCCAGATCT<br>GAATCTTGGACTCTGTCTG<br>GCAATACCTGGAGTCCAGatT<br>aCAGATCTGGCACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7268       | CCAGATCTGAATCCTGGAC<br>TCTGTCTTGCCAATACCTG<br>GAGTCCAGATTACAGATCT<br>GG   | 403      |
| 6942       | AAACCAGA<br>TCTGAATCC<br>TGGA  | 7051       | TCCAGGATa<br>aAtATCTGGT<br>TT  | 7160       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCCAGA<br>TCTGAATCCTGGATGTCTG<br>GCAATACCTGTCCAGGATaaA<br>tATCTGGTTTCACGGAGGCTT<br>GCCCTGACTGCCACCGGT | 7269       | AAACCAGATCTGAATCCTG<br>GATGTCTTGCCAATACCTG<br>TCCAGGATAAATAATCTGGT<br>TT  | 406      |
| 6943       | CCACCGAG<br>GAGCCTGA<br>GGGTG  | 7052       | CACCCTCAct<br>CgCCTCGGT<br>GG  | 7161       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGCCACCGAG<br>GAGCCTGAGGGTGTGTCTG<br>GCAATACCTGCACCTCAcC<br>gCCTCGGTGGCAGGAGGCC<br>TGCCCTGACTGCCACCGGT     | 7270       | CCACCGAGGAGCCTGAGGG<br>TGTGTCTTGCCAATACCTG<br>CACCCCTCACTCGCCTCGGT<br>GG  | 757      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                         | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|-------------------------------|------------|-------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6944       | CTTCGATTCTGAAACCA<br>GATC     | 7053       | GATCTGGTg<br>gCcGAATCG<br>AAG | 7162       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGCTTCGATT<br>CTGAAACAGATCTGTCTG<br>GCAATACCTGGATCTGGTggC<br>cGAATCGAAGCAGGAGGCC<br>TGCCCTGACTGCCACCGGT     | 7271       | CTTCGATTCTGAAACCCAGA<br>TCTGTCTTGCCAAATACCTG<br>GATCTGGTGGCCGAATCGA<br>AG | 417      |
| 6945       | CCAGATCTG<br>AATCCTGG<br>ACTC | 7054       | GATCCAGa<br>rfCcCAGATCT<br>GG | 7163       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGCTTCGATCT<br>GAATCTTGACTCTGTCTG<br>GCAATACCTGGAGTCCAGaT<br>cCAGATCTGGCAGGAGGCC<br>TGCCCTGACTGCCACCGGT     | 7272       | CCAGATCTGAATCCTGGAC<br>TCTGTCTTGCCAAATACCTG<br>GATCCAGATTCCAGATCT<br>GG   | 403      |
| 6946       | AACGAGTC<br>TCCGTGCGC<br>GTCC | 7055       | GGACGGCGt<br>aGtAGACTC<br>GTT | 7164       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGGAATCTGA<br>TCCGTGCGCGTCTGTCTGG<br>CAATACCTGGGACGGGtaGt<br>AGACTCGTTACGGAGGCC<br>GCCCTGACTGCCACCGGT       | 7273       | AACGAGTCTCCGTGCGCGT<br>CCTGTCTTGCCAAATACCTG<br>GGACGGCGTAGTAGACTCG<br>TT  | 55       |
| 6947       | GATTCTGAA<br>ACCAGATCT<br>GAA | 7056       | TTCAGATCet<br>GaTTCAGAA<br>TC | 7165       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGGAATCTGA<br>AACAGATCTGAATGTCTG<br>GCAATACCTGTTTCAGATCetG<br>aTTCAGAAATCCACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7274       | GATTCTGAAACCCAGATCTG<br>AATGTCTTGCCAAATACCTG<br>TTCAGATCCTGATTCAGAA<br>TC | 413      |
| 6948       | GATTCTGAA<br>ACCAGATCT<br>GAA | 7057       | TTCAGATCg<br>aGaTTCAGA<br>ATC | 7166       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGCTTCGAAAC<br>AACAGATCTGAATGTCTG<br>GCAATACCTGTTTCAGATCgaG<br>aTTCAGAAATCCACGGAGGCC<br>TGCCCTGACTGCCACCGGT | 7275       | GATTCTGAAACCCAGATCTG<br>AATGTCTTGCCAAATACCTG<br>TTCAGATCGAGATTCAGAA<br>TC | 413      |
| 6949       | GTCCAAAC<br>GAGTCTCCG<br>TCGC | 7058       | GCGACGGAc<br>tCaCGTTTGG<br>AC | 7167       | GCCGGCTGCACACCTCCTGG<br>CGGCAGCTGTGCTTCGAAAC<br>GAGTCTCCGTGCTGTCTG<br>GCAATACCTGGCGACGGaCtC<br>aCGTTTGGACCCACGGAGGCC<br>TGCCCTGACTGCCACCGGT  | 7276       | GTCCAAACGAGTCTCCGTG<br>GCTGTCTTGCCAAATACCTG<br>GCGACGGACTCACGTTTGG<br>AC  | 60       |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                        | SEQ ID NO: | SenLoopAnti.                                                             | targetID |
|------------|-------------------------------|------------|-------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------|----------|
| 6950       | TCCGTCGCC<br>GTCTCGTC<br>CCC  | 7059       | GGGACGAt<br>cAgGGCGAC<br>GGA  | 7168       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCGTGCGC<br>CGTCTCGTCCCTGTCTGG<br>CAATACCTGGGGACGAtcAg<br>GGCGACGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 7277       | TCCGTCGCCGTCTCTGTCCC<br>CTGTCTGGCAATACCTGG<br>GGGACGATCAGGGCGACG<br>GA   | 47       |
| 6951       | TCCGTCGCC<br>GTCTCGTC<br>CCC  | 7060       | GGGACGAt<br>tAgGGCGAC<br>GGA  | 7169       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCGTGCGC<br>CGTCTCGTCCCTGTCTGG<br>CAATACCTGGGGACGAtcAg<br>GGCGACGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT   | 7278       | TCCGTCGCCGTCTCTGTCCC<br>CTGTCTGGCAATACCTGG<br>GGGACGATCAGGGCGACG<br>GA   | 47       |
| 6952       | AACGAGTC<br>TCCGTCGCC<br>GTCC | 7061       | GGACGGCGt<br>aGaAGACTC<br>GTT | 7170       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAAACG<br>TCCGTCCCGTCTCTGTCTGG<br>CAATACCTGGGACGGCGtaGa<br>AGACTCGTTACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7279       | AACGAGTCCTCCGTGCGCGT<br>CTGTCTGGCAATACCTG<br>GGACGGCGTAGAAGACTCG<br>TT   | 55       |
| 6953       | TCCAAACG<br>AGTCTCCGT<br>CGCC | 7062       | GGCGACGGt<br>tAaTCGTTTG<br>GA | 7171       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAAACG<br>AGTCTCCGTCCCTGTCTGG<br>CAATACCTGGGCGACGGttAa<br>TCGTTTGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7280       | TCCAAACGAGTCTCCGTGCG<br>CTGTCTGGCAATACCTG<br>GGCGACGGTTAATCGTTTG<br>GA   | 59       |
| 6954       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7063       | TCCAGGATa<br>aAaATCTGG<br>TTT | 7172       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCAGA<br>TCTGAATCTCTGGATGTTCTG<br>GCAATACCTGTCCAGGATaaA<br>aATCTGGTTACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 7281       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATAAAAAATCTGGT<br>TT | 406      |
| 6955       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7064       | TCCAGGATa<br>gAaATCTGG<br>TTT | 7173       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCAGA<br>TCTGAATCTCTGGATGTTCTG<br>GCAATACCTGTCCAGGATagA<br>aATCTGGTTACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 7282       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATAGAAATCTGGT<br>TT  | 406      |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                          | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|-------------------------------|------------|-------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6956       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7065       | TCCAGGATg<br>gAaATCTGG<br>TTT | 7174       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCAGA<br>TCTGAATCCTGGATGTTCTG<br>GCAATACCTGTCCAGGATgga<br>aATCTGGTTTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7283       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATGGAATCTGGT<br>TT    | 406      |
| 6957       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7066       | TCCAGGATc<br>aAtATCTGGT<br>TT | 7175       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCAGA<br>TCTGAATCCTGGATGTTCTG<br>GCAATACCTGTCCAGGATcaA<br>tATCTGGTTTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7284       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATCAATATCTGGT<br>TT   | 406      |
| 6958       | AACGAGTC<br>TCCGTGCCC<br>GTCC | 7067       | GGACGGCGt<br>gGaAGACTC<br>GTT | 7176       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGACCAGATCT<br>TCCGTGCGCGTCTGTTCTGG<br>CAATACCTGGGACGGCGtgGa<br>AGACTCGTTTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT | 7285       | AACGAGTCTCCGTGCGCGT<br>CCTGTTCTGGCAATACCTG<br>GGACGGCGTGGAGACTCG<br>TT    | 55       |
| 6959       | CCAGATCTG<br>AATCCTGG<br>ACTC | 7068       | GAGTCCAGtt<br>TaCAGATCT<br>GG | 7177       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGACCAGATCT<br>GAATCCTGGACTCTGTTCTG<br>GCAATACCTGGAGTCCAGttA<br>CAGATCTGGCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7286       | CCAGATCTGAATCCTGGAC<br>TCTGTTCTGGCAATACCTG<br>GAGTCCAGTTTACAGATCT<br>GG   | 403      |
| 6960       | AAACCAGA<br>TCTGAATCC<br>TGGA | 7069       | TCCAGGATc<br>gAaATCTGG<br>TTT | 7178       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGAAACCAGA<br>TCTGAATCCTGGATGTTCTG<br>GCAATACCTGTCCAGGATgga<br>aATCTGGTTTCACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7287       | AAACCAGATCTGAATCCTG<br>GATGTTCTGGCAATACCTG<br>TCCAGGATCGAAATCTGGT<br>TT   | 406      |
| 6961       | TCCGTGCCC<br>GTCTCTGTC<br>CCC | 7070       | GGGGACGA<br>atAgGGCGA<br>CGGA | 7179       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCTGTCGC<br>CGTCTCTGTCCTCTGTTCTGG<br>CAATACCTGGGGACGAatAg<br>GGCGACGGACACGGAGGCCT<br>GCCCTGACTGCCACCGGT  | 7288       | TCCGTGCGCGTCTCTGTCCTG<br>CTGTTCTGGCAATACCTGG<br>GGGACGAATAGGGCGGACG<br>GA | 47       |

| SEQ ID NO: | guide                         | SEQ ID NO: | passenger                     | SEQ ID NO: | full                                                                                                                                           | SEQ ID NO: | SenLoopAnti.                                                              | targetID |
|------------|-------------------------------|------------|-------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------|----------|
| 6962       | TCCAAACG<br>AGTCTCCGT<br>CGCC | 7071       | GGCGACGGc<br>tAgTCGTTTG<br>GA | 7180       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAAACG<br>AGTCTCCGTGCGCTGTTCCTGG<br>CAATACCTGGGCGACGGcAg<br>TCGTTTGGACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT  | 7289       | TCCAAACGAGTCTCCGTGCG<br>CCTGTTCCTGGCAATACCTG<br>GGCGACGGCTAGTCGTTTG<br>GA | 59       |
| 6963       | TCCAAACG<br>AGTCTCCGT<br>CGCC | 7072       | GGCGACGGt<br>aAgTCGTTT<br>GGA | 7181       | GCCGGCTGCACACCTCCTGG<br>CGGGCAGCTGTGTCCAAACG<br>AGTCTCCGTGCGCTGTTCCTGG<br>CAATACCTGGGCGACGGtaAg<br>TCGTTTGGACACGGAGGCCCT<br>GCCCTGACTGCCACCGGT | 7290       | TCCAAACGAGTCTCCGTGCG<br>CCTGTTCCTGGCAATACCTG<br>GGCGACGGTAAGTCGTTTG<br>GA | 59       |

Brief Description of the Drawings

**FIG. 1** shows a schematic of knockdown of DUX4 mRNA.

**FIG. 2** is a schematic of lentiviral constructs used to screen miRNAs.

**FIG. 3** is a graph of FACS sorting of positive and negative populations with miRNA sequences.

**FIG. 4** is a graph showing top miRNA sequences based on enrichment.

**FIG. 5A-B** show graphs of DUX4 expression of DUX4 and DUX4 downstream gene hZSCAN4 in FSHD patient myotubes transduced with miRNA candidates.

**FIG. 6A-D** show graphs of DUX4 and DUX4 target gene expression in patient myotubules following lead candidate transduction.

**FIG. 7A-B** show volcano plots of RNAseq results of off-targets by candidate miRNAs in human primary myotubes.

**FIG. 8A-6B** are graphs of skeletal muscle mRNA and liver capsid DNA expression following MyoAAV administration to non-human primates (NHPs).

**FIG. 9** shows immunofluorescent imaging of bicep tissue following MyoAAV administration to non-human primates (NHPs).

**FIG. 10** shows a study design in mice after injection with a candidate miRNA.

**FIG. 11** shows a graph of FSHD composite gene expression following tamoxifen induced DUX4 expression and administration of vehicle and a lead candidate.

**FIG. 12A-B** show graphs of DUX4 and mKif4 expression in mouse triceps following administration of candidate miRNA sequence.

**FIG. 13** shows images of muscle degeneration in mice following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate. Arrows show area of active degeneration.

**FIG. 14A-B** show graphs of results from treadmill assessments of mice following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate.

**FIG. 15** shows a study design in older mice after injection with a candidate miRNA.

**FIG. 16** shows a graph of FSHD composite gene expression following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate.

**FIG. 17** shows images of muscle degeneration in mice following administration of vehicle and the lead candidate. Arrows show area of active degeneration.

### Detailed Description

The present invention provides novel nucleic acid molecules and methods that result in changes to expression of DUX4 that result in treatment of FSHD. Nucleic acid molecules of the invention comprise an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript. By targeting DUX4 transcripts, the nucleic acid molecules of the invention result in an appropriate expression profile for the DUX4 gene.

### Adeno Associated Virus Vector

AAVs are particularly appropriate viral vectors for delivery of genetic material into mammalian cells. AAVs are not known to cause disease in mammals and cause a very mild immune response. Additionally, AAVs are able to infect cells in multiple stages whether at rest or in a phase of the cell replication cycle. Advantageously, AAV DNA is not regularly inserted into the host's genome at random sites, reducing the oncogenic properties of this vector.

AAVs have been engineered to deliver a variety of treatments, especially for genetic disorders caused by single nucleotide polymorphisms ("SNP"). Genetic diseases that have been studied in conjunction with AAV vectors include Cystic fibrosis, hemophilia, arthritis, macular degeneration, muscular dystrophy, Parkinson's disease, congestive heart failure, and Alzheimer's disease. The AAV can be used as a vector to deliver engineered nucleic acid to a host and utilize the host's own ribosomes to transcribe that nucleic acid into the desired proteins. See, e.g., West et al., Virology 160:38-47 (1987); U.S. Pat. No. 4,797,368; WO 93/24641; Kotin, Human Gene Therapy 5:793-801 (1994); and Muzyczka, J. Clin. Invest. 94:1351 (1994). AAVs have some deficiency in their replication and/or pathogenicity and thus can be safer than adenoviral vectors. In some embodiments, the AAV can integrate into a specific site on chromosome 19 of a human cell with no observable side effects. In some embodiments, the capacity of the AAV vector, system thereof, and/or AAV particles can be up to about 4.7 kb. The AAV vector or system thereof can include one or more engineered capsid polynucleotides described herein.

AAVs are small, replication-defective, nonenveloped viruses that infect humans and other primate species and have a linear single-stranded DNA genome. Naturally occurring AAV serotypes exhibit liver tropism. As a result, transfection of non-liver tissue with traditional AAV vectors is impeded by the virus's natural liver tropism. Moreover, because the liver acts to break



down substances delivered to a subject, transfection of non-liver tissue with unmodified AAV vectors requires higher dosing to provide sufficient viral load to overcome the liver and reach non-liver tissue. More than 30 naturally occurring serotypes of AAV are available. Many natural variants in the AAV capsid exist. AAV serotypes include, but are not limited to, AAV serotypes  
5 AAV1, AAV2, AAV3, AAV3B, AAV4, AAV5, AAV6, AAV7, AAV8, AAV9, AAV10, AAV11, AAV 12, AAV13. AAVs may be engineered using conventional molecular biology techniques, making it possible to optimize these particles, for example, for cell specific delivery, for minimizing immunogenicity, for tuning stability and particle lifetime, for efficient degradation, for accurate delivery to the nucleus. AAV vectors can be specifically targeted to one  
10 or more types of cells by choosing the appropriate combination of AAV serotype, promoter, and delivery method.

Previous approaches to identify AAV sequences correlated with tropism have relied upon the comparison of highly related extant serotypes with distinct characteristics, random domain swaps between unrelated serotypes, or consideration of higher-order structure, to identify motifs  
15 that define liver tropism. For example, mapping determinants of AAV tropism have been carried out by comparing highly related serotypes. One such example is the single-amino acid change (E531K) between AAV1 and AAV6 that improves murine liver transduction in AAV1. See Wu et al. (2006) J. Virol., 80(22):11393-7, incorporated by reference herein. Another example is a reciprocal domain swap between AAV2 and AAV8 that alters tropism, but fails to define any  
20 robust specific tissue-targeting motifs. See Raupp et al. (201) J. Virol., 86(17):9396-408, incorporated by reference herein. Further, global consideration of structure has only highlighted gross differences between better- or worse-liver-transducers that are more observational than useful in practice. Nam et al (2007) J. Virol., 81(22):12260-71.

AAVs exhibiting modified tissue tropism that may be used with the present invention are  
25 described in U.S. Patent No. 9,695,220, U.S. Patent No. 9,719,070; U.S. Patent No. 10,119,125; U.S. Patent No. 10,526,584; U.S. Patent Application Publication No. 2018-0369414; U.S. Patent Application Publication No. 2020-0123504; U.S. Patent Application Publication No. 2020-0318082; PCT International Patent Application Publication No. WO 2015/054653; PCT International Patent Application Publication No. WO 2016/179496; PCT International Patent  
30 Application Publication No. WO 2017/100791; and PCT International Patent Application

Publication No. WO 2019/217911, the entirety of the contents of each of which are incorporated by reference herein.

The AAV vector or system thereof may include one or more regulatory molecules, such as promoters, enhancers, repressors and the like. In some embodiments, the AAV vector or system thereof can include one or more polynucleotides that can encode one or more regulatory proteins. In some embodiments, the one or more regulatory proteins can be selected from Rep78, Rep68, Rep52, Rep40, variants thereof, and combinations thereof. In some embodiments, the muscle specific promoter can drive expression of an engineered AAV capsid polynucleotide.

The AAV vector or system thereof can include one or more polynucleotides that can encode one or more capsid proteins, such as the engineered AAV capsid proteins described elsewhere herein. The engineered capsid proteins can be capable of assembling into a protein shell (an engineered capsid) of the AAV virus particle. The engineered capsid can have a cell-, tissue-, and/or organ-specific tropism.

The AAV vector or system thereof can be configured to produce AAV particles having a specific serotype. In some embodiments, the serotype can be AAV-1, AAV-2, AAV-3, AAV-4, AAV-5, AAV-6, AAV-8, AAV-9 or any combinations thereof. In some embodiments, the AAV can be AAV1, AAV-2, AAV-5, AAV-9 or any combination thereof. One can select the AAV of the AAV with regard to the cells to be targeted; e.g., one can select AAV serotypes 1, 2, 5, 9 or a hybrid capsid AAV-1, AAV-2, AAV-5, AAV-9 or any combination thereof for targeting brain and/or neuronal cells; and one can select AAV-4 for targeting cardiac tissue; and one can select AAV-8 for delivery to the liver. Thus, in some embodiments, an AAV vector or system thereof capable of producing AAV particles capable of targeting the brain and/or neuronal cells can be configured to generate AAV particles having serotypes 1, 2, 5 or a hybrid capsid AAV-1, AAV-2, AAV-5 or any combination thereof. In some embodiments, an AAV vector or system thereof capable of producing AAV particles capable of targeting cardiac tissue can be configured to generate an AAV particle having an AAV-4 serotype. In some embodiments, an AAV vector or system thereof capable of producing AAV particles capable of targeting the liver can be configured to generate an AAV having an AAV-8 serotype. See also Srivastava. 2017. Curr. Opin. Virol. 21:75-80.

It will be appreciated that while the different serotypes can provide some level of cell, tissue, and/or organ specificity, each serotype still is multi-tropic and thus can result in tissue-

toxicity if using that serotype to target a tissue that the serotype is less efficient in transducing. Thus, in addition to achieving some tissue targeting capacity via selecting an AAV of a particular serotype, it will be appreciated that the tropism of the AAV serotype can be modified by an engineered AAV capsid described herein. As described elsewhere herein, variants of wild-type

5 AAV of any serotype can be generated via a method described herein and determined to have a particular cell-specific tropism, which can be the same or different as that of the reference wild-type AAV serotype. In some embodiments, the cell, tissue, and/or specificity of the wild-type serotype can be enhanced (e.g., made more selective or specific for a particular cell type that the serotype is already biased towards). For example, wild-type AAV-9 is biased towards muscle

10 and brain in humans (see e.g., Srivastava. 2017. Curr. Opin. Virol. 21:75-80.) By including an engineered AAV capsid and/or capsid protein variant of wild-type AAV-9 as described herein, the tropism for nervous cells might be reduced or eliminated and/or the muscle specificity increased such that the nervous specificity appears reduced in comparison, thus enhancing the specificity for muscle as compared to the wild-type AAV-9. As previously mentioned, inclusion

15 of an engineered capsid and/or capsid protein variant of a wild-type AAV serotype can have a different tropism than the wild-type reference AAV serotype. For example, an engineered AAV capsid and/or capsid protein variant of AAV-9 can have specificity for a tissue other than muscle or brain in humans.

In some embodiments, the AAV vector is a hybrid AAV vector or system thereof. Hybrid

20 AAVs are AAVs that include genomes with elements from one serotype that are packaged into a capsid derived from at least one different serotype. For example, if it is the rAAV2/5 that is to be produced, and if the production method is based on the helper-free, transient transfection method discussed above, the 1st plasmid and the 3rd plasmid (the adeno helper plasmid) will be the same as discussed for rAAV2 production. However, the 2nd plasmid, the pRepCap will be different. In

25 this plasmid, called pRep2/Cap5, the Rep gene is still derived from AAV2, while the Cap gene is derived from AAV5. The production scheme is the same as the above-mentioned approach for AAV2 production. The resulting rAAV is called rAAV2/5, in which the genome is based on recombinant AAV2, while the capsid is based on AAV5. It is assumed the cell or tissue-tropism displayed by this AAV2/5 hybrid virus should be the same as that of AAV5. It will be

30 appreciated that wild-type hybrid AAV particles suffer the same specificity issues as with the non-hybrid wild-type serotypes previously discussed.

Advantages achieved by the wild-type based hybrid AAV systems can be combined with the increased and customizable cell-specificity that can be achieved with the engineered AAV capsids can be combined by generating a hybrid AAV that can include an engineered AAV capsid described elsewhere herein. It will be appreciated that hybrid AAVs can contain an engineered AAV capsid containing a genome with elements from a different serotype than the reference wild-type serotype that the engineered AAV capsid is a variant of. For example, a hybrid AAV can be produced that includes an engineered AAV capsid that is a variant of an AAV-9 serotype that is used to package a genome that contains components (e.g., rep elements) from an AAV-2 serotype. As with wild-type based hybrid AAVs previously discussed, the tropism of the resulting AAV particle will be that of the engineered AAV capsid.

In some embodiments, the AAV vector or system thereof is configured as a “gutless” vector, similar to that described in connection with a retroviral vector. In some embodiments, the “gutless” AAV vector or system thereof can have the cis-acting viral DNA elements involved in genome amplification and packaging in linkage with the heterologous sequences of interest (e.g., the engineered AAV capsid polynucleotide(s)).

The vectors described herein can be constructed using any suitable process or technique. In some embodiments, one or more suitable recombination and/or cloning methods or techniques can be used to the vector(s) described herein. Suitable recombination and/or cloning techniques and/or methods can include, but not limited to, those described in U.S. Application publication No. US 2004-0171156 A1. Other suitable methods and techniques are described elsewhere herein.

Construction of recombinant AAV vectors are described in a number of publications, including U.S. Pat. No. 5,173,414; Tratschin et al., Mol. Cell. Biol. 5:3251-3260 (1985); Tratschin, et al., Mol. Cell. Biol. 4:2072-2081 (1984); Hermonat & Muzyczka, PNAS 81:6466-6470 (1984); and Samulski et al., J. Virol. 63:03822-3828 (1989). Any of the techniques and/or methods can be used and/or adapted for constructing an AAV or other vector described herein. AAV vectors are discussed elsewhere herein.

In some embodiments, the vector can have one or more insertion sites, such as a restriction endonuclease recognition sequence (also referred to as a “cloning site”). In some embodiments, one or more insertion sites (e.g., about or more than about 1, 2, 3, 4, 5, 6, 7, 8, 9,

10, or more insertion sites) are located upstream and/or downstream of one or more sequence elements of one or more vectors.

Delivery vehicles, vectors, particles, nanoparticles, formulations and components thereof for expression of one or more elements of a engineered AAV capsid system described herein are  
5 as used in the foregoing documents, such as International Patent Application Publications WO 2021/050974 and WO 2021/077000 and PCT International Application No. PCT/US2021/042812, the contents of which are incorporated by reference herein.

Additional AAV vectors are described in International Patent Application Publication WO 2019/2071632, the contents of which are incorporated by reference herein.

10 Further AAV vectors are described in International Patent Application Publications WO 2020/086881 and WO 2020/235543, the contents of each of which are incorporated by reference herein.

Further AAV vectors are described in International Patent Application Publications WO 2005/033321; WO 2006/110689; WO 2007/127264; WO 2008/027084; WO 2009/073103; WO  
15 2009/073104; WO 2009/105084; WO 2009/134681; WO 2009/136977; WO 2010/051367; WO 2010/138675; WO 2001/038187; WO 2012/112832; WO 2015/054653; WO 2016/179496; WO 2017/100791; WO 2017/019994; WO 2018/209154; WO 2019/067982; WO 2019/195701; WO 2019/217911; WO 2020/041498; WO 2020/210839; U.S. Patent No. 7,906,111; U.S. Patent No. 9,737,618; U.S. Patent No. 10,265,417; U.S. Patent No. 10,485,883; U.S. Patent No. 10,695,441;  
20 U.S. Patent No. 10,722,598; U.S. Patent No. 8,999,678; U.S. Patent No. 10,301,648; U.S. Patent No. 10,626,415; U.S. Patent No. 9,198,984; U.S. Patent No. 10,155,931; U.S. Patent No. 8,524,219; U.S. Patent No. 9,206,238; U.S. Patent No. 8,685,387; U.S. Patent No. 9,359,618; U.S. Patent No. 8,231,880; U.S. Patent No. 8,470,310; U.S. Patent No. 9,597,363; U.S. Patent No. 8,940,290; U.S. Patent No. 9,593,346; U.S. Patent No. 10,501,757; U.S. Patent No.  
25 10,786,568; U.S. Patent No. 10,973,928; U.S. Patent No. 10,519,198; U.S. Patent No. 8,846,031; U.S. Patent No. 9,617,561; U.S. Patent No. 9,884,071; U.S. Patent No. 10,406,173; U.S. Patent No. 9,596,220; U.S. Patent No. 9,719,010; U.S. Patent No. 10,117,125; U.S. Patent No. 10,526,584; U.S. Patent No. 10,881,548; U.S. Patent No. 10,738,087; U.S. Patent Publication No. 2011-023353; U.S. Patent Publication No. 2019-0015527; U.S. Patent Publication No. 2020-  
30 155704; U.S. Patent Publication No. 2017-0191079; U.S. Patent Publication No. 2019-0218574; U.S. Patent Publication No. 2020-0208176; U.S. Patent Publication No. 2020-0325491; U.S.

Patent Publication No. 2019-0055523; U.S. Patent Publication No. 2020-0385689; U.S. Patent Publication No. 2009-0317417; U.S. Patent Publication No. 2016-0051603; U.S. Patent Publication No. 2016-00244783; U.S. Patent Publication No. 2017-0183636; U.S. Patent Publication No. 2020-0263201; U.S. Patent Publication No. 2020-0101099; U.S. Patent  
5 Publication No. 2020-0318082; U.S. Patent Publication No. 2018-0369414; U.S. Patent Publication No. 2019-0330278; U.S. Patent Publication No. 2020-0231986, the contents of each of which are incorporated by reference herein.

Promoter

10 The invention may contain a muscle specific promoter or another promoter. The promoter may be linked to the nucleic acid sequence so that the transcription preferably occurs within myocytes. Promoter regions enable the host cells to replicate the AAV delivered nucleic acid only in those cell types and tissues or organs in which the desired protein should be created. Here, the muscle specific promoter is included because it is principally desired that the proteins  
15 only be translated in myocytes. Specificity of the cell type into which the nucleic acid is delivered and thus the proteins translated is desired because of the adverse effects that may ensue from delivering the nucleic acid and having it translated in cells in which that nucleic acid and thus protein is not needed.

The myocyte specific promoter may be coupled or otherwise associated with a truncated  
20 DUX4 sequence. In some embodiments, the promoter may be directly attached, and in others there may be a linker molecule or another indirect coupling method to attach to the truncated DUX4 sequence. In some embodiments, there may be an associated polypeptide or other particle that is coupled to the truncated DUX4 sequence.

In some embodiments, the muscle specific promoter yields increased muscle cell  
25 potency, muscle cell specificity, reduced immunogenicity, or any combination thereof. As used herein the terms “muscle-specific”, “muscle cell specificity”, “muscle cell potency,” “myocyte specific” and the like, refer to the increased specificity, selectivity, or potency, of the muscle-specific targeting moieties and compositions incorporating said muscle-specific targeting moieties of the present invention for myocytes relative to non-muscle cells. In some  
30 embodiments, the cell specificity, or selectivity, or potency, or a combination thereof of a muscle-specific targeting moiety or composition incorporating a muscle-specific targeting

moiety described herein is at least 2 to at least 500 times more specific, selective, and/or potent for/in a muscle cell relative to a non-muscle cell.

In some embodiments, the myocyte-selective promoter utilized is MHCK7. MHCK7 is a 770 base pair length promoter that is small enough to be included in an AAV vector. MHCK7  
5 directs expression in fast and slow skeletal and cardiac muscle, with low expression in the liver, lung, and spleen. It is less active in smooth muscle. The MHCK7 promoter is associated with high levels of expression in skeletal muscles, including the diaphragm, and includes an enhancer to especially drive expression in the heart, whereas expression in off-target tissues is minimal.

In some embodiments, the promoters described herein are inserted into an AAV protein  
10 (e.g., an AAV capsid protein) that has reduced specificity (or no detectable, measurable, or clinically relevant interaction) for one or more non-muscle cell types. Exemplary non-muscle cell types include, but are not limited to, liver, kidney, lung, heart, spleen, central or peripheral nervous system cells, bone, immune, stomach, intestine, eye, skin cells and the like. In some embodiments, the non-muscle cells are liver cells.

15 The term “operably linked” refers to the association of two or more nucleic acid molecules on a single nucleic acid fragment so that the function of one is affected by the other.

Further exemplary tissue specific promoters include U6 promoter sequence, MHCK7 promoter sequence, CK6 promoter sequence, tMCK promoter sequence, CK5 promoter sequence, MCK promoter sequence, HAS promoter sequence, MPZ promoter sequence, desmin  
20 promoter sequence, APOA2 promoter sequence, hAAT promoter sequence, INS promoter sequence, IRS2 promoter sequence, MYH6 promoter sequence, MYL2 promoter sequence, TNNI3 promoter sequence, SYN1 promoter sequence, GFAP promoter sequence, NES promoter sequence, MBP promoter sequence, or TH promoter sequence.

Muscle specific promoters are described in International Patent Application Publications  
25 WO 2020/006458 and WO 2021/126880, the contents of each of which are incorporated by reference herein.

Further muscle specific promoters are described in U.S. Patent No. 9,133,482; U.S. Patent No. 10,105,453; U.S. Patent No. 10,301,367; U.S. Patent Publication No. 2020-0360534; PCT International Patent Publication Nos. WO 2020/006458; WO 2021/035120; WO  
30 2021/053124; and WO 2021/077000, the contents of each of which are incorporated by reference herein.

It may be convenient to use an RNA polymerase II or III promoter; these are known to the person skilled in the art and reviewed in e.g. Kornberg 1999. However, transcripts from an RNA II polymerase often have complex transcription terminators and transcripts are polyadenylated; this may hamper with the requirements of the miRNA strand which because both its 5' and 3' ends need to be precisely defined in order to achieve the required secondary structure to produce a functional molecule. These drawbacks can however be circumvented. In case an RNA polymerase II or III promoter is used, the polynucleotide encoding the miRNA strand may also encode self-processing ribozymes and may be operably linked to an RNA polymerase II or III promoter; as such the polynucleotide encodes a pre- miRNA strand comprising the miRNA strand and self-processing ribozymes, wherein, when transcribed, the miRNA strand is released by the self-processing ribozymes from the pre- miRNA strand de transcript.

Preferably, in a composition according to the present invention the AAV vector is comprised of an RNA polymerase II promoter or III promoter, and encodes a pre- miRNA strand comprising the miRNA strand and self-processing ribozymes, wherein, when transcribed, the miRNA strand is released by the self-processing ribozymes from the pre- miRNA strand transcript. Conveniently, multiple pre-miRNA strands and multiple self-processing ribozymes may be encoded by a single polynucleotide, operably linked to one or more RNA polymerase II promoters.

RNA polymerase II or III promoters that are inducible and/or tissue-specific have been previously described. RNA polymerase promoters are known in the art and further described in U.S. Patent Publication 11,149,288, the contents of which is incorporated by reference herein.

#### Capsid Protein

The capsid protein is the shell or coating of the virus that enables its delivery into the host. Without the protein, the nucleic acids would be destroyed by the host without entering into the host cells and beginning transcription and translation. The capsid protein may be in the natural conformation of a naturally occurring AAV, or it may be modified.

In certain example embodiments, the AAV capsid protein is an engineered AAV capsid protein having reduced or eliminated uptake in a non-muscle cell as compared to a corresponding



wild-type AAV capsid polypeptide, for example an AAV9 capsid polypeptide described in SEQ ID NO: 1.

In some embodiments, the engineered AAV capsid encoding polynucleotide can be included in a polynucleotide that is configured to be an AAV genome donor in an AAV vector system that can be used to generate engineered AAV particles described elsewhere herein. In some embodiments, the engineered AAV capsid encoding polynucleotide can be operably coupled to a poly adenylation tail. In some embodiments, the poly adenylation tail can be an SV40 poly adenylation tail. In some embodiments, the AAV capsid encoding polynucleotide can be operably coupled to a promoter. In some embodiments, the promoter can be a tissue specific promoter. In some embodiments, the tissue specific promoter is specific for muscle (e.g., cardiac, skeletal, and/or smooth muscle), neurons and supporting cells (e.g., astrocytes, glial cells, Schwann cells, etc.), fat, spleen, liver, kidney, immune cells, spinal fluid cells, synovial fluid cells, skin cells, cartilage, tendons, connective tissue, bone, pancreas, adrenal gland, blood cell, bone marrow cells, placenta, endothelial cells, and combinations thereof. In some embodiments, the promoter can be a constitutive promoter. Suitable tissue specific promoters and constitutive promoters are discussed elsewhere herein and are generally known in the art and can be commercially available. Suitable muscle specific promoters include, but are not limited to CK8, MHCK7, Myoglobin promoter (Mb), Desmin promoter, muscle creatine kinase promoter (MCK) and variants thereof, and SPc5-12 synthetic promoter.

Described herein are various embodiments of engineered viral capsids, such as adeno-associated virus (AAV) capsids, that can be engineered to confer cell-specific tropism, such as muscle specific tropism, to an engineered viral particle. Engineered viral capsids can be lentiviral, retroviral, adenoviral, or AAV capsids. The engineered capsids can be included in an engineered virus particle (e.g., an engineered lentiviral, retroviral, adenoviral, or AAV virus particle), and can confer cell-specific tropism, reduced immunogenicity, or both to the engineered viral particle. The engineered viral capsids described herein can include one or more engineered viral capsid proteins described herein. The engineered viral capsids described herein can include one or more engineered viral capsid proteins described herein that can contain a muscle-specific targeting moiety containing or composed of an n-mer motif described elsewhere herein.

The engineered viral capsid and/or capsid proteins can be encoded by one or more engineered viral capsid polynucleotides. In some embodiments, the engineered viral capsid polynucleotide is an engineered AAV capsid polynucleotide, engineered lentiviral capsid polynucleotide, engineered retroviral capsid polynucleotide, or engineered adenovirus capsid polynucleotide. In some embodiments, an engineered viral capsid polynucleotide (e.g., an engineered AAV capsid polynucleotide, engineered lentiviral capsid polynucleotide, engineered retroviral capsid polynucleotide, or engineered adenovirus capsid polynucleotide) can include a 3' polyadenylation signal. The polyadenylation signal can be an SV40 polyadenylation signal.

The engineered viral capsids can be variants of wild-type viral capsid. For example, in some embodiments, the engineered AAV capsids can be variants of wild-type AAV capsids. In some embodiments, the wild-type AAV capsids can be composed of VP1, VP2, VP3 capsid proteins or a combination thereof. In other words, the engineered AAV capsids can include one or more variants of a wild-type VP1, wild-type VP2, and/or wild-type VP3 capsid proteins. In some embodiments, the serotype of the reference wild-type AAV capsid can be AAV-1, AAV-2, AAV-3, AAV-4, AAV-5, AAV-6, AAV-8, AAV-9 or any combination thereof. In some embodiments, the serotype of the wild-type AAV capsid can be AAV-9. The engineered AAV capsids can have a different tropism than that of the reference wild-type AAV capsid.

The engineered viral capsid can contain 1-60 engineered capsid proteins. In some embodiments, the engineered viral capsids can contain 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, or 60 engineered capsid proteins. In some embodiments, the engineered viral capsid can contain 0-59 wild-type viral capsid proteins. In some embodiments, the engineered viral capsid can contain 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, or 59 wild-type viral capsid proteins.

In some embodiments, the engineered AAV capsid can contain 1-60 engineered capsid proteins. In some embodiments, the engineered AAV capsids can contain 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, or 60 engineered capsid proteins. In some embodiments, the engineered AAV capsid can contain 0-59

wild-type AAV capsid proteins. In some embodiments, the engineered AAV capsid can contain 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, or 59 wild-type AAV capsid proteins.

5 In some embodiments, the engineered viral capsid protein can have an *n*-mer amino acid motif, where *n* can be at least 3 amino acids. In some embodiments, *n* can be 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15 amino acids. In some embodiments, an engineered AAV capsid can have a 6-mer or 7-mer amino acid motif. In some embodiments, the *n*-mer amino acid motif can be inserted between two amino acids in the wild-type viral protein (VP) (or capsid protein). In  
10 some embodiments, the *n*-mer motif can be inserted between two amino acids in a variable amino acid region in a viral capsid protein.

In some embodiments, the *n*-mer motif can be inserted between two amino acids in a variable amino acid region in an AAV capsid protein. The core of each wild-type AAV viral protein contains an eight-stranded beta-barrel motif (betaB to betaI) and an alpha-helix (alphaA)  
15 that are conserved in autonomous parvovirus capsids (see e.g., DiMattia et al. 2012. J. Virol. 86(12):6947-6958). Structural variable regions (VRs) occur in the surface loops that connect the beta-strands, which cluster to produce local variations in the capsid surface. AAVs have 12 variable regions (also referred to as hypervariable regions) (see e.g., Weitzman and Linden. 2011. "Adeno-Associated Virus Biology." In Snyder, R.O., Moullier, P. (eds.) Totowa, NJ:  
20 Humana Press). In some embodiments, one or more *n*-mer motifs can be inserted between two amino acids in one or more of the 12 variable regions in the wild-type AAV capsid proteins. In some embodiments, the one or more *n*-mer motifs can be each be inserted between two amino acids in VR-I, VR-II, VR-III, VR-IV, VR-V, VR-VI, VR-VII, VR-III, VR-IX, VR-X, VR-XI, VR-XII, or a combination thereof. In some embodiments, the *n*-mer can be inserted between two  
25 amino acids in the VR-III of a capsid protein. In some embodiments, the engineered capsid can have an *n*-mer inserted between any two contiguous amino acids between amino acids 262 and 269, between any two contiguous amino acids between amino acids 327 and 332, between any two contiguous amino acids between amino acids 382 and 386, between any two contiguous amino acids between amino acids 452 and 460, between any two contiguous amino acids  
30 between amino acids 488 and 505, between any two contiguous amino acids between amino acids 545 and 558, between any two contiguous amino acids between amino acids 581 and 593,

between any two contiguous amino acids between amino acids 704 and 714 of an AAV9 viral protein. In some embodiments, the engineered capsid can have an *n*-mer inserted between amino acids 588 and 589 of an AAV9 viral protein. In some embodiments, the engineered capsid can have a 7-mer motif inserted between amino acids 588 and 589 of an AAV9 viral protein. In other  
5   embodiments, the motif inserted is a 10-mer motif, with replacement of amino acids 586-88 and an insertion before 589. It will be appreciated that *n*-mers can be inserted in analogous positions in AAV viral proteins of other serotypes. In some embodiments as previously discussed, the *n*-mer(s) can be inserted between any two contiguous amino acids within the AAV viral protein and in some embodiments the insertion is made in a variable region.

10           In some embodiments, the first 1, 2, 3, or 4 amino acids of an *n*-mer motif can replace 1, 2, 3, or 4 amino acids of a polypeptide into which it is inserted and preceding the insertion site. In some embodiments, the amino acids of the *n*-mer motif that replace 1 or more amino acids of the polypeptide into which the *n*-mer motif is inserted come before or immediately before an “RGD” in an *n*-mer motif. For example, in one or more of the 10-mer inserts shown in e.g.,  
15   Tables 2-3, the first three amino acids shown can replace 1-3 amino acids into a polypeptide to which they may be inserted. Using an AAV as another non-limiting example, one or more of the *n*-mer motifs can be inserted into e.g., and AAV9 capsid prolylpeptide between amino acids 588 and 589 and the insert can replace amino acids 586, 587, and 588 such that the amino acid immediately preceding the *n*-mer motif after insertion is residue 585. It will be appreciated that  
20   this principle can apply in any other insertion context and is not necessarily limited to insertion between residues 588 and 589 of an AAV9 capsid or equivalent position in another AAV capsid. It will further be appreciated that in some embodiments, no amino acids in the polypeptide into which the *n*-mer motif is inserted are replaced by the *n*-mer motif.

          In some embodiments, the AAV capsids or other viral capsids or compositions can be  
25   muscle-specific. In some embodiments, muscle-specificity of the engineered AAV or other viral capsid or other composition is conferred by a muscle specific *n*-mer motif incorporated in the engineered AAV or other viral capsid or other composition described herein. While not intending to be bound by theory, it is believed that the *n*-mer motif confers a 3D structure to or within a domain or region of the engineered AAV capsid or other viral capsid or other composition such  
30   that the interaction of the viral particle or other composition containing the engineered AAV capsid or other viral capsid or other composition described herein has increased or improved

interactions (e.g., increased affinity) with a cell surface receptor and/or other molecule on the surface of a muscle cell. In some embodiments, the cell surface receptor is AAV receptor (AAVR). In some embodiments, the cell surface receptor is a muscle cell specific AAV receptor. In some embodiments, the cell surface receptor or other molecule is a cell surface receptor or other molecule selectively expressed on the surface of a muscle cell. In some embodiments, the cell surface receptor or molecule is an integrin or dimer thereof. In some embodiments, the cell surface receptor or molecule is an Vb6 integrin heterodimer.

In some embodiments, a muscle specific engineered viral particle or other composition described herein containing the muscle-specific capsid, n-mer motif, or muscle-specific targeting moiety described herein can have an increased uptake, delivery rate, transduction rate, efficiency, amount, or a combination thereof in a muscle cell as compared to other cells types and/or other virus particles (including but not limited to AAVs) and other compositions that do not contain the muscle-specific n-mer motif of the present invention.

First- and second-generation muscle specific AAV capsids were developed using a muscle specific promoter and the resulting capsid libraries were screened in mice and non-human primates as described elsewhere herein and/or in e.g., U.S. Provisional Application Serial Nos. 62/899,453, 62/916,207, 63/018,454, and 63/242,008. First and second generation myoAAV capsids were further optimized in mice and non-human primates as previously described to generate enhanced myoAAV capsids. Capsids that may be used in together with the invention may be as described in PCT application no. PCT/US2024/044341.

**Tables 1 and 2** show the top hits of enhanced muscle specific n-mer motifs and their encoding sequence in rank order within each table. Enhanced MyoAAV (eMyoAAV) capsid variants can transduce mouse muscle more effectively as compared to the first generation MyoAAV after systemic delivery. First and second generation myoAAV capsid variants are dependent on the aVb6 integrin heterodimer for transduction of human primary myotubes.

**Tables 3 and 4** show top-ranking capsid variants produced in rounds of directed evolution of capsid variants for skeletal muscle specificity. As shown in the Tables above with respect to those variant n-mer inserts containing P-motifs, the first three amino acids of the variant sequences shown are amino acids that replaced amino acids corresponding to positions 596, 597, and 598 of an AAV9 capsid polypeptide. Thus, the P-motif, for example, was inserted between amino acids at positions 598 and 599 of an AAV9 vector.

**Tables 5a** and **5b** show top-ranked capsid variants products in rounds of directed evolution of capsid variants for skeletal muscle specificity. The capsid protein variant may comprise substitutions at amino acids 451-455 relative to a wild-type AAV9 vector capsid. For example, the substitutions at amino acids 451-455 relative to a wild-type AAV9 vector capsid may be an amino acid sequence selected from column 1 of Table 6b. In aspects of the invention, the capsid protein variant may further comprise an insert. For example, the capsid protein may comprise a 7-mer insert selected from column 2 of Table 6b. The insert may be in the location after amino acid 455 relative to a wild-type AAV9 vector. For HVR IV variants, the 5 amino acids upstream are at positions 451-455, shown in column 1 of Table 6b. The 7-mer insert for HVR IV variants starts with "RGD" and is inserted after amino acid 455, shown in column 2 of Table 6b.

#### Micro RNA

MicroRNA (miRNA) are small, single-stranded, non-coding RNA molecules. miRNAs base-pair to complementary sequences in mRNA molecules, thereby silencing post-transcriptional regulation of gene expression. Typically, miRNA molecules silence mRNA translation by cleavage of mRNA strand into two pieces or destabilization of the mRNA by shortening its poly(A) tail.

miRNAs resemble small interfering RNAs (siRNAs), however miRNAs derive from regions of RNA transcripts that fold back on themselves to form short hairpins. Animal miRNAs are initially transcribed as part of one arm of an RNA stem-loop that in turn forms part of a several hundred nucleotide-long miRNA precursor termed a pri-miRNA. A single pri-miRNA may contain from one to six miRNA precursors. These hairpin loop structures are typically composed of about 70 nucleotides each. Each hairpin is flanked by sequences necessary for efficient processing.

The pre-miRNA hairpin is typically cleaved by the RNase enzyme Dicer. The RNase interacts with 5' and 3' ends of the hairpin and cuts away the loop joining the 3' and 5' arms, resulting in an miRNA:miRNA duplex about 22 nucleotides in length. Overall hairpin length and loop size influence the efficiency of Dicer processing. Although either strand of the duplex may potentially act as a functional miRNA, only one strand is generally incorporated into the RNA-induced silencing complex (RISC) where the miRNA and its mRNA target interact.

For example, pri-miR scaffolds together with their guide and passenger sequence may form a hairpin loop structure. The hairpin loop structure may be greater than 250 nucleotides in length (for example between 250-270 nucleotides in length). The pri-miR may have the structure, in order, of a first (“upstream”) scaffold sequence, the guide sequence, a hairpin loop, a sequence complimentary or partially complimentary to the guide sequence (called a “passenger” sequence), and second (“downstream”) scaffold sequence. The guide sequence and passenger sequence form a double stranded RNA (dsRNA), with the first and second scaffold sequence being single stranded RNA (ssRNA) on either end of the double stranded molecule (referred to as “arms”). The passenger strand may be fully complementary to the guide sequence or may have one or more mismatched nucleotides to the guide strand. For example, mismatches or additional nucleotides may result in “bulges” in the pre-miRNA, while maintaining overall hybridization between the guide strand and passenger strand. The hairpin loop is found at the opposite end of the dsRNA from the first and second scaffold sequences, connecting the 5’ and 3’ end of the guide and passenger. An example a pri-miR scaffold and its guide is shown below:

The hairpin structure may be processed by cleaving near the junction between dsRNA and ssRNA arms. After processing, which may result in substantially cleaving of the ssRNA arms, the pri-miRNAs loop structure is generally 60-100 nucleotides long, and is referred to as a precursor miRNA (pre-miRNA).

The pre-miRNA may be exported to the cytoplasm and further processed by an enzyme, for example (Dicer). The enzyme may process the pre-miRNA at the 5’ and 3’ ends of the hairpin by cutting away the loop joining the 3’ and 5’ arms, resulting in an miRNA(guide):miRNA (passenger) duplex about 21 nucleotides in length.

The duplexed miRNA may then be processed to form a precursor to an RNA-induced silencing complex (RISC). The complex may unwind the duplex and the passenger RNA strand may then be discarded, leaving behind a mature RISC carrying the mature, single stranded guide miRNA.

Advantageously, artificial miRNA molecules may be engineered to comprise the scaffold of an endogenous miRNA and a targeting sequence to a gene of interest. Aspects of the invention comprise miRNA molecules that target DUX4 transcripts. The pri-miRNA scaffold may be selected from any scaffold, for example based on cell or tissue specificity of the mature miRNA. For example, the pri-miRNA scaffold may be derived from the pri-miRNA selected from the

group consisting of pri-miR-21, pri-miR-22, pri-miR-26a, pri-miR-30a, pri-miR-33, pri-miR-122, pri-miR-375, pri-miR-199, pri-miR-99, pri-miR-194, pri-miR-155, and pri-miR-451. In preferred aspects of the invention, the miRNA scaffold is derived pri-miR-33.

MiRNA-based therapies, including miRNA inhibition and miRNA replacement, may be used to treat many diseases such as hepatitis C viral infection, muscular dystrophies, neurodegenerative diseases, peripheral neuropathies, chronic heart failure and post-myocardial infarction remodeling and cancers. In addition, miRNA directed regulation of gene expression may improve traditional gene therapy approaches in which the vector payload is a protein coding gene.

microRNA sequences are described in U.S. Patent Publication Nos. 2020-0248179, 2019-0300903, 2019-0136235, 2019-0024083, 2017-0029849, and 2014-0322169, the contents of each of which are incorporated by reference herein.

#### Pharmaceutical Composition

Some embodiments of the invention may include any acceptable form of providing the AAV vector to a subject. For example, the AAV vector may be provided to the subject in the form of a composition or formulation comprising the AAV vector. The expression vector of this invention can be formulated and administered to treat a variety of disease states by any means that produces contact of the active ingredient with the agent's site of action in the body of the subject. The compositions, polynucleotides, polypeptides, particles, cells, vector systems and combinations thereof described herein can be contained in a formulation, such as a pharmaceutical formulation. In some embodiments, the formulations can be used to generate polypeptides and other particles that include one or more muscle-specific targeting moieties described herein. In some embodiments, the formulations can be delivered to a subject in need thereof. In some embodiments, component(s) of the engineered AAV capsid system, engineered cells, engineered AAV capsid particles, and/or combinations thereof described herein can be included in a formulation that can be delivered to a subject or a cell. In some embodiments, the formulation is a pharmaceutical formulation. One or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein can be provided to a subject in need thereof or a cell alone or as an active ingredient, such as in a pharmaceutical formulation. As such, also described herein are pharmaceutical formulations containing an amount of one or



more of the polypeptides, polynucleotides, vectors, cells, or combinations thereof described herein. In some embodiments, the pharmaceutical formulation can contain an effective amount of the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein. The pharmaceutical formulations described herein can be administered to a  
5 subject in need thereof or a cell.

In some embodiments, the amount of the one or more of the polypeptides, polynucleotides, vectors, cells, virus particles, nanoparticles, other delivery particles, and combinations thereof described herein contained in the pharmaceutical formulation can range from about 1 pg/kg to about 10 mg/kg based upon the bodyweight of the subject in need thereof  
10 or average bodyweight of the specific patient population to which the pharmaceutical formulation can be administered. The amount of the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein in the pharmaceutical formulation can range from about 1 pg to about 10 g, from about 10 nL to about 10 mL. In  
15 embodiments where the pharmaceutical formulation contains one or more cells, the amount can range from about 1 cell to  $1 \times 10^2$ ,  $1 \times 10^3$ ,  $1 \times 10^4$ ,  $1 \times 10^5$ ,  $1 \times 10^6$ ,  $1 \times 10^7$ ,  $1 \times 10^8$ ,  $1 \times 10^9$ ,  $1 \times 10^{10}$  or more cells. In embodiments where the pharmaceutical formulation contains one or more cells, the amount can range from about 1 cell to  $1 \times 10^2$ ,  $1 \times 10^3$ ,  $1 \times 10^4$ ,  $1 \times 10^5$ ,  $1 \times 10^6$ ,  $1 \times 10^7$ ,  $1 \times 10^8$ ,  $1 \times 10^9$ ,  $1 \times 10^{10}$  or more cells per nL,  $\mu$ L, mL, or L.

In embodiments, where engineered AAV capsid particles are included in the formulation,  
20 the formulation can contain 1 to  $1 \times 10^2$ ,  $1 \times 10^3$ ,  $1 \times 10^4$ ,  $1 \times 10^5$ ,  $1 \times 10^6$ ,  $1 \times 10^7$ ,  $1 \times 10^8$ ,  $1 \times 10^9$ ,  $1 \times 10^{10}$ ,  $1 \times 10^{11}$ ,  $1 \times 10^{12}$ ,  $1 \times 10^{13}$ ,  $1 \times 10^{14}$ ,  $1 \times 10^{15}$ ,  $1 \times 10^{16}$ ,  $1 \times 10^{17}$ ,  $1 \times 10^{18}$ ,  $1 \times 10^{19}$ , or  $1 \times 10^{20}$  transducing units (TU)/mL of the engineered AAV capsid particles. In some  
25 embodiments, the formulation can be 0.1 to 100 mL in volume and can contain 1 to  $1 \times 10^2$ ,  $1 \times 10^3$ ,  $1 \times 10^4$ ,  $1 \times 10^5$ ,  $1 \times 10^6$ ,  $1 \times 10^7$ ,  $1 \times 10^8$ ,  $1 \times 10^9$ ,  $1 \times 10^{10}$ ,  $1 \times 10^{11}$ ,  $1 \times 10^{12}$ ,  $1 \times 10^{13}$ ,  $1 \times 10^{14}$ ,  $1 \times 10^{15}$ ,  $1 \times 10^{16}$ ,  $1 \times 10^{17}$ ,  $1 \times 10^{18}$ ,  $1 \times 10^{19}$ , or  $1 \times 10^{20}$  transducing units (TU)/mL of the engineered AAV capsid particles.

*Pharmaceutically Acceptable Carriers and Auxiliary Ingredients and Agents*

In embodiments, the pharmaceutical formulation containing an amount of one or more of  
30 the polypeptides, polynucleotides, vectors, cells, virus particles, nanoparticles, other delivery particles, and combinations thereof described herein can further include a pharmaceutically

acceptable carrier. Suitable pharmaceutically acceptable carriers include, but are not limited to, water, salt solutions, alcohols, gum arabic, vegetable oils, benzyl alcohols, polyethylene glycols, gelatin, carbohydrates such as lactose, amylose or starch, magnesium stearate, talc, silicic acid, viscous paraffin, perfume oil, fatty acid esters, hydroxy methylcellulose, and polyvinyl pyrrolidone, which do not deleteriously react with the active composition.

The pharmaceutical formulations can be sterilized, and if desired, mixed with auxiliary agents, such as lubricants, preservatives, stabilizers, wetting agents, emulsifiers, salts for influencing osmotic pressure, buffers, coloring, flavoring and/or aromatic substances, and the like which do not deleteriously react with the active composition.

In some embodiments, the pharmaceutical formulations described herein may be in a dosage form. The dosage forms can be adapted for administration by any appropriate route. Appropriate routes include, but are not limited to, oral (including buccal or sublingual), rectal, epidural, intracranial, intraocular, inhaled, intranasal, topical (including buccal, sublingual, or transdermal), vaginal, intraurethral, parenteral, intracranial, subcutaneous, intramuscular, intravenous, intraperitoneal, intradermal, intraosseous, intracardiac, intraarticular, intracavernous, intrathecal, intravitreal, intracerebral, gingival, subgingival, intracerebroventricular, and intradermal. Such formulations may be prepared by any method known in the art.

Dosage forms adapted for oral administration can be discrete dosage units such as capsules, pellets or tablets, powders or granules, solutions, or suspensions in aqueous or non-aqueous liquids; edible foams or whips, or in oil-in-water liquid emulsions or water-in-oil liquid emulsions. In some embodiments, the pharmaceutical formulations adapted for oral administration also include one or more agents which flavor, preserve, color, or help disperse the pharmaceutical formulation. Dosage forms prepared for oral administration can also be in the form of a liquid solution that can be delivered as foam, spray, or liquid solution. In some embodiments, the oral dosage form can contain about 1 ng to 1000 g of a pharmaceutical formulation containing a therapeutically effective amount or an appropriate fraction thereof of the targeted effector fusion protein and/or complex thereof or composition containing the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein. The oral dosage form can be administered to a subject in need thereof.

Where appropriate, the dosage forms described herein can be microencapsulated.

The dosage form can also be prepared to prolong or sustain the release of any ingredient. In some embodiments, the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein can be the ingredient whose release is delayed. In other embodiments, the release of an optionally included auxiliary ingredient is delayed. Suitable methods for delaying the release of an ingredient include, but are not limited to, coating or embedding the ingredients in material in polymers, wax, gels, and the like. Delayed release dosage formulations can be prepared as described in standard references such as "Pharmaceutical dosage form tablets," eds. Liberman et. al. (New York, Marcel Dekker, Inc., 1989), "Remington - The science and practice of pharmacy", 20th ed., Lippincott Williams & Wilkins, Baltimore, MD, 2000, and "Pharmaceutical dosage forms and drug delivery systems", 6th Edition, Ansel et al., (Media, PA: Williams and Wilkins, 1995). These references provide information on excipients, materials, equipment, and processes for preparing tablets and capsules and delayed release dosage forms of tablets and pellets, capsules, and granules. The delayed release can be anywhere from about an hour to about 3 months or more.

Examples of suitable coating materials include, but are not limited to, cellulose polymers such as cellulose acetate phthalate, hydroxypropyl cellulose, hydroxypropyl methylcellulose, hydroxypropyl methylcellulose phthalate, and hydroxypropyl methylcellulose acetate succinate; polyvinyl acetate phthalate, acrylic acid polymers and copolymers, and methacrylic resins that are commercially available under the trade name EUDRAGIT® (Roth Pharma, Westerstadt, Germany), zein, shellac, and polysaccharides.

Coatings may be formed with a different ratio of water-soluble polymer, water insoluble polymers, and/or pH dependent polymers, with or without water insoluble/water soluble non-polymeric excipient, to produce the desired release profile. The coating is either performed on the dosage form (matrix or simple) which includes, but is not limited to, tablets (compressed with or without coated beads), capsules (with or without coated beads), beads, particle compositions, "ingredient as is" formulated as, but not limited to, suspension form or as a sprinkle dosage form.

Dosage forms adapted for topical administration can be formulated as ointments, creams, suspensions, lotions, powders, solutions, pastes, gels, sprays, aerosols, or oils. In some embodiments for treatments of the eye or other external tissues, for example the mouth or the skin, the pharmaceutical formulations are applied as a topical ointment or cream. When

formulated in an ointment, the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein can be formulated with a paraffinic or water-miscible ointment base. In some embodiments, the active ingredient can be formulated in a cream with an oil-in-water cream base or a water-in-oil base. Dosage forms adapted for topical administration  
5 in the mouth include lozenges, pastilles, and mouth washes.

Dosage forms adapted for nasal or inhalation administration include aerosols, solutions, suspension drops, gels, or dry powders. In some embodiments, the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein is contained in a dosage form adapted for inhalation is in a particle-size-reduced form that is  
10 obtained or obtainable by micronization. In some embodiments, the particle size of the size reduced (e.g., micronized) compound or salt or solvate thereof, is defined by a D50 value of about 0.5 to about 10 microns as measured by an appropriate method known in the art. Dosage forms adapted for administration by inhalation also include particle dusts or mists. Suitable dosage forms wherein the carrier or excipient is a liquid for administration as a nasal spray or  
15 drops include aqueous or oil solutions/suspensions of an active ingredient (e.g., the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein and/or auxiliary active agent), which may be generated by various types of metered dose pressurized aerosols, nebulizers, or insufflators.

In some embodiments, the dosage forms can be aerosol formulations suitable for  
20 administration by inhalation. In some of these embodiments, the aerosol formulation can contain a solution or fine suspension of the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein and a pharmaceutically acceptable aqueous or non-aqueous solvent. Aerosol formulations can be presented in single or multi-dose quantities in sterile form in a sealed container. For some of these embodiments, the sealed container is a  
25 single dose or multi-dose nasal, or an aerosol dispenser fitted with a metering valve (e.g., metered dose inhaler), which is intended for disposal once the contents of the container have been exhausted.

Where the aerosol dosage form is contained in an aerosol dispenser, the dispenser contains a suitable propellant under pressure, such as compressed air, carbon dioxide, or an  
30 organic propellant, including but not limited to a hydrofluorocarbon. The aerosol formulation dosage forms in other embodiments are contained in a pump-atomizer. The pressurized aerosol

formulation can also contain a solution or a suspension of one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein. In further embodiments, the aerosol formulation can also contain co-solvents and/or modifiers incorporated to improve, for example, the stability and/or taste and/or fine particle mass characteristics (amount and/or profile) of the formulation. Administration of the aerosol formulation can be once daily or several times daily, for example 2, 3, 4, or 8 times daily, in which 1, 2, or 3 doses are delivered each time.

For some dosage forms suitable and/or adapted for inhaled administration, the pharmaceutical formulation is a dry powder inhalable formulation. In addition to the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein, an auxiliary active ingredient, and/or pharmaceutically acceptable salt thereof, such a dosage form can contain a powder base such as lactose, glucose, trehalose, mannitol, and/or starch. In some of these embodiments, the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein is in a particle-size reduced form. In further embodiments, a performance modifier, such as L-leucine or another amino acid, cellobiose octaacetate, and/or metals salts of stearic acid, such as magnesium or calcium stearate.

In some embodiments, the aerosol dosage forms can be arranged so that each metered dose of aerosol contains a predetermined amount of an active ingredient, such as the one or more of the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein.

Dosage forms adapted for vaginal administration can be presented as pessaries, tampons, creams, gels, pastes, foams, or spray formulations. Dosage forms adapted for rectal administration include suppositories or enemas.

Dosage forms adapted for parenteral administration and/or adapted for any type of injection (e.g. intravenous, intraperitoneal, subcutaneous, intramuscular, intradermal, intraosseous, epidural, intracardiac, intraarticular, intracavernous, gingival, subgingival, intrathecal, intravitreal, intracerebral, and intracerebroventricular) can include aqueous and/or non-aqueous sterile injection solutions, which can contain anti-oxidants, buffers, bacteriostats, solutes that render the composition isotonic with the blood of the subject, and aqueous and non-aqueous sterile suspensions, which can include suspending agents and thickening agents. The dosage forms adapted for parenteral administration can be presented in a single- unit dose or

multi-unit dose containers, including but not limited to sealed ampoules or vials. The doses can be lyophilized and resuspended in a sterile carrier to reconstitute the dose prior to administration. Extemporaneous injection solutions and suspensions can be prepared in some embodiments, from sterile powders, granules, and tablets.

5 Dosage forms adapted for ocular administration can include aqueous and/or nonaqueous sterile solutions that can optionally be adapted for injection, and which can optionally contain anti-oxidants, buffers, bacteriostats, solutes that render the composition isotonic with the eye or fluid contained therein or around the eye of the subject, and aqueous and nonaqueous sterile suspensions, which can include suspending agents and thickening agents.

10 For some embodiments, the dosage form contains a predetermined amount of the one or more of the polypeptides, polynucleotides, vectors, cells, and combinations thereof described herein per unit dose. In some embodiments, the predetermined amount of the Such unit doses may therefore be administered once or more than once a day. Such pharmaceutical formulations may be prepared by any of the methods well known in the art.

15 *DUX4 and Facioscapulohumeral Muscular Dystrophy*

Muscular dystrophies (MDs) are a group of genetic diseases. The group is characterized by progressive weakness and degeneration of the skeletal muscles that control movement or breathing. Some forms of MD develop in infancy or childhood, while others may not appear  
20 until middle age or later. The disorders differ in terms of the distribution and extent of muscle weakness (some forms of MD also affect cardiac muscle), the age of onset, the rate of progression, and the pattern of inheritance.

Facioscapulohumeral muscular dystrophy (FSHD) is a complex autosomal dominant disorder characterized by progressive and asymmetric weakness of facial, shoulder and limb  
25 muscles. Symptoms typically arise in adulthood with most patients showing clinical features before age thirty. About five percent of patients develop symptoms as infants or juveniles and these are generally more severely affected. Clinical presentation can vary from mild (some limited muscle weakness) to severe (wheelchair dependence). Historically, FSHD was classified as the third most common MD, affecting one in 20,000 individuals worldwide. However, recent  
30 data indicate FSHD is the most common MD in Europe, suggesting its worldwide incidence could be as high as 1 in 8,333. Typical FSHD cases (FSHD1A, heretofore referred to as FSHD)

are linked to heterozygous chromosomal deletions that decrease the copy number of 3.3 kilobase (kb) D4Z4 repeats on human chromosome 4q35. Simplistically, normal individuals have 11-100 tandemly-repeated D4Z4 copies on both 4q35 alleles, while patients with FSHD have one normal and one contracted allele containing 1-10 repeats. In addition, FSHD-associated D4Z4

5 contractions must occur on specific disease-permissive chromosome 4q35 backgrounds (called 4qA). Importantly, no genes are completely lost or structurally mutated as a result of FSHD-associated deletions. Instead, genetic changes associated with FSHD give rise to expression of the toxic DUX4 gene, which is damaging to muscle. FSHD2 (also known as FSHD1B) is phenotypically identical to FSHD1, is associated with DUX4 expression, and requires the 4qA

10 chromosomal background. FSHD2 is not associated with D4Z4 repeat contraction, but is instead caused by mutation in the SMCHD1 gene, which is a chromatin regulator normally involved in repressing the DUX4 locus at 4qA. Mutated SMCHD1 proteins fail to participate in adding heterochromatin to the 4qA DUX4 allele, thereby allowing DUX4 gene expression.

In the leading FSHD pathogenesis model, D4Z4 contractions are proposed to cause

15 epigenetic changes that permit expression of the DUX4 gene. As a result, the aberrant over-expression of otherwise silent or near-silent DUX4 gene, and the genes it regulates, may ultimately cause FSHD. This model is consistent with data showing normal 4q35 D4Z4 repeats have heterochromatin characteristics, while FSHD-linked D4Z4 repeats contain marks more indicative of actively transcribed euchromatin. These transcription-permissive epigenetic

20 changes, coupled with the observation that complete monosomic D4Z4 deletions (i.e., zero repeats) do not cause FSHD, support the hypothesis that D4Z4 repeats harbor potentially myopathic open reading frames (ORFs), which are abnormally expressed in FSHD muscles. This notion was initially considered in 1994, when a D4Z4-localized ORF, called DUX4, was first identified. However, the locus had some characteristics of an unexpressed pseudogene and

25 DUX4 was therefore summarily dismissed as an FSHD candidate. For many years thereafter, the search for FSHD-related genes was mainly focused outside the D4Z4 repeats, and although some intriguing candidates emerged from these studies, no single gene had been conclusively linked to FSHD development. This slow progress led to the re-emergence of DUX4 as an FSHD candidate in 2007.

30 The role of DUX4 in FSHD pathogenesis can be explained as follows. First, D4Z4 repeats contain identical DUX4 coding regions, and D4Z4 repeats also harbor smaller sense and

antisense transcripts, including some resembling microRNAs. Over-expressed DUX4 transcripts and a .about.50 kDa full-length DUX4 protein are found in biopsies and cell lines from FSHD patients. These data are consistent with a transcriptional de-repression model of FSHD pathogenesis. In addition, unlike pseudogenes, D4Z4 repeats and DUX4 likely have functional importance, since tandemly-arrayed D4Z4 repeats are conserved in at least eleven different placental mammalian species (non-placental animals lack D4Z4 repeats), with the greatest sequence conservation occurring within the DUX4 ORF. Second, over-expressed DUX4 is toxic to tissue culture cells and embryonic progenitors of developing lower organisms in vivo. This toxicity occurs at least partly through a pro-apoptotic mechanism, indicated by Caspase-3 activation in DUX4 transfected cells, and presence of TUNEL-positive nuclei in developmentally arrested *Xenopus* embryos injected with DUX4 mRNA at the two-cell stage. These findings are consistent with studies showing some pro-apoptotic proteins, including Caspase-3, are present in FSHD patient muscles. In addition to stimulating apoptosis, DUX4 may negatively regulate myogenesis. Human DUX4 inhibits differentiation of mouse C2C12 myoblasts in vitro, potentially by interfering with PAX3 and/or PAX7, and causes developmental arrest and reduced staining of some muscle markers when delivered to progenitor cells of zebrafish or *Xenopus* embryos. Finally, aberrant DUX4 function is directly associated with potentially important molecular changes seen in FSHD patient muscles. Specifically, full-length human DUX4 encodes an approximately 50 kDa double homeodomain transcription factor, and DUX4 targets can be found at elevated levels in FSHD patient muscles. These data support that DUX4 catalyzes numerous downstream molecular changes that are incompatible with maintaining normal muscle integrity.

#### Exemplary guides and capsids

The present invention provides novel nucleic acid molecules and methods that result in changes to expression of DUX4 that result in treatment of FSHD. Nucleic acid molecules of the invention comprise an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript. By targeting DUX4 transcripts, the nucleic acid molecules of the invention result in an appropriate expression profile for the DUX4 gene.

Preferential exemplary guides are described in Table 7 below.



In exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860-6865. For example, SEQ ID NOs: 6860, 6861, 6862, 6863, 6864, or 6865.

5 The nucleic acid molecule may comprise an miRNA having at least 95% sequence identity to a sequence selected from the group of SEQ ID NOs: 2770-3597 or 6670-6812, each of which incorporates a guide sequence targeting DUX4. The nucleic acid molecule may target a DUX4 transcript at a position shown in Table 6 (with exemplary guide sequences described in Table 7).

10 In preferred aspects of the invention, the miRNA guide sequence comprises a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NO: 1250-2769, SEQ ID NOs: 6855-6963, SEQ ID NOs: 6855-6955, SEQ ID NOs: 6855-6945, SEQ ID NOs: 6855-6935, SEQ ID NOs: 6855-6925, SEQ ID NOs: 6855-6915, SEQ ID NOs: 6855-6905, SEQ ID NOs: 6855-6895, SEQ ID NOs: 6855-6885, SEQ ID NOs: 6855-6875, SEQ ID NOs: 6855-6870, SEQ ID NOs: 6855-6865, or SEQ ID NOs: 6860-6865. For example, SEQ ID NO: 6861, 6862,  
15 6863, 6864, or 6865, for example, SEQ ID NOs: 6860, 6861, 6862, 6863, 6864, or 6865.

In preferred aspects of the invention, the guide sequence may be encapsidated in an AAV vector comprising an engineered AAV vector capsid. The vector capsid may be engineered from an AAV9 capsid protein. The AAV vector capsid may comprise an amino acid sequence as shown as described in Tables 1-5 below, with Table 5a/b describing preferred engineered capsid  
20 sequences.

In exemplary aspects of the invention, the capsid may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

In aspects of the invention, the capsid protein may comprise a sequence selected from among sequences 4470-4490, 4500-4520, 4540-4560, 4660-4680, 4830-4850, 5630-5650.

25 The capsid may comprise a sequence selected from among sequences 4475-4480, 4480-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5030-5040.

The capsid may comprise a sequence selected from among sequences 4475-4480, 4485-4490, 4500-4505, 4540-4545, 4665-4670, 4830-4835, 5035-5040, for example SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

30

Altogether, exemplary guide miRNAs (for example as part of a construct) may be encapsidated by exemplary capsids described herein. For example:

In exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860, 6861, 5 6862, 6863, 6864, or 6865. The guide sequence may be encapsidated by an AAV capsid comprising a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

For example, exemplary miRNA guide sequences may be encapsidated by exemplary engineered capsids as shown below:

| miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: | miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: | miRNA<br>guide SEQ<br>ID NO: | Capsid<br>comprising<br>SEQ ID NO: |
|------------------------------|------------------------------------|------------------------------|------------------------------------|------------------------------|------------------------------------|
| 6860                         | 4479                               | 6862                         | 4838                               | 6865                         | 4667                               |
| 6860                         | 4486                               | 6862                         | 5036                               | 6865                         | 4832                               |
| 6860                         | 4487                               | 6863                         | 4479                               | 6865                         | 4838                               |
| 6860                         | 4503                               | 6863                         | 4486                               | 6865                         | 5036                               |
| 6860                         | 4544                               | 6863                         | 4487                               | 10                           |                                    |
| 6860                         | 4667                               | 6863                         | 4503                               |                              |                                    |
| 6860                         | 4832                               | 6863                         | 4544                               |                              |                                    |
| 6860                         | 4838                               | 6863                         | 4667                               |                              |                                    |
| 6860                         | 5036                               | 6863                         | 4832                               |                              |                                    |
| 6861                         | 4479                               | 6863                         | 4838                               |                              |                                    |
| 6861                         | 4486                               | 6863                         | 5036                               |                              |                                    |
| 6861                         | 4487                               | 6864                         | 4479                               |                              |                                    |
| 6861                         | 4503                               | 6864                         | 4486                               |                              |                                    |
| 6861                         | 4544                               | 6864                         | 4487                               |                              |                                    |
| 6816                         | 4667                               | 6864                         | 4503                               |                              |                                    |
| 6861                         | 4832                               | 6864                         | 4544                               |                              |                                    |
| 6861                         | 4838                               | 6864                         | 4667                               |                              |                                    |
| 6861                         | 5036                               | 6864                         | 4832                               |                              |                                    |
| 6862                         | 4479                               | 6864                         | 4838                               |                              |                                    |
| 6862                         | 4486                               | 6864                         | 5036                               |                              |                                    |
| 6862                         | 4487                               | 6865                         | 4479                               |                              |                                    |
| 6862                         | 4503                               | 6865                         | 4486                               |                              |                                    |
| 6862                         | 4544                               | 6865                         | 4487                               |                              |                                    |
| 6862                         | 4667                               | 6865                         | 4503                               |                              |                                    |
| 6862                         | 4832                               | 6865                         | 4544                               |                              |                                    |

Accordingly, in preferred aspects of the invention, the miRNA guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NO: 1250-2769 and the AAV vector capsid encapsidating the miRNA guide may comprise a sequence selected from Tables 1-5.

For example, in embodiments of the invention the miRNA guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6963 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4470-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5630-5640.

In further exemplary aspects of the invention the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6955 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4470-4490, 4500-4510, 4540-4550, 4660-4670, 4830-4840, 5630-5640.

The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6945 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6935 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040.

In further exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6925 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6915 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6895 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from

among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040. The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6885 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505,  
5 4665-4670, 4830-4840, 5035-5040.

In further exemplary aspects of the invention, the guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6875 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among sequences 4475-4490, 4500-4505, 4540-4505, 4665-4670, 4830-4840, 5035-5040.

10 The guide sequence may comprise a sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6855-6865 and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

In preferred aspects of the invention, the guide sequence may comprise a sequence  
15 having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 6860-6865, for example, SEQ ID NOs: 6861, 6862, 6863, 6864, or 6865, and the capsid protein encapsidating the miRNA guide may comprise a sequence selected from among SEQ ID NO: 4479, 4486, 4487, 4503, 4544, 4667, 4832, 4838, or 5036.

## 20 Experimental Examples

Facioscapulohumeral muscular dystrophy (FSHD) is an autosomal-dominant genetic disorder affecting an estimated 1 in 8,000 individuals. Patients with FSHD typically exhibit progressive wasting of muscles in the face, shoulders, upper arms, legs, and abdomen; approximately 20% of patients will eventually require the use of a wheelchair, and the majority  
25 experience debilitating pain and fatigue. De-repression of the transcription factor DUX4 has been identified as the pathogenetic mechanism in FSHD: insufficient epigenetic silencing of the DUX4 gene in patient muscles results in aberrant expression of DUX4, which is toxic to mature myofibers.

Knockdown of DUX4 transcripts using gene therapy as a therapeutic strategy for FSHD  
30 was analyzed.

**FIG. 1** shows a schematic of knockdown of DUX4 mRNA.

A high throughput tiling screen of artificial miRNAs targeting DUX4 identified the most potent miRNA targeting the transcript. Stringent *in vitro* and *in vivo* screening was utilized to identify the most potent and selective miRNA knockdown sequences to target DUX4, resulting in the identification of a lead and backup miRNA knockdown sequence. Greater than 14,000 candidate miRNA sequences were screened in a cell-based DUX4 knockdown assay. An *in silico* selection of candidate sequences was conducted to exclude sequences that had a perfect 21-mer match to an off-target RNA. The top 13 lead sequences for potency (DUX4 kD) and selectivity (RNAseq) were identified. The top 5 leads were tested in ACTA1-MCC;FLEXDUX4 mice confirming *in vivo* potency. Lead miRNA candidates of the invention were advanced to NHP biodistribution/safety studies.

*In vitro tiling screen identifies the most potent artificial miRNA sequences targeting DUX4*

HEK293 cell line were generated stably expressing mCherry-tagged DUX4 (Hox1 mutant).

**FIG. 2** is a schematic of lentiviral constructs used to screen miRNAs. Transduction of the stable cell line at low MOI. Fluorescence-activated cell sorting (FACS) and next generation sequencing (NGS) was conducted of the miRNA sequences.

A lentiviral/FACS-based screen was performed to identify the most potent artificial miRNA sequences targeting DUX4.

**FIG. 3** is a graph of FACS sorting of positive and negative populations with miRNA sequences.

Several potent sequences were selected for individual testing in FSHD patient-derived myotubes.

**FIG. 4** is a graph showing top miRNA sequences based on enrichment.

*Primary human myotubule expression*

Top miRNA hits from the screen knock down DUX4 when tested individually in FSHD1 patient myotubes.

**FIG. 5A-B** show graphs of DUX4 expression of DUX4 and DUX4 downstream gene hZSCAN4 in FSHD patient myotubes transduced with miRNA candidates. An FSHD lead candidate was selected with potentially knocks down DUX4 and decreases expression of DUX4 downstream genes, regardless of the timing of transduction.

5 **FIG. 6A-D** show graphs of DUX4 and DUX4 target gene expression in patient myotubules following lead candidate transduction. The FSHD lead candidate knocked down DUX4 in FSHD patient myotubes in a dose dependent manner when cells were transduced at the time of inducing differentiation as shown in FSHD composite gene expression calculated by averaging normalized expression of several DUX4 downstream genes (CCNA1, MBD3L2,  
10 ZSCAN4, TRIM43, KHDC1L). The FSHD lead candidate knocked down DUX4 in FSHD patient myotubes in a dose dependent manner when myotubes were transduced after differentiation.

The FSHD lead candidate effectively knocked down DUX4 and decreased expression of DUX downstream genes in FSHD patient cells

15 RNAseq and small RNAseq in control cells was used as a measure of relative selectivity based on off-target expression changes in human myotubes to assess differential gene and endogenous miRNA expression between myotubes transduced with the lead candidate and scrambled control.

**FIG. 7A-B** show volcano plots of RNAseq results of differentially expressed genes and  
20 differentially expressed endogenous miRNAs in human myotubes transduced with FSHD lead miRNA candidates vs scrambled control based on RNAseq.

Lead miRNAs were expressed at therapeutic levels. Lead candidates did not result in off-target effects based on RNAseq and small RNAseq, with no endogenous mRNA or miRNAs meeting criteria of adjusted  $p < 0.001$ , 33% decrease or 50% increase.

25

#### Candidate capsids

Muscle tropic liver de-targeted capsid described herein encapsidating the FSHD lead candidates were engineered to transduce all muscle fibers after systemic administration in NHPs. The new class of muscle targeted and liver de-targeted MyoAAV-LD capsid variants were  
30 evolved, with top MyoAAV-LD variants from directed evolution benchmarked against naturally

occurring and engineered AAV capsids in NHPs. MyoAAV-LD 6.1 was identified as the lead capsid.

Transgene mRNA expression from MyoAAV-LD 6.1 was compared to different naturally occurring and engineered capsids in non-human primate (NHP) skeletal muscles.

5 Barcoded hFXN was packaged in different capsids and injected into NHPs as a pool. Abundance of transgene mRNA was measured by NGS. MyoAAV-LD-6.1 showed ~60 times higher transgene expression compared to AAVrh74.

10 **FIG. 8A-B** are graphs of skeletal muscle mRNA and liver capsid DNA expression following MyoAAV administration to non-human primates (NHPs). MyoAAV-LD-6.1 showed ~10 times lower vector genome levels in the liver compared to AAVrh74.

**FIG. 9** shows immunofluorescent imaging of bicep tissue following MyoAAV administration to Cynomolgus macaques systemically injected with MyoAAV-LD-6.1-KEP1.1-microDystrophin-FLAG at 4E+13 vg/kg.

15 MyoAAV-LD-6.1 transduced all muscle fibers after systemic administration in NHPs.

#### Mouse expression

The lead candidates were tested in ACTA1-MCM;FLEXDUX4 mice. Bitransgenic ACTA1-MCM;FLEXDUX4 mice express DUX4 and DUX4 downstream genes following tamoxifen induction.

20 ~3 month old mice

**FIG. 10** shows a study design in mice after injection with a candidate miRNA.

ACTA1-MCM;FLEXDUX4 mice (~3 months old) were injected with MyoAAV delivering different top DUX4 miRNAs. 3 weeks later, mice were injected with tamoxifen to induce DUX4 expression. Expression of DUX4 and DUX4 target genes were quantified 10 days after tamoxifen induction.

25 **FIG. 11** shows a graph of FSHD composite gene expression following tamoxifen induced DUX4 expression and administration of vehicle and a lead candidate. DUX4 downstream gene expression was decreased in induced mice treated with the lead candidate. FSHD composite gene expression is the average of DUX4 downstream genes SLN, KIF4, WFDC3, and ENTPD3.

**FIG. 12A-B** show graphs of DUX4 and mKif4 expression in mouse triceps following administration of candidate miRNA sequence.

**FIG. 13** shows images of muscle degeneration in mice following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate. Arrows show area of active degeneration. Muscle histology was improved in induced mice treated with the lead candidate compared to vehicle injected induced animals.

**FIG. 14A-B** show graphs of results from treadmill assessments of mice following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate. ACTA1-MCM;FLExDUX4 mice treated with the lead candidate run longer on the treadmill compared to vehicle injected induced animals.

#### Older mice

**FIG. 15** shows a study design in older mice after injection with a candidate miRNA. ACTA1-MCM;FLExDUX4 mice (~14 months old) were injected with MyoAAV delivering different top DUX4 miRNAs.

**FIG. 16** shows a graph of FSHD composite gene expression following tamoxifen induced DUX4 expression and administration of vehicle and the lead candidate. DUX4 downstream gene expression was decreased in older ACTA1-MCM;FLExDUX4 mice treated with the lead candidate.

**FIG. 17** shows images of muscle degeneration in mice following administration of vehicle and the lead candidate. Arrows show area of active degeneration. Muscle histology was improved in old ACTA1-MCM;FLExDUX4 mice treated with the lead candidate compared to vehicle injected animals

The FSHD lead candidate resulted in a reduction of DUX4 downstream gene expression and improvement of muscle histology in old ACTA1-MCM; FLExDUX4 mice

#### Conclusions

The MyoAAV Engineered AAV significantly outperformed competitor capsids in transducing NHP muscle and is de-targeted from the liver after systemic administration.

The lead candidate knocked down DUX4 and DUX4 downstream genes in FSHD patient myotubes, regardless of timing of transduction.



The lead candidate knocked down DUX4 downstream genes and rescues functional phenotypes and histopathology in a severe mouse model of FSHD.

The FSHD lead candidate did not result in off-target effects on endogenous mRNA and miRNA expression in human myotubes.

5

#### Incorporation by Reference

References and citations to other documents, such as patents, patent applications, patent publications, journals, books, papers, web contents, have been made throughout this disclosure. All such documents are hereby incorporated herein by reference in their entirety for all purposes.

10

#### Equivalents

Various modifications of the invention and many further embodiments thereof, in addition to those shown and described herein, will become apparent to those skilled in the art from the full contents of this document, including references to the scientific and patent literature cited herein. The subject matter herein contains important information, exemplification and guidance that can be adapted to the practice of this invention in its various embodiments and equivalents thereof.

15

Claims

1. A nucleic acid molecule comprising an miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript.
- 5 2. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule comprises a miRNA guide sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 1250-2769 or 6687-6770.
3. The nucleic acid molecule of claim 2, wherein the nucleic acid molecule comprises a miRNA  
10 guide sequence selected from SEQ ID NOs: 1250-2769 or 6687-6770.
4. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule comprises a miRNA having at least 95% sequence identity to a sequence selected from the group of SEQ ID NOs: 2770-3597 or 6671-6812.
- 15 5. The nucleic acid molecule of claim 4, wherein the miRNA targets a double homeobox 4 (DUX4) transcript at the position shown in Table 6.
6. The nucleic acid molecule of claim 1, wherein the miRNA scaffold is derived from the pri-miRNA selected from the group consisting of pri-miR-21, pri-miR-22, pri-miR-26a, pri-miR-  
20 30a, pri-miR-33, pri-miR-122, pri-miR-375, pri-miR-199, pri-miR-99, pri-miR-194, pri-miR-155, and pri-miR-451.
7. The nucleic acid molecule of claim 6, wherein the miRNA scaffold is derived from pri-miR-  
25 33.
8. The nucleic acid of claim 1, wherein the miRNA further comprises 5-6 thymidines at the 5' end.
- 30 9. The nucleic acid of claim 1, further comprising a promoter sequence.

10. The nucleic acid of claim 9, wherein the promoter sequence is a U6 promoter sequence, MHCK7 promoter sequence, CK6 promoter sequence, tMCK promoter sequence, CK5 promoter sequence, MCK promoter sequence, HAS promoter sequence, MPZ promoter sequence, desmin promoter sequence, APOA2 promoter sequence, hAAT promoter sequence, INS promoter sequence, IRS2 promoter sequence, MYH6 promoter sequence, MYL2 promoter sequence, TNNI3 promoter sequence, SYN1 promoter sequence, GFAP promoter sequence, NES promoter sequence, MBP promoter sequence, or TH promoter sequence.
11. A adeno-associated virus (AAV) vector comprising:
- 10 a promoter sequence,  
an nucleic acid molecule comprising a miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript; and  
a capsid protein.
- 15 12. The AAV vector of claim 11, wherein the nucleic acid molecule comprises a miRNA guide sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 2010-2769.
13. The AAV vector of claim 12, wherein the nucleic acid molecule comprises a miRNA guide sequence selected from SEQ ID NOs: 1250-2769 or 6687-6770.
- 20
14. The AAV vector of claim 13, wherein the nucleic acid molecule comprises a miRNA having at least 95% sequence identity to a sequence selected from the group of SEQ ID NOs: 2770-3597 or 6670-6812.
- 25
15. The AAV vector of claim 14, wherein the nucleic acid molecule comprises a miRNA guide sequence selected from SEQ ID NOs: 2770-3597 or 6670-6812.
16. The AAV vector of claim 11, wherein the miRNA targets a double homeobox 4 (DUX4) transcript at the position shown in Table 6.
- 30

17. The AAV vector of claim 11, wherein the miRNA scaffold is derived from the pri-miRNA selected from the group consisting of pri-miR-21, pri-miR-22, pri-miR-26a, pri-miR-30a, pri-miR-33, pri-miR-122, pri-miR-375, pri-miR-199, pri-miR-99, pri-miR-194, pri-miR-155, and pri-miR-451.
- 5
18. The AAV vector of claim 17, wherein the miRNA scaffold is derived from pri-miR-33.
19. The AAV vector of claim 11, wherein the miRNA further comprises 5-6 thymidines at the 5' end.
- 10
20. The AAV vector of claim 1, further comprising a promoter sequence.
21. The AAV vector of claim 20, wherein the promoter sequence is a U6 promoter sequence, MHCK7 promoter sequence, CK6 promoter sequence, tMCK promoter sequence, CK5 promoter
- 15
22. The AAV vector of claim 11, wherein the capsid protein comprises at least one modification that results in reduced liver-tropism of the AAV vector and/or preferential targeting of the AAV vector to muscle tissue.
- 20
23. The AAV vector of claim 11, wherein the vector further comprises a nuclear export sequence enabling nuclear spreading.
24. The AAV vector of claim 11, wherein the capsid protein comprises at least one modification that is an insertion between any two contiguous amino acids between amino acids 262-269, 327-
- 25
- 332, 382-386, 452-460, 488-505, 527-539, 545-558, 581-593, 704-714, or any combination thereof in an AAV9 capsid polypeptide or in an analogous position in an AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV rh.74, AAV rh.10 capsid polypeptide.
25. The AAV vector of claim 24, wherein the capsid protein may be selected from the sequences
- 30
- in Tables 1-5.

26. A method of inhibiting expression of a gene or gene product in a cell, the method comprising administering to a subject a composition that results in expression within the cell of a nucleic acid molecule comprising a pri-miR scaffold and a miR guide sequence that targets a double homeobox 4 (DUX4) transcript.

5

27. The method of claim 26, wherein the nucleic acid molecule comprises a miRNA guide sequence having at least 95% sequence identity to a sequence selected from SEQ ID NOs: 1250-2769.

10 28. The method of claim 27, wherein the nucleic acid molecule comprises a miRNA guide sequence selected from SEQ ID NOs: 2010-2769 or 2770-3597.

29. The method of claim 28 wherein the nucleic acid molecule comprises a miRNA having at least 95% sequence identity to a sequence selected from the group of SEQ ID NOs: 2770-3529  
15 or 6670-6812.

30. The method of claim 29, wherein the miRNA targets a double homeobox 4 (DUX4) transcript at the position shown in Table 6.

20 31. The method of claim 1, wherein the miRNA scaffold is derived from the pri-miRNA selected from the group consisting of pri-miR-21, pri-miR-22, pri-miR-26a, pri-miR-30a, pri-miR-33, pri-miR-122, pri-miR-375, pri-miR-199, pri-miR-99, pri-miR-194, pri-miR-155, and pri-miR-451.

25 32. The method of claim 31, wherein the miRNA scaffold is derived from pri-miR-33.

33. The method of claim 1, wherein the miRNA further comprises 5-6 thymidines at the 5' end.

34. The method of claim 1, further comprising a promoter sequence.

30

35. The method of claim 34, wherein the promoter sequence is a U6 promoter sequence, MHCK7 promoter sequence, CK6 promoter sequence, tMCK promoter sequence, CK5 promoter sequence, MCK promoter sequence, HAS promoter sequence, MPZ promoter sequence, desmin promoter sequence, APOA2 promoter sequence, hAAT promoter sequence, INS promoter sequence, IRS2 promoter sequence, MYH6 promoter sequence, MYL2 promoter sequence, TNNI3 promoter sequence, SYN1 promoter sequence, GFAP promoter sequence, NES promoter sequence, MBP promoter sequence, or TH promoter sequence.
36. The method of claim 26, wherein the composition comprises an adeno-associated virus (AAV) vector comprising a promoter sequence, the nucleic acid molecule comprising the pri-miR scaffold and miR guide sequence, and a capsid protein.
37. The method of claim 26, wherein the capsid protein comprises at least one modification that results in reduced liver-tropism of the AAV vector and/or preferential targeting of the AAV vector to muscle tissue.
38. The method of claim 36, wherein the AAV vector comprises at least one modification that is an insertion between any two contiguous amino acids between amino acids 262-269, 327-332, 382-386, 452-460, 488-505, 527-539, 545-558, 581-593, 704-714, or any combination thereof in an AAV9 capsid polypeptide or in an analogous position in an AAV1, AAV2, AAV3, AAV4, AAV5, AAV6, AAV7, AAV8, AAV rh.74, AAV rh.10 capsid polypeptide.
39. The method of claim 38, wherein the capsid protein may be selected from the sequences in Tables 1-5.
40. The method of claim 36, wherein the vector further comprises a nuclear export sequence enabling nuclear spreading.
41. The method of claim 26, wherein inhibition of the gene or gene product results in treatment of muscular dystrophy.

42. The method of claim 41, wherein the muscular dystrophy is Facioscapulohumeral Muscular Dystrophy 1.

43. The method of claim 42, wherein the treatment may comprise arresting the muscular effects  
5 of muscular dystrophy.

44. The method of claim 43, wherein the treatment may comprise reversing the muscular effects of the muscular dystrophy.