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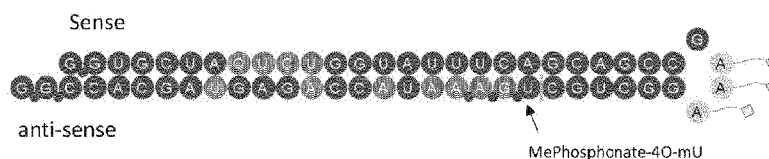
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(54) Title: COMPOSITIONS AND METHODS FOR INHIBITING TRANSMEMBRANE SERINE PROTEASE 6 (TMPRSS6) EXPRESSION

FIG. 3A



(57) Abstract: Oligonucleotides are provided herein that inhibit TMPRSS6 expression. Also provided are compositions including the same and uses thereof, particularly uses relating to treating diseases, disorders and/or conditions associated with hepcidin deficiency or suppression. 5

COMPOSITIONS AND METHODS FOR INHIBITING TRANSMEMBRANE SERINE PROTEASE 6 (TMPRSS6) EXPRESSION

BACKGROUND

Iron is a micronutrient that is a biologically essential component of every living organism. It is required for an adequate erythropoietic function, oxidative metabolism, cellular immune response, and numerous other cellular processes. In its free form, iron is involved in oxidation-reduction reactions, leading to the formation of free radicals, oxidative stress which may lead to organ damage. Living organisms have developed protein systems to transport free iron through the cell membranes and biological fluids and store it in a non-toxic and readily mobilizable form to avoid iron toxicity. In the human body, iron mainly exists in complex forms bound to protein as heme compounds, heme enzymes, or nonheme compounds. Iron absorption occurs by the enterocytes by divalent metal transport 1 and takes place in the duodenum and upper jejunum. Iron is then transferred across the he duodenal mucosa into the blood, where it is transported by transferrin to the cells or the bone marrow for erythropoiesis. Since iron is required for a number of diverse cellular functions, a constant balance between iron uptake, transport, storage, and utilization is required to maintain iron homeostasis. Hepcidin, a circulating peptide hormone encoded by the *HAMP* gene, is secreted by the liver that plays a crucial role in maintaining iron homeostasis. Hepcidin expression is directly regulated by variations in iron intake and its repression leads to an increase in bioavailable serum iron level. Hepcidin blocks iron flux into the plasma by its direct binding to ferroportin, the principal iron exporter localized at the cell membrane of duodenal enterocytes, which absorb iron from the diet, and macrophages, which recycle iron from senescent erythrocytes. Hepcidin binding to ferroportin triggers its internalization and subsequent lysosomal degradation, thereby blocking iron export to the circulatory system. Hepatic hepcidin expression is regulated by three independent pathways, where inflammation (inflammatory cytokines) and high serum iron levels result in hepcidin upregulation, whereas it is downregulated by elevated erythropoiesis facilitating high iron demand for red blood cell production. Put differently, when hepcidin levels are high, serum iron levels decrease which can result in anemia. When hepcidin levels are low, in disease states such as hemochromatosis, iron levels rise and overload can occur.

In pathological situations, prolonged repression of hepcidin often leads to primary iron overload, due to its malfunctional expression as a result of loss of function in the plasma iron-sensing signalling pathway (e.g. hereditary hemochromatosis). In situations of elevated, but dysfunctional erythropoiesis (e.g. beta thalassemia), hepcidin is down regulated resulting in

secondary iron overload. The pathophysiological consequences of primary and secondary iron overload are common resulting in built-up of free plasma iron, accumulation in organs causing damage at disease progression.

5 TMPRSS6 (transmembrane Protease, Serine 6) encodes a type II serine protease and is expressed mainly in the liver. TMPRSS6 participates in a transmembrane signaling pathway triggered by iron deficiency and suppresses diverse pathways of the *HAMP* activation, the gene that encodes hepcidin.

10 Studies show that upregulation of hepcidin ameliorate abnormal erythropoiesis and prevents or limits iron overload in mouse models of β -thalassemia intermedia and hereditary hemochromatosis (Gardenghi et al. **J. Clin. Invest.**, 2010; Guo et al, . **J. Clin. Invest.**, 2013, Schmidt et al. **Blood** 2013; Casu et al. **Blood** 2016; Ramos et al. **Blood** 2012).

15 HFE-associated hereditary hemochromatosis is the most common type of inherited iron overload disorder, with a high prevalence of the p.C282Y mutation in northern European populations (Alexander and Kowdley, **Genetics in Medicine**, 2009). It is thought that impaired hepcidin production in the liver leads to iron overload in HFE-associated hemochromatosis. Iron overload in this context often leads to complications such as liver cirrhosis and diabetes, as well as failure of other affected organs.

20 Consistent with its role in suppressing hepcidin expression, mutations in TMPRSS6 result in disorders such as iron-refractory, iron-deficient anemia. Hepcidin expression is significantly elevated in TMPRSS6 $-/-$ mice and reduction of TMPRSS6 in Hfe $-/-$ mice could ameliorate the iron overload phenotype (Du et al. **Science** 2008; Folgueras et al. **Blood** 2008; Finberg KE et al., **Blood**, 2011).

25 Such evidence suggests a role for targeting TMPRSS6 in the treatment of diseases associated with iron overload. Current treatment options for such diseases are limited. Accordingly, methods for effective treatment of disorders associated with iron overload are currently needed and the present invention addresses this need.

SUMMARY OF DISCLOSURE

30 The present disclosure is based, in part, on the discovery of oligonucleotides (e.g., RNAi oligonucleotides) that reduce *TMPRSS6* expression *in vitro* and *in vivo*. Aberrant expression of *TMPRSS6* has been shown to be associated with altered *hepcidin* expression and serum iron levels. As demonstrated herein, serum iron and serum iron saturation are reduced *in vivo* following administration of *TMPRSS6* RNAi oligonucleotides. Without being bound by theory, inhibition of *TMPRSS6* increases hepcidin expression and subsequently reduces serum iron levels preventing iron overload. Therefore, without wishing to be bound by

theory, oligonucleotides targeting *TMPRSS6* are useful for treating diseases or disorders associated with hepcidin deficiency or suppression.

Accordingly, in some aspects, the present disclosures provides an RNAi oligonucleotide for reducing transmembrane serine protease 6 (*TMPRSS6*) expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand and the antisense strand form a duplex region, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* mRNA target sequence of any one of SEQ ID NOs: 661-852, and wherein the region of complementarity is at least 15 contiguous nucleotides in length.

In some embodiments the sense strand is 15 to 50 nucleotides in length. In some embodiments, the sense strand is 18 to 36 nucleotides in length.

In some embodiments, the antisense strand is 15 to 30 nucleotides in length.

In some embodiments, the antisense strand is 22 nucleotides in length and the antisense strand and the sense strand form a duplex region of at least 19 nucleotides in length, optionally at least 20 nucleotides in length. In some embodiments, the region of complementarity is at least 19 contiguous nucleotides in length. In some embodiments, the region of complementarity is at least 20 contiguous nucleotides in length.

In some aspects, the disclosure provides a double stranded RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising:

(i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is selected from SEQ ID NOs: 1-192, and

(ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some aspects, the disclosure provides a double stranded RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising:

(i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence selected from SEQ ID NOs: 1-192, and wherein the antisense strand is complementary a *TMPRSS6* mRNA target sequence, and

(ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are

separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, the 3' end of the sense strand comprises a stem-loop set forth as S1-Lp-S2, wherein S1 is complementary to S2, and wherein Lp forms a loop between S1 and S2 of 3-5 nucleotides in length. In some embodiments, Lp is a triloop or a tetraloop. In some embodiments, Lp is a tetraloop. In some embodiments, the tetraloop comprises the sequence 5'-GAAA-3'. In some embodiments, the S1 and S2 are 1-10 nucleotides in length and have the same length. In some embodiments, S1 and S2 are 1 nucleotide, 2 nucleotides, 3 nucleotides, 4 nucleotides, 5 nucleotides, 6 nucleotides, 7 nucleotides, 8 nucleotides, 9 nucleotides, or 10 nucleotides in length. In some embodiments, S1 and S2 are 6 nucleotides in length. In some embodiments, the stem-loop comprises the sequence 5'-GCAGCCGAAAGGCUGC-3' (SEQ ID NO: 856).

In some embodiments, the sense strand, proximal to the 3' end of the sense strand, comprises a stem-loop set forth as S1-Lp-S2, wherein S1 is complementary to S2, and wherein Lp forms a loop between S1 and S2 of 3-5 nucleotides in length. In some embodiments, Lp is a triloop or a tetraloop. In some embodiments, Lp is a tetraloop. In some embodiments, the tetraloop comprises the sequence 5'-GAAA-3'. In some embodiments, the S1 and S2 are 1-10 nucleotides in length and have the same length. In some embodiments, S1 and S2 are 1 nucleotide, 2 nucleotides, 3 nucleotides, 4 nucleotides, 5 nucleotides, 6 nucleotides, 7 nucleotides, 8 nucleotides, 9 nucleotides, or 10 nucleotides in length. In some embodiments, S1 and S2 are 6 nucleotides in length. In some embodiments, the stem-loop comprises the sequence 5'-GCAGCCGAAAGGCUGC-3' (SEQ ID NO: 856).

In some embodiments, the antisense strand comprises a 3' overhang sequence of one or more nucleotides in length. In some embodiments, the overhang comprises purine nucleotides. In some embodiments, the 3' overhang sequence is 2 nucleotides in length. In some embodiments, the 3' overhang is selected from AA, GG, AG, and GA. In some embodiments, the overhang is GG or AA. In some embodiments, the overhang is GG.

In some embodiments, the oligonucleotide comprises at least one modified nucleotide. In some embodiments, the modified nucleotide comprises a 2'-modification. In some embodiments, the 2'-modification is a modification selected from 2'-aminoethyl, 2'-fluoro, 2'-O-methyl, 2'-O-methoxyethyl, and 2'-deoxy-2'-fluoro-β-d-arabinonucleic acid. In some embodiments, the modification is a 2'-modification selected from 2'-fluoro and 2'-O-methyl. In some embodiments, about 10-15%, 10%, 11%, 12%, 13%, 14% or 15% of the nucleotides of the sense strand comprise a 2'-fluoro modification. In some embodiments, about 25-35%, 25%, 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34% or 35% of the nucleotides of the

antisense strand comprise a 2'-fluoro modification. In some embodiments, about 25-35%, 25%, 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34% or 35% of the nucleotides of the oligonucleotide comprise a 2'-fluoro modification. In some embodiments, the sense strand comprises 36 nucleotides with positions 1-36 from 5' to 3', wherein positions 8-11 comprise a 2'-fluoro modification. In some embodiments, the antisense strand comprises 22 nucleotides with positions 1-22 from 5' to 3', and wherein positions 2, 3, 4, 5, 7, 10 and 14 comprise a 2'-fluoro modification.

In some embodiments, the oligonucleotide comprises at least one modified internucleotide linkage. In some embodiments, the at least one modified internucleotide linkage is a phosphorothioate linkage. In some embodiments, the antisense strand comprises a phosphorothioate linkage (i) between positions 1 and 2, and between positions 2 and 3; or (ii) between positions 1 and 2, between positions 2 and 3, and between positions 3 and 4, wherein positions are numbered 1-4 from 5' to 3'. In some embodiments, the antisense strand is 22 nucleotides in length, and wherein the antisense strand comprises a phosphorothioate linkage between positions 20 and 21 and between positions 21 and 22, wherein positions are numbered 1-22 from 5' to 3'. In some embodiments, the antisense strand is 22 nucleotides in length, and wherein the antisense strand comprises a phosphorothioate linkage between positions 1 and 2, between positions 2 and 3, positions 3 and 4, positions 20 and 21, and positions 21 and 22. In some embodiments, the sense strand comprises a phosphorothioate linkage between positions 1 and 2, wherein positions are numbered 5' to 3'.

In some embodiments, the 4'-carbon of the sugar of the 5'-nucleotide of the antisense strand comprises a phosphate analog. In some embodiments, the phosphate analog is oxymethyl phosphonate, vinyl phosphonate or malonyl phosphonate, optionally wherein the phosphate analog is a 4'-phosphate analog comprising 4'-oxymethylphosphonate.

In some embodiments, at least one nucleotide of the oligonucleotide is conjugated to one or more targeting ligands. In some embodiments, each targeting ligand comprises a carbohydrate, amino sugar, cholesterol, or polypeptide. In some embodiments, the stem loop comprises one or more targeting ligands conjugated to one or more nucleotides of the stem loop. In some embodiments, the one or more targeting ligands is conjugated to one or more nucleotides of the loop. In some embodiments, the loop comprises 4 nucleotides numbered 1-4 from 5' to 3', wherein nucleotides at positions 2, 3, and 4 each comprise one or more targeting ligands, wherein the targeting ligands are the same or different. In some embodiments, each targeting ligand comprises a N-acetylgalactosamine (GalNAc) moiety. In some embodiments, the GalNAc moiety is a monovalent GalNAc moiety, a bivalent GalNAc moiety, a trivalent

GalNAc moiety or a tetravalent GalNAc moiety. In some embodiments, up to 4 nucleotides of Lp of the stem-loop are each conjugated to a monovalent GalNAc moiety.

In some embodiments, the region of complementarity is fully complementary to the mRNA target sequence. In some embodiments, the region of complementarity is partially complementary to the mRNA target sequence. In some embodiments, the region of complementarity comprises no more than four mismatches to the mRNA target sequence.

In some embodiments, the region of complementarity is fully complementary to the *TMPRSS6* mRNA target sequence at nucleotide positions 2-8 of the antisense strand, wherein nucleotide positions are numbered 5' to 3'. In some embodiments, the region of complementarity is fully complementary to the *TMPRSS6* mRNA target sequence at nucleotide positions 2-11 of the antisense strand, wherein nucleotide positions are numbered 5' to 3'.

In some embodiments, the sense strand comprises a nucleotide sequence of any one of SEQ ID NOs: 579-580, 585-587, 590 and 595-597. In some embodiments, the antisense strand comprises a nucleotide sequence of any one of SEQ ID NOs: 600-601, 606-608, 611 and 616-618.

In some embodiments, the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively.

In some embodiments, the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively.

In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 579, and the antisense strand comprises a nucleotide sequence as set forth in

SEQ ID NO: 600. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 580, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 601. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 590, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 611. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 597, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 618. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 586, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 607.

In some embodiments, the antisense strand is 22 nucleotides in length.

In some embodiments, the antisense strand comprises a nucleotide sequence selected from SEQ ID NOs: 600-601, 606-608, 611, and 616-618.

In some embodiments, the sense strand is 36 nucleotides in length.

In some embodiments, the sense strand comprises a nucleotide sequence selected from SEQ ID NOs: 579-580, 585-587, 590, and 595-597.

In some embodiments, the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 621 and 642, respectively;
- b) SEQ ID NOs: 622 and 643, respectively;
- c) SEQ ID NOs: 637 and 658, respectively;
- d) SEQ ID NOs: 632 and 653, respectively;
- e) SEQ ID NOs: 638 and 659, respectively;
- f) SEQ ID NOs: 639 and 660, respectively;
- g) SEQ ID NOs: 627 and 648, respectively;
- h) SEQ ID NOs: 628 and 649, respectively; and,
- i) SEQ ID NOs: 629 and 650, respectively.

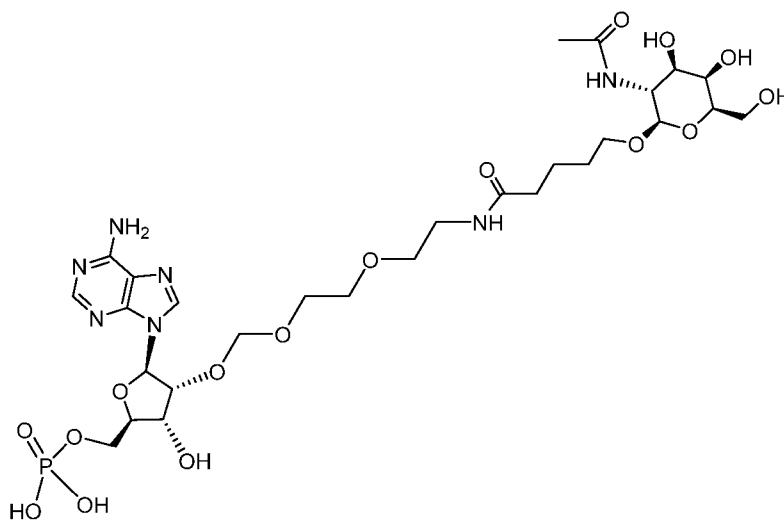
In some embodiments, the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 621 and 642, respectively;
- b) SEQ ID NOs: 622 and 643, respectively;
- c) SEQ ID NOs: 632 and 653, respectively;
- d) SEQ ID NOs: 639 and 660, respectively; and,
- e) SEQ ID NOs: 628 and 649, respectively.

In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 621, and the antisense strand comprises a nucleotide sequence as set forth in

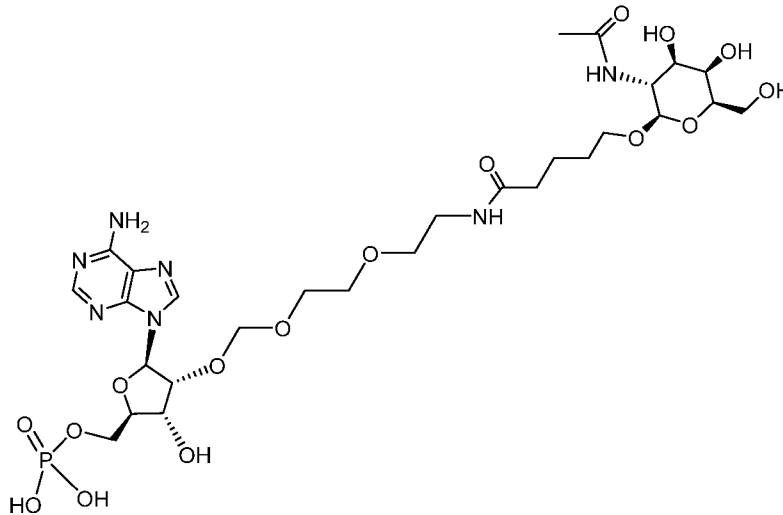
SEQ ID NO: 642. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 622, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 643. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 632, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 653. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 639, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 660. In some embodiments, the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 628, and the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 649.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' - [mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mU][mC][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 621), and wherein the antisense strand comprises the sequence and all of the modifications of 5' [MePhosphonate-4O-mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG]-3' (SEQ ID NO: 642), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' [mGs][mC][mU][mA][mC][mU][mC][fU][fG][fG][fU][mA][mU][mU][mU][mC][mC][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-

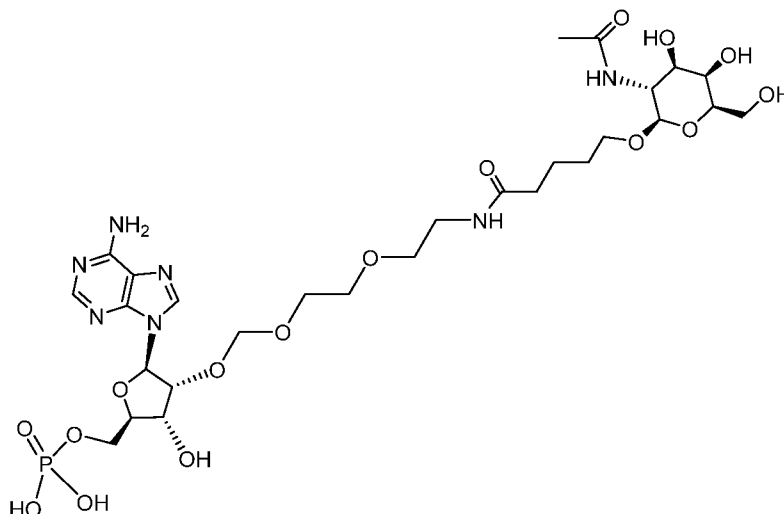
GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 622), and wherein the antisense strand comprises the sequence and all of the modifications of 5' [MePhosphonate-4O-mUs][fUs][fAs][fG][fG][mA][fA][mA][mU][fA][mC][mC][mA][fG][mA][mG][mU][mA][mG][mCs][mGs][mG]- 3' (SEQ ID NO: 643), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' -

10 [mCs][mU][mC][mA][mC][mC][mU][fG][fC][fU][fU][mC][mU][mU][mC][mU][mG][mG][mU][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 632), and wherein the antisense strand comprises the sequence and all of the modifications of 5' -[MePhosphonate-4O-mUs][fAs][fCs][fC][fA][mG][fA][mA][mG][fA][mA][mG][mC][fA]

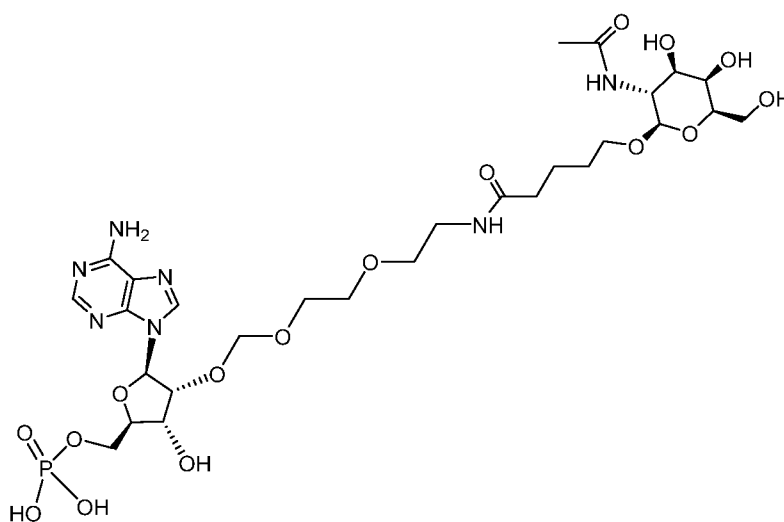
15 [mG][mG][mU][mG][mA][mGs][mGs][mG] -3' (SEQ ID NO: 653), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' -

5 [mAs][mG][mU][mG][mU][mG][mA][fA][fG][fA][mC][mA][mU][mA][mG][mC][mU][mG][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]3' (SEQ ID NO: 639), and wherein the antisense strand comprises the sequence and all of the modifications of 5'- [MePhosphonate-4O-mUs][fCs][fAs][fG][fC][mU][fA][mU][mG][fU][mC][mU][mU][fU][mC][mA][mC][mA][mC][mUs][mGs][mG]-3' (SEQ ID NO: 660), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =

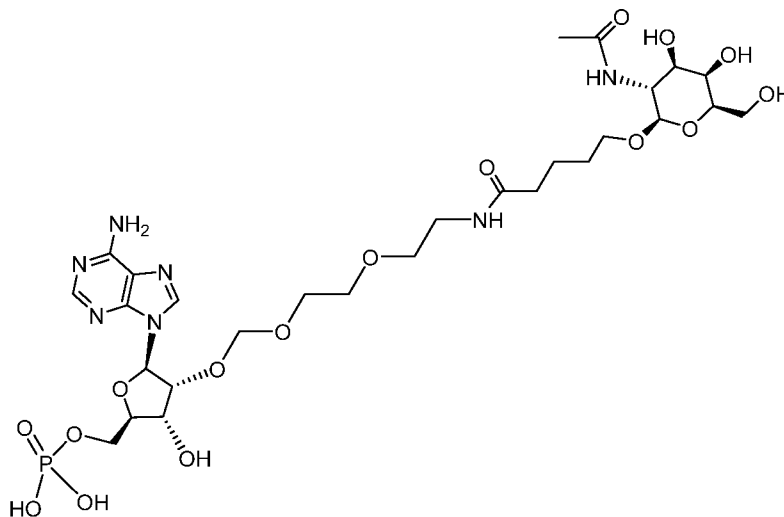
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In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' -

15 [mGs][mG][mG][mU][mG][mC][mA][fC][fU][fA][fU][mG][mG][mC][mU][mU][mG][mU][mA][mA][

mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]3' (SEQ ID NO: 628), and wherein the antisense strand comprises the sequence and all of the modifications of 5'- [MePhosphonate-4O-mUs][fUs][fAs][fC][fA][mA][fG][mC][mC][fA][mU][mA][mG][fU][mG][mC][mA][mC][mC][mCs][mGs][mG] -3' (SEQ ID NO: 649), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 621 and the antisense strand comprises SEQ ID NO: 642, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14A.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 632 and the antisense strand comprises SEQ ID NO: 653, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14B.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 639 and the antisense strand comprises SEQ ID NO: 660, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14C.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 628 and the antisense strand comprises SEQ ID NO: 649, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14D.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 621 and the antisense strand comprises SEQ ID NO: 642, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 10A-B.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 632 and the antisense strand comprises SEQ ID NO: 653, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 11A-B.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 639 and the antisense strand comprises SEQ ID NO: 660, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 12A-B.

In some aspects, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 628 and the antisense strand comprises SEQ ID NO: 649, the antisense strand comprising a region of complementarity to a *TMPRSS6* RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 13A-B.

In some embodiments, the disclosure provides a pharmaceutical composition comprising an RNAi oligonucleotide described herein, and a pharmaceutically acceptable carrier, delivery agent or excipient.

In some embodiments, the disclosure provides a method for treating a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression, the method comprising administering to the subject a therapeutically effective amount of an RNAi oligonucleotide or pharmaceutical composition described herein, thereby treating the subject.

5 In some embodiments, hepcidin expression is increased after administering the RNAi oligonucleotide. In some embodiments, iron saturation levels in the serum are decreased after administering the RNAi oligonucleotide. In some embodiments, serum iron levels are decreased after administering the RNAi oligonucleotide.

10 In some embodiments, the disclosure provides a method of delivering an oligonucleotide to a subject, the method comprising administering a pharmaceutical composition described herein to the subject.

In some embodiments, the disclosure provides a method for reducing *TMPRSS6* expression in a cell, a population of cells or a subject, the method comprising the step of:

- 15 i. contacting the cell or the population of cells with an RNAi oligonucleotide described herein, or a pharmaceutical composition described herein; or
ii. administering to the subject an RNAi oligonucleotide described herein, or a pharmaceutical composition described herein.

20 In some embodiments, reducing *TMPRSS6* expression comprises reducing an amount or level of *TMPRSS6* mRNA, an amount or level of matriptase-2 protein, or both. In some embodiments, reducing *TMPRSS6* expression results in an increase in hepcidin production. In some embodiments, reducing *TMPRSS6* expression results in a decrease in serum iron levels. In some embodiments, reducing *TMPRSS6* expression results in a decrease in serum iron saturation.

25 In some embodiments, the subject has a disease, disorder or condition associated with hepcidin deficiency or suppression. In some embodiments, the disease, disorder or condition associated with hepcidin deficiency is hemochromatosis or beta-thalassemia. In some embodiments, the disease, disorder or condition associated with hepcidin suppression is polycythemia vera.

30 In some embodiments, the RNAi oligonucleotide, or pharmaceutical composition, is administered in combination with a second composition or therapeutic agent.

In some embodiments, the disclosure provides use of an RNAi oligonucleotide or pharmaceutical composition described herein, in the manufacture of a medicament for the treatment of a disease, disorder or condition associated with hepcidin deficiency or suppression, optionally for the treatment of hemochromatosis (e.g. hereditary
35 hemochromatosis), polycythaemia vera or beta-thalassemia.

In some embodiments, the disclosure provides an RNAi oligonucleotide or pharmaceutical composition described herein, for use, or adaptable for use, in the treatment of a disease, disorder or condition associated with hepcidin deficiency or suppression, optionally for the treatment of hemochromatosis (e.g. hereditary hemochromatosis), polycythaemia vera or beta-thalassemia.

In some embodiments, the disclosure provides a kit comprising an RNAi oligonucleotide described herein, an optional pharmaceutically acceptable carrier, and a package insert comprising instructions for administration to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression.

In some embodiments, the disclosure provides an RNAi oligonucleotide or pharmaceutical composition for use, or adaptable for use, or a kit described herein, wherein the disease, disorder or condition associated with hepcidin deficiency or suppression is hemochromatosis (e.g. hereditary hemochromatosis), polycythaemia vera or beta-thalassemia.

BRIEF DESCRIPTION OF DRAWINGS

FIGs. 1A and 1B provide graphs depicting the percent (%) of human *TMPRSS6* mRNA remaining in the liver of mice exogenously expressing human *TMPRSS6* (hydrodynamic injection model) after treatment with GalNAc-conjugated *TMPRSS6* oligonucleotides. CD-1 mice were dosed subcutaneously with 1 mg/kg or 2 mg/kg of the indicated GalNAc-conjugated *TMPRSS6* oligonucleotide formulated in PBS. Four days post-dose mice were hydrodynamically injected (HDI) with a DNA plasmid encoding human *TMPRSS6*. The level of human *TMPRSS6* mRNA was determined from livers collected 18 hours later using a 3' qPCR assay (**FIG. 1A**) and a 5' qPCR assay (**FIG. 1B**). Hs/Mf= construct is human and monkey *TMPRSS6* specific; Hs-Mf-Mm = construct is human, monkey, and murine *TMPRSS6* specific.

FIG. 2 provides a graph depicting the percent (%) of murine *TMPRSS6* mRNA remaining in the liver of mice of **FIGs. 1A-1B**.

FIGs. 3A-3D provide schematics depicting the modification patterns of GalNAc-conjugated *TMPRSS6* oligonucleotides -0416 (**FIG. 3A**), -0651 (**FIG. 3B**), -0831 (**FIG. 3C**), and -1546 (**FIG. 3D**). The sense strand includes a tetraloop structure of nucleotides 27-30 of the 36-nucleotide strand. The antisense strand is complementary and includes a 2-nucleotide overhang.

FIGs. 4A-4F provide graphs depicting the percent (%) of endogenous monkey *TMPRSS6* mRNA remaining in the liver of NHP (non-human primates) after treatment with

GalNAc-conjugated *TMPRSS6* oligonucleotides. *Macaca fascicularis* were dosed subcutaneously with 1 mg/kg or 4 mg/kg of the indicated GalNAc-conjugated *TMPRSS6* oligonucleotide formulated in PBS at Day 0, 28, 56, 84, and 112. Liver samples were collected at Day -7 (1 week prior to administration) (FIG. 4A); Day 28 (FIG. 4B); Day 56 (FIG. 4C); Day 84 (FIG. 4D); Day 112 (FIG. 4E); and, Day 168 (FIG. 4F) and the level of monkey *TMPRSS6* mRNA was determined using a qPCR assay relative to PBS treated animals.

FIGs. 5A-5F provide graphs depicting the percent (%) of monkey endogenous *hepcidin* mRNA remaining in the liver of NHP (non-human primate) after treatment with GalNAc-conjugated *TMPRSS6* oligonucleotides. *Macaca fascicularis* were dosed subcutaneously with 1 mg/kg or 4 mg/kg of the indicated GalNAc-conjugated *TMPRSS6* oligonucleotide formulated in PBS at Day 0, 28, 56, 84, and 112. Liver samples were collected at Day -7 (1 week prior to administration) (FIG. 5A); Day 28 (FIG. 5B); Day 56 (FIG. 5C); Day 84 (FIG. 5D); Day 112 (FIG. 5E); and, Day 168 (FIG. 5F) and the level of monkey *hepcidin* mRNA was determined using a qPCR assay relative to PBS treated animals.

FIGs. 6A-6F provide graphs depicting serum iron levels in monkeys after treatment with GalNAc-conjugated *TMPRSS6* oligonucleotides. *Macaca fascicularis* were dosed subcutaneously with 1 mg/kg or 4 mg/kg of the indicated GalNAc-conjugated *TMPRSS6* oligonucleotide formulated in PBS at Day 0, 28, 56, 84, and 112. Serum samples were collected at Day -7 (1 week prior to administration) (FIG. 6A); Day 28 (FIG. 6B); Day 56 (FIG. 6C); Day 84 (FIG. 6D); Day 112 (FIG. 6E); and, Day 168 (FIG. 6F) and the level of serum iron level was determined.

FIGs. 7A-7B provide graphs depicting the serum iron levels measured in FIGs. 6A-6F relative to PBS control treated animals for the doses of 1 mg/kg and 4 mg/kg, respectively.

FIGs. 8A-8F provide graphs depicting serum iron saturation levels in monkeys after treatment with GalNAc-conjugated *TMPRSS6* oligonucleotides. *Macaca fascicularis* were dosed subcutaneously with 1 mg/kg or 4 mg/kg of the indicated GalNAc-conjugated *TMPRSS6* oligonucleotide formulated in PBS at Day 0, 28, 56, 84, and 112. Serum samples were collected at Day -7 (1 week prior to administration) (FIG. 8A); Day 28 (FIG. 8B); Day 56 (FIG. 8C); Day 84 (FIG. 8D); Day 112 (FIG. 8E); and, Day 168 (FIG. 8F) and serum iron saturation was determined.

FIGs. 9A-9B provide graphs depicting the serum iron saturation measured in FIGs. 8A-8F relative to PBS control treated animals, for the doses of 1 mg/kg and 4 mg/kg, respectively.

FIGs. 10A-B provide a chemical drawing of GalNAc-conjugated *TMPRSS6* oligonucleotide -0416, wherein A and B identify the bonds between Figs. 10A and 10B.

FIGs. 11A-B provide a chemical drawing of GalNAc-conjugated *TMPRSS6* oligonucleotide -0651, wherein A and B identify the bonds between Figs. 11A and 11B.

FIGs. 12A-B provide a chemical drawing of GalNAc-conjugated *TMPRSS6* oligonucleotide -0831, wherein A and B identify the bonds between Figs. 12A and 12B.

5 **FIGs. 13A-B** provide a chemical drawing of GalNAc-conjugated *TMPRSS6* oligonucleotide -1546, wherein A and B identify the bonds between Figs. 13A and 13B.

FIGs. 14A-D provides provide chemical of GalNAc-conjugated *TMPRSS6* oligonucleotides -0416 (**FIG. 14A**), -0651 (**FIG. 14B**), -0831 (**FIG. 14C**), and -1546 (**FIG. 14D**).

DESCRIPTION

10 Transmembrane Serine Protease 6 (*TMPRSS6*) encodes the type II transmembrane serine proteinase, matriptase-2, located on the surface of cells. The matriptase-2 protein functions in iron homeostasis by regulating hepcidin.

According to some aspects, the disclosure provides oligonucleotides (e.g., RNAi oligonucleotides) that reduce *TMPRSS6* expression in the liver. In some embodiments, the
15 oligonucleotides provided herein are designed to treat diseases associated with hepcidin deficiency or suppression. In some respects, the disclosure provides methods of treating a disease associated with hepcidin deficiency or suppression by reducing *TMPRSS6* expression in specific cells (e.g., cells of the liver) or in organs (e.g., liver).

Oligonucleotide Inhibitors of *TMPRSS6* Expression

20 *TMPRSS6* Target Sequences

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) is targeted to a target sequence comprising a *TMPRSS6* mRNA. In some embodiments, an oligonucleotide described herein is targeted to a target sequence within a *TMPRSS6* mRNA sequence. In some embodiments, the oligonucleotide described herein corresponds to a target
25 sequence within a *TMPRSS6* mRNA sequence. In some embodiments, the oligonucleotide, or a portion, fragment, or strand thereof (e.g., an antisense strand or a guide strand of a double-stranded (ds) RNAi oligonucleotide) binds or anneals to a target sequence comprising *TMPRSS6* mRNA, thereby inhibiting *TMPRSS6* expression.

In some embodiments, the oligonucleotide is targeted to a *TMPRSS6* target sequence
30 for the purpose of inhibiting *TMPRSS6* expression *in vivo*. In some embodiments, the amount or extent of inhibition of *TMPRSS6* expression by an oligonucleotide targeted to a *TMPRSS6* target sequence correlates with the potency of the oligonucleotide. In some embodiments, the amount or extent of inhibition of *TMPRSS6* expression by an oligonucleotide targeted to a

TMPRSS6 target sequence correlates with the amount or extent of therapeutic benefit in a subject or patient having a disease, disorder or condition associated with hepcidin deficiency or suppression treated with the oligonucleotide.

Through examination of the nucleotide sequence of mRNAs encoding *TMPRSS6*, including mRNAs of multiple different species (e.g., human, cynomolgus monkey, and mouse; see, e.g., Example 2) and as a result of *in vitro* and *in vivo* testing (see, e.g., Examples 2 -5), it has been discovered that certain nucleotide sequences of *TMPRSS6* mRNA are more amenable than others to oligonucleotide-based inhibition and are thus useful as target sequences for the oligonucleotides herein. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, a sequence of any one of SEQ ID NOs: 661-852. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 844, 841, 818, 794 or 762. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 844. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 841. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 818. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 794. In some embodiments, a *TMPRSS6* target sequence comprises, or consists of, the sequence set forth in SEQ ID NO: 762.

TMPRSS6 Targeting Sequences

In some embodiments, the oligonucleotides herein (e.g., RNAi oligonucleotides) have regions of complementarity to *TMPRSS6* mRNA (e.g., within a target sequence of *TMPRSS6* mRNA) for purposes of targeting the *TMPRSS6* mRNA in cells and inhibiting and/or reducing *TMPRSS6* expression. In some embodiments, the oligonucleotides herein comprise a *TMPRSS6* targeting sequence (e.g., an antisense strand or a guide strand of an RNAi oligonucleotide) having a region of complementarity that binds or anneals to a *TMPRSS6* target sequence by complementary (Watson-Crick) base pairing. The targeting sequence or region of complementarity is generally of a suitable length and base content to enable binding or annealing of the oligonucleotide (or a strand thereof) to a *TMPRSS6* mRNA for purposes of inhibiting and/or reducing *TMPRSS6* expression. In some embodiments, the targeting sequence or region of complementarity is at least about 12, at least about 13, at least about 14, at least about 15, at least about 16, at least about 17, at least about 18, at least about 19, at least about 20, at least about 21, at least about 22, at least about 23, at least about 24, at least about 25, at least about 26, at least about 27, at least about 28, at least about 29 or at

least about 30 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is about 12 to about 30 (e.g., 12 to 30, 12 to 22, 15 to 25, 17 to 21, 18 to 27, 19 to 27, or 15 to 30) nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is about 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 or 30 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 18 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 19 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 20 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 21 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 22 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 23 nucleotides in length. In some embodiments, the targeting sequence or region of complementarity is 24 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 661-852, and the targeting sequence or region of complementarity is 18 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 661-852, and the targeting sequence or region of complementarity is 19 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 193-384, and the targeting sequence or region of complementarity is 20 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 193-384, and the targeting sequence or region of complementarity is 21 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 193-384, and the targeting sequence or region of complementarity is 22 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 193-384, and the targeting sequence or region of complementarity is 23 nucleotides in length. In some embodiments, an oligonucleotide comprises a targeting sequence or region of complementarity complementary to a sequence of any one of SEQ ID NOs: 193-384 and the targeting sequence or region of complementarity is 24 nucleotides in length.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a targeting sequence or a region of complementarity (e.g., an antisense strand or a

guide strand of a double-stranded oligonucleotide) that is fully complementary to a *TMPRSS6* target sequence. In some embodiments, the targeting sequence or region of complementarity is partially complementary to a *TMPRSS6* target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is fully complementary to a *TMPRSS6* target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is partially complementary to a *TMPRSS6* target sequence.

In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is fully complementary to a sequence of any one of SEQ ID NOs: 661-852. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is fully complementary to the sequence set forth in SEQ ID NOs: 844, 841, 818, 794, and 762. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is partially complementary to a sequence of any one of SEQ ID NOs: 661-852. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is partially complementary to the sequence set forth in SEQ ID NOs: 844, 841, 818, 794, and 762.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a targeting sequence or region of complementarity that is complementary to a contiguous sequence of nucleotides within a *TMPRSS6* mRNA, wherein the contiguous sequence of nucleotides is about 12 to about 30 nucleotides in length (e.g., 12 to 30, 12 to 28, 12 to 26, 12 to 24, 12 to 20, 12 to 18, 12 to 16, 14 to 22, 16 to 20, 18 to 20 or 18 to 19 nucleotides in length). In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is complementary to a contiguous sequence of nucleotides within a *TMPRSS6* mRNA, wherein the contiguous sequence of nucleotides is 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20 nucleotides in length. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is complementary to a contiguous sequence of nucleotides within a *TMPRSS6* mRNA, wherein the contiguous sequence of nucleotides is 19 nucleotides in length. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity that is complementary to a contiguous sequence of nucleotides within a *TMPRSS6* mRNA, wherein the contiguous sequence of nucleotides is 20 nucleotides in length.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, optionally wherein the contiguous sequence of nucleotides is 19 nucleotides in length. In some embodiments, the

oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 844, 841, 818, 794, and 762, wherein the contiguous sequence of nucleotides is 19 nucleotides in length. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 376, 373, 350, 326, and 294, wherein the contiguous sequence of nucleotides is 20 nucleotides in length.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a targeting sequence or region of complementarity having one or more base pair (bp) mismatches with the corresponding *TMPRSS6* target sequence. In some embodiments, the targeting sequence or region of complementarity may have up to about 1, up to about 2, up to about 3, up to about 4, up to about 5, etc. mismatches with the corresponding *TMPRSS6* target sequence provided that the ability of the targeting sequence or region of complementarity to bind or anneal to the *TMPRSS6* mRNA under appropriate hybridization conditions and/or the ability of the oligonucleotide to inhibit *TMPRSS6* expression is maintained. Alternatively, the targeting sequence or region of complementarity may have no more than 1, no more than 2, no more than 3, no more than 4, or no more than 5 mismatches with the corresponding *TMPRSS6* target sequence provided that the ability of the targeting sequence or region of complementarity to bind or anneal to the *TMPRSS6* mRNA under appropriate hybridization conditions and/or the ability of the oligonucleotide to inhibit *TMPRSS6* expression is maintained. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having 1 mismatch with the corresponding target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having 2 mismatches with the corresponding target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having 3 mismatches with the corresponding target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having 4 mismatches with the corresponding target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having 5 mismatches with the corresponding target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having more than one mismatch (e.g., 2, 3, 4, 5 or more mismatches) with the corresponding target sequence, wherein at least 2 (e.g., all) of the mismatches are positioned consecutively (e.g., 2, 3, 4, 5 or more mismatches in a row), or wherein the mismatches are interspersed throughout the targeting sequence or region of complementarity.

In some embodiments, the oligonucleotide comprises a targeting sequence or region of complementarity having more than one mismatch (e.g., 2, 3, 4, 5 or more mismatches) with the corresponding target sequence, wherein at least 2 (e.g., all) of the mismatches are positioned consecutively (e.g., 2, 3, 4, 5 or more mismatches in a row), or wherein at least one or more non-mismatched base pair is located between the mismatches, or a combination thereof. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, wherein the targeting sequence or region of complementarity may have up to about 1, up to about 2, up to about 3, up to about 4, up to about 5, *etc.* mismatches with the corresponding *TMPRSS6* target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, wherein the targeting sequence or region of complementarity may have no more than 1, no more than 2, no more than 3, no more than 4, or no more than 5 mismatches with the corresponding *TMPRSS6* target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, wherein the targeting sequence or region of complementarity may have up to about 1, up to about 2, up to about 3, up to about 4, up to about 5, *etc.* mismatches with the corresponding *TMPRSS6* target sequence. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 844, 841, 818, 794, and 762, wherein the targeting sequence or region of complementarity may have no more than 1, no more than 2, no more than 3, no more than 4, or no more than 5 mismatches with the corresponding *TMPRSS6* target sequence.

Types of Oligonucleotides

A variety of oligonucleotide types and/or structures are useful for targeting *TMPRSS6* in the methods herein including, but not limited to, RNAi oligonucleotides, antisense oligonucleotides (ASOs), miRNAs, *etc.* Any of the oligonucleotide types described herein or elsewhere are contemplated for use as a framework to incorporate a *TMPRSS6* targeting sequence herein for the purposes of inhibiting *TMPRSS6* expression.

In some embodiments, the oligonucleotides herein inhibit *TMPRSS6* expression by engaging with RNA interference (RNAi) pathways upstream or downstream of Dicer involvement. For example, RNAi oligonucleotides have been developed with each strand having sizes of about 19-25 nucleotides with at least one 3' overhang of 1 to 5 nucleotides

(see, e.g., US Patent No. 8,372,968). Longer oligonucleotides also have been developed that are processed by Dicer to generate active RNAi products (see, e.g., US Patent No. 8,883,996). Further work produced extended dsRNAs where at least one end of at least one strand is extended beyond a duplex targeting region, including structures where one of the strands includes a thermodynamically stabilizing tetraloop structure (see, e.g., US Patent Nos. 8,513,207 and 8,927,705, as well as Intl. Patent Application Publication No. WO 2010/033225). Such structures may include single-stranded (ss) extensions (on one or both sides of the molecule) as well as double-stranded (ds) extensions.

In some embodiments, the oligonucleotides herein engage with the RNAi pathway downstream of the involvement of Dicer (e.g., Dicer cleavage). In some embodiments, the oligonucleotides described herein are Dicer substrates. In some embodiments, upon endogenous Dicer processing, double-stranded nucleic acids of 19-23 nucleotides in length capable of reducing *TMPRSS6* expression are produced. In some embodiments, the oligonucleotide has an overhang (e.g., of 1, 2, or 3 nucleotides in length) in the 3' end of the antisense strand. In some embodiments, the oligonucleotide (e.g., siRNA) comprises a 21-nucleotide guide strand that is antisense to a target RNA and a complementary passenger strand, in which both strands anneal to form a 19-bp duplex and 2 nucleotide overhangs at either or both 3' ends. Longer oligonucleotide designs also are available including oligonucleotides having a guide strand of 23 nucleotides and a passenger strand of 21 nucleotides, where there is a blunt end on the right side of the molecule (3' end of passenger strand/5' end of guide strand) and a two nucleotide 3'-guide strand overhang on the left side of the molecule (5' end of the passenger strand/3' end of the guide strand). In such molecules, there is a 21 bp duplex region. See, e.g., US Patent Nos. 9,012,138; 9,012,621 and 9,193,753.

In some embodiments, the oligonucleotides herein comprise sense and antisense strands that are both in the range of about 17 to 36 (e.g., 17 to 36, 20 to 25 or 21-23) nucleotides in length. In some embodiments, the oligonucleotides described herein comprise an antisense strand of 19-30 nucleotides in length and a sense strand of 19-50 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand. In some embodiments, an oligonucleotide herein comprises a sense and antisense strand that are both in the range of about 19-22 nucleotides in length. In some embodiments, the sense and antisense strands are of equal length. In some embodiments, an oligonucleotide comprises sense and antisense strands, such that there is a 3'-overhang on either the sense strand or the antisense strand, or both the sense and antisense strand. In some embodiments, for oligonucleotides that have sense and antisense strands that are both

in the range of about 21-23 nucleotides in length, a 3' overhang on the sense, antisense, or both sense and antisense strands is 1 or 2 nucleotides in length. In some embodiments, the oligonucleotide has a guide strand of 22 nucleotides and a passenger strand of 20 nucleotides, where there is a blunt end on the right side of the molecule (3' end of passenger strand/5' end of guide strand) and a 2 nucleotide 3'-guide strand overhang on the left side of the molecule (5' end of the passenger strand/3' end of the guide strand). In such molecules, there is a 20 bp duplex region.

Other oligonucleotide designs for use with the compositions and methods herein include: 16-mer siRNAs (see, e.g., Nucleic Acids in Chemistry and Biology, Blackburn (ed.), ROYAL SOCIETY OF CHEMISTRY, 2006), shRNAs (e.g., having 19 bp or shorter stems; see, e.g., Moore *et al.* (2010) *Methods Mol. Biol.* 629:141-158), blunt siRNAs (e.g., of 19 bps in length; see, e.g., Kraynack & Baker (2006) *RNA* 12:163-176), asymmetrical siRNAs (aiRNA; see, e.g., Sun *et al.* (2008) *Nat. Biotechnol.* 26:1379-82), asymmetric shorter-duplex siRNA (see, e.g., Chang *et al.* (2009) *Mol. Ther.* 17:725-32), fork siRNAs (see, e.g., Hohjoh (2004) *FEBS Lett.* 557:193-98), ss siRNAs (Elsner (2012) *Nat. Biotechnol.* 30:1063), dumbbell-shaped circular siRNAs (see, e.g., Abe *et al.* (2007) *J. Am. Chem. Soc.* 129:15108-09), and small internally segmented interfering RNA (siRNA; see, e.g., Bramsen *et al.* (2007) *Nucleic Acids Res.* 35:5886-97). Further non-limiting examples of an oligonucleotide structures that may be used in some embodiments to reduce or inhibit the expression of *TMPRSS6* are microRNA (miRNA), short hairpin RNA (shRNA) and short siRNA (see, e.g., Hamilton *et al.* (2002) *EMBO J.* 21:4671-79; see also, US Patent Application Publication No. 2009/0099115).

Still, in some embodiments, an oligonucleotide for reducing or inhibiting *TMPRSS6* expression herein is single-stranded (ss). Such structures may include but are not limited to single-stranded RNAi molecules. Recent efforts have demonstrated the activity of ss RNAi molecules (see, e.g., Matsui *et al.* (2016) *Mol. Ther.* 24:946-55). However, in some embodiments, oligonucleotides herein are antisense oligonucleotides (ASOs). An antisense oligonucleotide is a single-stranded oligonucleotide that has a nucleobase sequence which, when written in the 5' to 3' direction, comprises the reverse complement of a targeted segment of a particular nucleic acid and is suitably modified (e.g., as a gapmer) to induce RNaseH-mediated cleavage of its target RNA in cells or (e.g., as a mixmer) to inhibit translation of the target mRNA in cells. ASOs for use herein may be modified in any suitable manner known in the art including, for example, as shown in US Patent No. 9,567,587 (including, e.g., length, sugar moieties of the nucleobase (pyrimidine, purine), and alterations of the heterocyclic portion of the nucleobase). Further, ASOs have been used for decades to reduce expression of specific target genes (see, e.g., Bennett *et al.* (2017) *Annu. Rev. Pharmacol.* 57:81-105).

In some embodiments, the antisense oligonucleotide shares a region of complementarity with *TMPRSS6* mRNA. In some embodiments, the antisense oligonucleotide targets various areas of the human *TMPRSS6* gene identified as NM_001289000.2. In some embodiments, the antisense oligonucleotide is 15-50 nucleotides in length. In some
5 embodiments, the antisense oligonucleotide is 15-25 nucleotides in length. In some embodiments, the antisense oligonucleotide is 22 nucleotides in length. In some embodiments, the antisense oligonucleotide is complementary to any one of SEQ ID NOs: 661-852. In some embodiments, the antisense oligonucleotide is at least 15 contiguous nucleotides in length. In
10 some embodiments, the antisense oligonucleotide is at least 19 contiguous nucleotides in length. In some embodiments, the antisense oligonucleotide is at least 20 contiguous nucleotides in length. In some embodiments, the antisense oligonucleotide differs by 1, 2, or 3 nucleotides from the target sequence.

Double-Stranded Oligonucleotides

15 In some aspects, the disclosure provides double-stranded (ds) RNAi oligonucleotides for targeting *TMPRSS6* mRNA and inhibiting *TMPRSS6* expression (e.g., via the RNAi pathway) comprising a sense strand (also referred to herein as a passenger strand) and an antisense strand (also referred to herein as a guide strand). In some embodiments, the sense strand and antisense strand are separate strands and are not covalently linked. In some
20 embodiments, the sense strand and antisense strand are covalently linked. In some embodiments, the sense strand and antisense strand form a duplex region, wherein the sense strand and antisense strand, or a portion thereof, binds with one another in a complementary fashion (e.g., by Watson-Crick base pairing).

In some embodiments, a first region (R1) of the sense strand and the antisense strand
25 form a first duplex (D1). In some embodiments, D1 is at least about 15 (e.g., at least 15, at least 16, at least 17, at least 18, at least 19, at least 20 or at least 21) nucleotides in length. In some embodiments, D1 is in the range of about 12 to 30 nucleotides in length (e.g., 12 to 30, 12 to 27, 15 to 22, 18 to 22, 18 to 25, 18 to 27, 18 to 30 or 21 to 30 nucleotides in length). In some embodiments, D1 is at least 12 nucleotides in length (e.g., at least 12, at least 15, at
30 least 20, at least 25, or at least 30 nucleotides in length). In some embodiments, D1 is 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 or 30 nucleotides in length. In some embodiments, D1 is 20 nucleotides in length. In some embodiments, D1 comprising sense strand and antisense strand does not span the entire length of the sense strand and/or antisense strand. In some embodiments, D1 comprising the sense strand and antisense strand
35 spans the entire length of either the sense strand or antisense strand or both. In certain

embodiments, D1 comprising the sense strand and antisense strand spans the entire length of both the sense strand and the antisense strand.

In some embodiments, the sense strand has a second region (R2), wherein R2 comprises a first subregion (S1), a loop (Lp), such as a tetraloop (tetraLp) or triloop (triLp), and a second subregion (S2), wherein Lp is located between S1 and S2, and wherein S1 and S2 form a second duplex (D2). D2 may have various lengths. In some embodiments, D2 is about 1-6 bp in length. In some embodiments, D2 is 2-6, 3-6, 4-6, 5-6, 1-5, 2-5, 3-5 or 4-5 bp in length. In some embodiments, D2 is 1, 2, 3, 4, 5 or 6 bp in length. In some embodiments, D2 is 6 bp in length.

In some embodiments, an oligonucleotide provided herein comprises a sense strand comprising a sequence of any one of SEQ ID NOs: 193-384 and an antisense strand comprising a sequence of any one of SEQ ID NOs: 385-576. In some embodiments, an oligonucleotide provided herein comprises a sense strand comprising a sequence of any one of SEQ ID NOs: 661-852 and an antisense strand comprising a sequence of any one of SEQ ID NOs: 1-192.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand comprising a sequence of any one of SEQ ID NOs: 577-597 and an antisense strand comprising a sequence of any one of SEQ ID NOs: 598-618 as is arranged in **Table 4**.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand comprising nucleotide sequences selected from:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand comprising nucleotide sequences selected from:

- 5 a) SEQ ID NOs: 579 and 600, respectively;
b) SEQ ID NOs: 580 and 601, respectively;
c) SEQ ID NOs: 590 and 611, respectively;
d) SEQ ID NOs: 597 and 618, respectively; and,
e) SEQ ID NOs: 586 and 607, respectively.

10 In some embodiments, the sense strand comprises the sequence of SEQ ID NO: 579 and the antisense strand comprises the sequence of SEQ ID NO: 600. In some embodiments, the sense strand comprises the sequence of SEQ ID NO: 580 and the antisense strand comprises the sequence of SEQ ID NO: 601. In some embodiments, the sense strand comprises the sequence of SEQ ID NO: 590 and the antisense strand comprises the sequence of SEQ ID NO: 611. In some embodiments, the sense strand comprises the sequence of SEQ ID NO: 597 and the antisense strand comprises the sequence of SEQ ID NO: 618. In some embodiments, the sense strand comprises the sequence of SEQ ID NO: 586 and the antisense strand comprises the sequence of SEQ ID NO: 607.

15 It should be appreciated that, in some embodiments, sequences presented in the Sequence Listing may be referred to in describing the structure of an oligonucleotide (e.g., an RNAi oligonucleotide) or other nucleic acid. In such embodiments, the actual oligonucleotide or other nucleic acid may have one or more alternative nucleotides (e.g., an RNA counterpart of a DNA nucleotide or a DNA counterpart of an RNA nucleotide) and/or one or more modified nucleotides and/or one or more modified internucleotide linkages and/or one or more other modification when compared with the specified sequence while retaining essentially same or similar complementary properties as the specified sequence.

20 In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand that, when acted upon by a Dicer enzyme, results in an antisense strand that is incorporated into the mature RISC. In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a 25-nucleotide sense strand and a 27-nucleotide antisense strand that when acted upon by a Dicer enzyme results in an antisense strand that is incorporated into the mature RISC. In some embodiments, the 25-nucleotide sense strand comprises a sequence selected from SEQ ID NOs: 193-384. In some embodiments, the 27-nucleotide antisense strand comprises a sequence selected from SEQ ID NOs: 385-576. In some embodiments, the sense strand of the oligonucleotide is longer than 27 nucleotides (e.g., 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 or 50 nucleotides). In some embodiments, the sense strand of the oligonucleotide is longer than 25 nucleotides (e.g., 26, 27, 28, 29 or 30 nucleotides). In some

embodiments, the sense strand of the oligonucleotide comprises a nucleotide sequence selected from SEQ ID NOs: 577-597, wherein the nucleotide sequence is longer than 27 nucleotides (e.g., 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49 or 50 nucleotides). In some embodiments, the sense strand of the oligonucleotide comprises a nucleotide sequence selected from SEQ ID NOs: 577-597, wherein the nucleotide sequence is longer than 25 nucleotides (e.g., 26, 27, 28, 29 or 30 nucleotides).

In some embodiments, oligonucleotides herein (e.g., RNAi oligonucleotides) have one 5' end that is thermodynamically less stable when compared to the other 5' end. In some embodiments, an asymmetric oligonucleotide is provided that includes a blunt end at the 3' end of a sense strand and a 3'-overhang at the 3' end of an antisense strand. In some embodiments, the 3'-overhang on the antisense strand is about 1-8 nucleotides in length (e.g., 1, 2, 3, 4, 5, 6, 7 or 8 nucleotides in length). In some embodiments, the oligonucleotide has an overhang comprising two (2) nucleotides on the 3' end of the antisense (guide) strand. However, other overhangs are possible. In some embodiments, an overhang is a 3'-overhang comprising a length of between 1 and 6 nucleotides, optionally 1 to 5, 1 to 4, 1 to 3, 1 to 2, 2 to 6, 2 to 5, 2 to 4, 2 to 3, 3 to 6, 3 to 5, 3 to 4, 4 to 6, 4 to 5, 5 to 6 nucleotides, or 1, 2, 3, 4, 5 or 6 nucleotides. However, in some embodiments, the overhang is a 5'-overhang comprising a length of between 1 and 6 nucleotides, optionally 1 to 5, 1 to 4, 1 to 3, 1 to 2, 2 to 6, 2 to 5, 2 to 4, 2 to 3, 3 to 6, 3 to 5, 3 to 4, 4 to 6, 4 to 5, 5 to 6 nucleotides, or 1, 2, 3, 4, 5 or 6 nucleotides. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, and a 5'-overhang comprising a length of between 1 and 6 nucleotides. In some embodiments, the oligonucleotide comprises a sense strand comprising a nucleotide sequence selected from SEQ ID NOs: 577-597, wherein the oligonucleotide comprises a 5'-overhang comprising a length of between 1 and 6 nucleotides. In some embodiments, the oligonucleotide comprises an antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 598-618, wherein the oligonucleotide comprises a 5'-overhang comprising a length of between 1 and 6 nucleotides. In some embodiments, the oligonucleotide comprises a sense strand comprising a nucleotide sequence selected from SEQ ID NOs: 577-597 and antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 598-618, wherein the oligonucleotide comprises a 5'-overhang comprising a length of between 1 and 6 nucleotides.

In some embodiments, two (2) terminal nucleotides on the 3' end of an antisense strand are modified. In some embodiments, the two (2) terminal nucleotides on the 3' end of the antisense strand are complementary with the target mRNA (e.g., *TMPRSS6* mRNA). In

some embodiments, the two (2) terminal nucleotides on the 3' end of the antisense strand are not complementary with the target mRNA. In some embodiments, the two (2) terminal nucleotides on the 3' end of the antisense strand of an oligonucleotide herein are unpaired. In some embodiments, the two (2) terminal nucleotides on the 3' end of the antisense strand of an oligonucleotide herein comprise an unpaired guanine (e.g., 5'-GG-3'). In some embodiments, the two (2) terminal nucleotides on the 3' end of an antisense strand of an oligonucleotide herein are not complementary to the target mRNA. In some embodiments, two (2) terminal nucleotides on each 3' end of an oligonucleotide are guanines (GG). In some embodiments, one or both of the two (2) terminal GG nucleotides on each 3' end of an oligonucleotide herein is not complementary with the target mRNA. In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, wherein the two (2) terminal nucleotides on the 3' end of the antisense strand of the oligonucleotide herein comprises an unpaired GG. In some embodiments, the oligonucleotide comprises an antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 1-192, wherein the two (2) terminal nucleotides on the 3' end of the antisense strand of the oligonucleotide comprises an unpaired GG. In some embodiments, the oligonucleotide comprises a sense strand comprising a nucleotide sequence selected from SEQ ID NOs: 577-597 and antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 598-618, wherein the two (2) terminal nucleotides on the 3' end of the antisense strand of the oligonucleotide comprises an unpaired GG.

In some embodiments, there is one or more (e.g., 1, 2, 3, 4 or 5) mismatch(s) between a sense and antisense strand comprising an oligonucleotide herein (e.g., an RNAi oligonucleotide). If there is more than one mismatch between a sense and antisense strand, they may be positioned consecutively (e.g., 2, 3 or more in a row), or interspersed throughout the region of complementarity. In some embodiments, the 3' end of the sense strand comprises one or more mismatches. In some embodiments, two (2) mismatches are incorporated at the 3' end of the sense strand. In some embodiments, base mismatches, or destabilization of segments at the 3' end of the sense strand of an oligonucleotide herein improves or increases the potency of the oligonucleotide. In some embodiments, the sense and antisense strands of an oligonucleotide herein comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;

- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein there is one or more (e.g., 1, 2, 3, 4 or 5) mismatch(s) between the sense and antisense strands.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand comprising nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

wherein there is one or more (e.g., 1, 2, 3, 4 or 5) mismatch(s) between the sense and antisense strands.

Antisense Strands

In some embodiments, an antisense strand of an oligonucleotide herein (e.g., an RNAi oligonucleotide) is referred to as a "guide strand". For example, an antisense strand that engages with RNA-induced silencing complex (RISC) and binds to an *Argonaute* protein such as Ago2, or engages with or binds to one or more similar factors, and directs silencing of a target gene, as the antisense strand is referred to as a guide strand. In some embodiments, a sense strand comprising a region of complementary to a guide strand is referred to herein as a "passenger strand."

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises an antisense strand of up to about 50 nucleotides in length (e.g., up to 50, up to 40, up to 35, up to 30, up to 27, up to 25, up to 21, up to 19, up to 17 or up to 12 nucleotides in length). In some embodiments, an oligonucleotide comprises an antisense strand of at least about 12 nucleotides in length (e.g., at least 12, at least 15, at least 19, at least 21, at least 22, at least 25, at least 27, at least 30, at least 35 or at least 38 nucleotides in length). In some embodiments, an oligonucleotide comprises an antisense strand in a range of about 12 to about 40 (e.g., 12 to 40, 12 to 36, 12 to 32, 12 to 28, 15 to 40, 15 to 36, 15 to 32, 15 to 28, 17

to 22, 17 to 25, 19 to 27, 19 to 30, 20 to 40, 22 to 40, 25 to 40 or 32 to 40) nucleotides in length. In some embodiments, an oligonucleotide comprises antisense strand of 15 to 30 nucleotides in length. In some embodiments, an antisense strand of any one of the oligonucleotides disclosed herein is of 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 or 40 nucleotides in length. In some embodiments, an oligonucleotide comprises an antisense strand of 22 nucleotides in length.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) for targeting *TMPRSS6* comprises an antisense strand comprising or consisting of a sequence as set forth in any one of SEQ ID NOs: 385-576. In some embodiments, an oligonucleotide herein comprises an antisense strand comprising at least about 12 (e.g., at least 12, at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least 23) contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 385-576. In some embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6* comprises an antisense strand comprising or consisting of a sequence as set forth in any one of SEQ ID NOs: 598-618. In some embodiments, an oligonucleotide herein comprises an antisense strand comprising at least about 12 (e.g., at least 12, at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least 23) contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 598-618. In some embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6* comprises an antisense strand comprising or consisting of a sequence as set forth in any one of SEQ ID NOs: 598-618. In some embodiments, an oligonucleotide herein comprises an antisense strand comprising at least about 12 (e.g., at least 12, at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least 23) contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 600, 601, 611, 618, and 607. In some embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6* comprises an antisense strand comprising or consisting of a sequence as set forth in any one of SEQ ID NOs: 600, 601, 611, 618, and 607.

In some embodiments, an oligonucleotide herein comprises an antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 1-192. In some embodiments, an oligonucleotide herein comprises an antisense strand comprising a nucleotide sequence selected from SEQ ID NOs: 184, 181, 158, 134, and 102.

Sense Strands

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) for targeting *TMPRSS6* mRNA and inhibiting *TMPRSS6* expression comprises a sense strand sequence as set forth in any one of SEQ ID NOs: 661-852. In some
5 embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) for targeting *TMPRSS6* mRNA and inhibiting *TMPRSS6* expression comprises a sense strand sequence as set forth in any one of SEQ ID NOs: 193-384. In some embodiments, an oligonucleotide herein has a sense strand comprised of at least about 12 (e.g., at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least
10 23) contiguous nucleotides of a sequence as set forth in in any one of SEQ ID NOs: 193-384. In some embodiments, an oligonucleotide herein has a sense strand comprised of at least about 12 (e.g., at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, or at least 19) contiguous nucleotides of a sequence as set forth in in any one of SEQ ID NOs: 661-852. In some embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6*
15 mRNA and inhibiting *TMPRSS6* expression comprises a sense strand sequence as set forth in any one of SEQ ID NOs: 577-597. In some embodiments, an oligonucleotide herein has a sense strand comprised of least about 12 (e.g., at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least 23) contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 577-597. In some
20 embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6* mRNA and inhibiting *TMPRSS6* expression comprises a sense strand sequence as set forth in any one of SEQ ID NOs: 579, 580, 590, 597, and 586. In some embodiments, an oligonucleotide herein has a sense strand that comprise at least about 12 (e.g., at least 13, at least 14, at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, at least 21, at least 22 or at least 23)
25 contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 579, 580, 590, 597, and 586. In some embodiments, an oligonucleotide disclosed herein for targeting *TMPRSS6* mRNA and inhibiting *TMPRSS6* expression comprises a sense strand sequence as set forth in any one of SEQ ID NOs: 844, 841, 818, 794, and 762. In some embodiments, an oligonucleotide herein has a sense strand that comprise at least about 12 (e.g., at least 13,
30 at least 14, at least 15, at least 16, at least 17, at least 18, or at least 19) contiguous nucleotides of a sequence as set forth in any one of SEQ ID NOs: 844, 841, 818, 794, and 762.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand (or passenger strand) of up to about 50 nucleotides in length (e.g., up to 50, up to 40, up to 36, up to 30, up to 27, up to 25, up to 21, up to 19, up
35 to 17 or up to 12 nucleotides in length). In some embodiments, an oligonucleotide herein

comprises a sense strand of at least about 12 nucleotides in length (e.g., at least 12, at least 15, at least 19, at least 21, at least 25, at least 27, at least 30, at least 36 or at least 38 nucleotides in length). In some embodiments, an oligonucleotide herein comprises a sense strand in a range of about 12 to about 50 (e.g., 12 to 50, 12 to 40, 12 to 36, 12 to 32, 12 to 28, 15 to 40, 15 to 36, 15 to 32, 15 to 28, 17 to 21, 17 to 25, 19 to 27, 19 to 30, 20 to 40, 22 to 40, 25 to 40 or 32 to 40) nucleotides in length. In some embodiments, an oligonucleotide herein comprises a sense strand of 15 to 50 nucleotides in length. In some embodiments, an oligonucleotide herein comprises a sense strand of 18 to 36 nucleotides in length. In some embodiments, an oligonucleotide herein comprises a sense strand of 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, or 50 nucleotides in length. In some embodiments, an oligonucleotide herein comprises a sense strand of 36 nucleotides in length.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand comprising a stem-loop structure proximal the 3' end of the sense strand. In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand comprising a stem-loop structure at the 3' end of the first region (R1) of the sense strand. In some embodiments, the stem-loop is formed by intrastrand base pairing. In some embodiments, a sense strand comprises a stem-loop structure proximal its 5' end. In some embodiments, a sense strand comprises a stem-loop structure at the 5' end of the first region (R1). In some embodiments, the stem of the stem-loop comprises a duplex of 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 2 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 3 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 4 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 5 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 6 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 7 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 8 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 9 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 10 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 11 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 12 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 13 nucleotides in length. In some embodiments, the stem of the stem-loop comprises a duplex of 14 nucleotides in length.

In some embodiments, a stem-loop provides the oligonucleotide protection against degradation (e.g., enzymatic degradation), facilitates or improves targeting and/or delivery to a target cell, tissue, or organ (e.g., the liver), or both. For example, in some embodiments, the loop of a stem-loop is comprised of nucleotides comprising one or more modifications that facilitate, improve, or increase targeting to a target mRNA (e.g., a *TMPRSS6* mRNA), inhibition of target gene expression (e.g., *TMPRSS6* expression), and/or delivery, uptake, and/or penetrance into a target cell, tissue, or organ (e.g., the liver), or a combination thereof. In some embodiments, the stem-loop itself or modification(s) to the stem-loop do not affect or do not substantially affect the inherent gene expression inhibition activity of the oligonucleotide, but facilitates, improves, or increases stability (e.g., provides protection against degradation) and/or delivery, uptake, and/or penetrance of the oligonucleotide to a target cell, tissue, or organ (e.g., the liver). In certain embodiments, an oligonucleotide herein comprises a sense strand comprising (e.g., at its 3' end, proximal its 3' end and/or at the 3' end of the first region (R1) of the sense strand) a stem-loop set forth as: S1-Lp-S2, in which S1 is complementary to S2, and in which Lp forms a single-stranded loop of linked nucleotides between S1 and S2 of up to about 10 nucleotides in length (e.g., 3, 4, 5, 6, 7, 8, 9 or 10 nucleotides in length). In some embodiments, the loop (Lp) is 3 nucleotides in length (referred to herein as "triloop"). In some embodiments, the loop (Lp) is 4 nucleotides in length (referred to herein as "tetraloop"). In some embodiments, the loop (Lp) is 5 nucleotides in length. In some embodiments, the loop (Lp) is 6 nucleotides in length. In some embodiments, the loop (Lp) is 7 nucleotides in length. In some embodiments, the loop (Lp) is 8 nucleotides in length. In some embodiments, the loop (Lp) is 9 nucleotides in length. In some embodiments, the loop (Lp) is 10 nucleotides in length.

In some embodiments, the tetraloop comprises the sequence 5'-GAAA-3'. In some embodiments, the stem loop comprises the sequence 5'-GCAGCCGAAAGGCUGC-3' (SEQ ID NO: 856).

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a targeting sequence or a region of complementary that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, and the oligonucleotide comprises a sense strand comprising (e.g., at its 3' end, proximal its 3' end and/or at the 3' end of the first region (R1) of the sense strand) a stem-loop set forth as: S1-Lp-S2, in which S1 is complementary to S2, and in which Lp forms a single-stranded loop between S1 and S2 of up to about 10 nucleotides in length (e.g., 3, 4, 5, 6, 7, 8, 9 or 10 nucleotides in length). In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementary that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852, and the oligonucleotide comprises a sense

strand comprising (e.g., at its 3' end, proximal its 3' end and/or at the 3' end of the first region (R1) of the sense strand) a stem-loop set forth as: S1-Lp-S2, in which S1 is complementary to S2, and in which Lp forms a single-stranded loop between S1 and S2 of 4 nucleotides in length.

In some embodiments, a loop (Lp) of a stem-loop having the structure S1-Lp-S2 as described herein is a triloop (triLp). In some embodiments, the oligonucleotide comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852 and a triloop. In some embodiments, the triloop comprises ribonucleotides, deoxyribonucleotides, modified nucleotides, ligands (e.g., delivery ligands), and combinations thereof.

In some embodiments, a loop (Lp) of a stem-loop having the structure S1-Lp-S2 as described above is a tetraloop (tetraLp) as described in US Patent No. 10,131,912, incorporated herein by reference. In some embodiments, an oligonucleotide herein comprises a targeting sequence or a region of complementarity that is complementary to a contiguous sequence of nucleotides of any one of SEQ ID NOs: 661-852 and a tetraloop. In some embodiments, the tetraloop comprises ribonucleotides, deoxyribonucleotides, modified nucleotides, ligands (e.g., delivery ligands), and combinations thereof.

Duplex Length

In some embodiments, a duplex formed between a sense and antisense strand is at least 12 (e.g., at least 15, at least 16, at least 17, at least 18, at least 19, at least 20, or at least 21) nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is in the range of 12-30 nucleotides in length (e.g., 12 to 30, 12 to 27, 12 to 22, 15 to 25, 18 to 30, 18 to 22, 18 to 25, 18 to 27, 18 to 30, 19 to 30 or 21 to 30 nucleotides in length). In some embodiments, a duplex formed between a sense and antisense strand is 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29 or 30 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 12 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 13 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 14 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 15 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 16 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 17 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 18 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 19 nucleotides in length. In some embodiments, a duplex formed between a sense

and antisense strand is 20 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 21 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 22 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 23 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 24 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 25 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 26 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 27 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 28 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 29 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand is 30 nucleotides in length. In some embodiments, a duplex formed between a sense and antisense strand does not span the entire length of the sense strand and/or antisense strand. In some embodiments, a duplex between a sense and antisense strand spans the entire length of either the sense or antisense strands. In some embodiments, a duplex between a sense and antisense strand spans the entire length of both the sense strand and the antisense strand. In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein a duplex formed between a sense and antisense strand is in the range of 12-30 nucleotides in length (e.g., 12 to 30, 12 to 27, 12 to 22, 15 to 25, 18 to 30, 18 to 22, 18 to 25, 18 to 27, 18 to 30, 19 to 30 or 21 to 30 nucleotides in length)

In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;

- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

wherein a duplex formed between a sense and antisense strand is in the range of 12-
 5 30 nucleotides in length (e.g., 12 to 30, 12 to 27, 12 to 22, 15 to 25, 18 to 30, 18 to 22, 18 to
 25, 18 to 27, 18 to 30, 19 to 30 or 21 to 30 nucleotides in length)

Oligonucleotide Termini

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi
 10 oligonucleotide) comprises a sense strand and an antisense strand, wherein the termini of
 either or both strands comprise a blunt end. In some embodiments, an oligonucleotide herein
 comprises sense and antisense strands that are separate strands which form an asymmetric
 duplex region having an overhang at the 3' terminus of the antisense strand. In some
 embodiments, an oligonucleotide herein comprises a sense strand and an antisense strand,
 15 wherein the termini of either or both strands comprise an overhang comprising one or more
 nucleotides. In some embodiments, the one or more nucleotides comprising the overhang are
 unpaired nucleotides. In some embodiments, an oligonucleotide herein comprises a sense
 strand and an antisense strand, wherein the 3' termini of the sense strand and the 5' termini
 of the antisense strand comprise a blunt end. In some embodiments, an oligonucleotide herein
 20 comprises a sense strand and an antisense strand, wherein the 5' termini of the sense strand
 and the 3' termini of the antisense strand comprise a blunt end.

In some embodiments, an oligonucleotide herein comprises a sense strand and an
 antisense strand, wherein the 3' terminus of either or both strands comprise a 3'-overhang
 comprising one or more nucleotides. In some embodiments, an oligonucleotide herein
 25 comprises a sense strand and an antisense strand, wherein the sense strand comprises a 3'-
 overhang comprising one or more nucleotides. In some embodiments, an oligonucleotide
 herein comprises a sense strand and an antisense strand, wherein the antisense strand
 comprises a 3'-overhang comprising one or more nucleotides. In some embodiments, an
 oligonucleotide herein comprises a sense strand and an antisense strand, wherein both the
 30 sense strand and the antisense strand comprises a 3'-overhang comprising one or more
 nucleotides.

In some embodiments, the 3'-overhang is about one (1) to twenty (20) nucleotides in
 length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or about 20
 nucleotides in length). In some embodiments, the 3' overhang is about one (1) to nineteen
 35 (19), one (1) to eighteen (18), one (1) to seventeen (17), one (1) to sixteen (16), one (1) to

fifteen (15), one (1) to fourteen (14), one (1) to thirteen (13), one (1) to twelve (12), one (1) to eleven (11), one (1) to ten (10), one (1) to nine (9), one (1) to eight (8), one (1) to seven (7), one (1) to six (6), one (1) to five (5), one (1) to four (4), one (1) to three (3), or about one (1) to two (2) nucleotides in length. In some embodiments, the 3'-overhang is (1) nucleotide in length.

- 5 In some embodiments, the 3'-overhang is two (2) nucleotides in length. In some embodiments, the 3'-overhang is three (3) nucleotides in length. In some embodiments, the 3'-overhang is four (4) nucleotides in length. In some embodiments, the 3'-overhang is five (5) nucleotides in length. In some embodiments, the 3'-overhang is six (6) nucleotides in length. In some
10 embodiments, the 3'-overhang is seven (7) nucleotides in length. In some embodiments, the 3'-overhang is eight (8) nucleotides in length. In some embodiments, the 3'-overhang is nine (9) nucleotides in length. In some embodiments, the 3'-overhang is ten (10) nucleotides in length. In some embodiments, the 3'-overhang is eleven (11) nucleotides in length. In some
15 embodiments, the 3'-overhang is twelve (12) nucleotides in length. In some embodiments, the 3'-overhang is thirteen (13) nucleotides in length. In some embodiments, the 3'-overhang is fourteen (14) nucleotides in length. In some embodiments, the 3'-overhang is fifteen (15) nucleotides in length. In some embodiments, the 3'-overhang is sixteen (16) nucleotides in length. In some
20 embodiments, the 3'-overhang is seventeen (17) nucleotides in length. In some embodiments, the 3'-overhang is eighteen (18) nucleotides in length. In some embodiments, the 3'-overhang is nineteen (19) nucleotides in length. In some embodiments, the 3'-overhang is twenty (20) nucleotides in length.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand, wherein the sense and antisense strands of the oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- 25 a) SEQ ID NOs: 579 and 600, respectively;
b) SEQ ID NOs: 580 and 601, respectively;
c) SEQ ID NOs: 595 and 616, respectively;
d) SEQ ID NOs: 590 and 611, respectively;
e) SEQ ID NOs: 596 and 617, respectively;
30 f) SEQ ID NOs: 597 and 618, respectively;
g) SEQ ID NOs: 585 and 606, respectively;
h) SEQ ID NOs: 586 and 607, respectively; and,
i) SEQ ID NOs: 587 and 608, respectively,

and wherein the antisense strand comprises a 3'-overhang about one (1) to twenty
35 (20) nucleotides in length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,

19, or about 20 nucleotides in length), optionally wherein the 3'-overhang is two (2) nucleotides in length.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand, wherein the sense and antisense strands of the oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

and wherein the antisense strand comprises a 3'-overhang about one (1) to twenty (20) nucleotides in length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or about 20 nucleotides in length), optionally wherein the 3'-overhang is two (2) nucleotides in length.

In some embodiments, an oligonucleotide herein comprises a sense strand and an antisense strand, wherein the 5' terminus of either or both strands comprise a 5'-overhang comprising one or more nucleotides. In some embodiments, an oligonucleotide herein comprises a sense strand and an antisense strand, wherein the sense strand comprises a 5'-overhang comprising one or more nucleotides. In some embodiments, an oligonucleotide herein comprises a sense strand and an antisense strand, wherein the antisense strand comprises a 5'-overhang comprising one or more nucleotides. In some embodiments, an oligonucleotide herein comprises a sense strand and an antisense strand, wherein both the sense strand and the antisense strand comprises a 5'-overhang comprising one or more nucleotides.

In some embodiments, the 5'-overhang is about one (1) to twenty (20) nucleotides in length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or about 20 nucleotides in length). In some embodiments, the 5' overhang is about one (1) to nineteen (19), one (1) to eighteen (18), one (1) to seventeen (17), one (1) to sixteen (16), one (1) to fifteen (15), one (1) to fourteen (14), one (1) to thirteen (13), one (1) to twelve (12), one (1) to eleven (11), one (1) to ten (10), one (1) to nine (9), one (1) to eight (8), one (1) to seven (7), one (1) to six (6), one (1) to five (5), one (1) to four (4), one (1) to three (3), or about one (1) to two (2) nucleotides in length. In some embodiments, the 5'-overhang is (1) nucleotide in length. In some embodiments, the 5'-overhang is two (2) nucleotides in length. In some embodiments, the 5'-overhang is three (3) nucleotides in length. In some embodiments, the 5'-overhang is

four (4) nucleotides in length. In some embodiments, the 5'-overhang is five (5) nucleotides in length. In some embodiments, the 5'-overhang is six (6) nucleotides in length. In some embodiments, the 5'-overhang is seven (7) nucleotides in length. In some embodiments, the 5'-overhang is eight (8) nucleotides in length. In some embodiments, the 5'-overhang is nine (9) nucleotides in length. In some embodiments, the 5'-overhang is ten (10) nucleotides in length. In some embodiments, the 5'-overhang is eleven (11) nucleotides in length. In some embodiments, the 5'-overhang is twelve (12) nucleotides in length. In some embodiments, the 5'-overhang is thirteen (13) nucleotides in length. In some embodiments, the 5'-overhang is fourteen (14) nucleotides in length. In some embodiments, the 5'-overhang is fifteen (15) nucleotides in length. In some embodiments, the 5'-overhang is sixteen (16) nucleotides in length. In some embodiments, the 5'-overhang is seventeen (17) nucleotides in length. In some embodiments, the 5'-overhang is eighteen (18) nucleotides in length. In some embodiments, the 5'-overhang is nineteen (19) nucleotides in length. In some embodiments, the 5'-overhang is twenty (20) nucleotides in length.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand, wherein the sense and antisense strands of the oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

and wherein the antisense strand comprises a 5'-overhang about one (1) to twenty (20) nucleotides in length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or about 20 nucleotides in length), optionally wherein the 5'-overhang is two (2) nucleotides in length.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand, wherein the sense and antisense strands of the oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- 5 e) SEQ ID NOs: 586 and 607, respectively,

and wherein the antisense strand comprises a 5'-overhang about one (1) to twenty (20) nucleotides in length (e.g., about 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, or about 20 nucleotides in length), optionally wherein the 5'-overhang is two (2) nucleotides in length.

10 In some embodiments, one or more (e.g., 2, 3, 4, 5, or more) nucleotides comprising the 3' terminus or 5' terminus of a sense and/or antisense strand are modified. For example, in some embodiments, one or two terminal nucleotides of the 3' terminus of the antisense strand are modified. In some embodiments, the last nucleotide at the 3' terminus of an antisense strand is modified, such that it comprises 2' modification, or it comprises, a 2'-O-
15 methoxyethyl. In some embodiments, the last one or two terminal nucleotides at the 3' terminus of an antisense strand are complementary with the target. In some embodiments, the last one or two nucleotides at the 3' terminus of the antisense strand are not complementary with the target.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi
20 oligonucleotide) comprises a sense strand and an antisense strand, wherein the 3' terminus of the sense strand comprises a step-loop described herein and the 3' terminus of the antisense strand comprises a 3'-overhang described herein. In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand that form a nicked tetraloop structure described herein, wherein the 3'
25 terminus of the sense strand comprises a stem-loop, wherein the loop is a tetraloop described herein, and wherein the 3' terminus of the antisense strand comprises a 3'-overhang described herein. In some embodiments, the 3'-overhang is two (2) nucleotides in length. In some embodiments, the two (2) nucleotides comprising the 3'-overhang both comprise guanine (G) nucleobases. One or both of the nucleotides comprising the 3'-overhang of the antisense
30 strand may not be complementary with the target mRNA. Typically, one or both of the nucleotides comprising the 3'-overhang of the antisense strand are not complementary with the target mRNA.

Oligonucleotide Modifications

In some embodiments, an oligonucleotide described herein (e.g., an RNAi oligonucleotide) comprises a modification. Oligonucleotides (e.g., RNAi oligonucleotides) may be modified in various ways to improve or control specificity, stability, delivery, bioavailability, resistance from nuclease degradation, immunogenicity, base-pairing properties, RNA distribution and cellular uptake and other features relevant to therapeutic or research use.

In some embodiments, the modification is a modified sugar. In some embodiments, the modification is a 5'-terminal phosphate group. In some embodiments, the modification is a modified internucleotide linkage. In some embodiments, the modification is a modified base.

In some embodiments, an oligonucleotide described herein can comprise any one of the modifications described herein or any combination thereof. For example, in some embodiments, an oligonucleotide described herein comprises at least one modified sugar, a 5'-terminal phosphate group, at least one modified internucleotide linkage, and at least one modified base. In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein the oligonucleotide comprises at least one modified sugar, a 5'-terminal phosphate group, at least one modified internucleotide linkage, and at least one modified base.

In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

wherein the oligonucleotide comprises at least one modified sugar, a 5'-terminal phosphate group, at least one modified internucleotide linkage, and at least one modified base.

The number of modifications on an oligonucleotide (e.g., an RNAi oligonucleotide) and the position of those nucleotide modifications may influence the properties of an oligonucleotide. For example, oligonucleotides may be delivered *in vivo* by conjugating them to or encompassing them in a lipid nanoparticle (LNP) or similar carrier. However, when an oligonucleotide is not protected by an LNP or similar carrier, it may be advantageous for at least some of the nucleotides to be modified. Accordingly, in some embodiments, all or substantially all the nucleotides of an oligonucleotide are modified. In some embodiments, more than half of the nucleotides are modified. In some embodiments, less than half of the nucleotides are modified. In some embodiments, the sugar moiety of all nucleotides comprising the oligonucleotide is modified at the 2' position. The modifications may be reversible or irreversible. In some embodiments, an oligonucleotide as disclosed herein has a number and type of modified nucleotides sufficient to cause the desired characteristics (e.g., protection from enzymatic degradation, capacity to target a desired cell after *in vivo* administration, and/or thermodynamic stability).

Sugar Modifications

In some embodiments, an oligonucleotide described herein (e.g., an RNAi oligonucleotide) comprises a modified sugar. In some embodiments, a modified sugar (also referred herein to a sugar analog) includes a modified deoxyribose or ribose moiety in which, for example, one or more modifications occur at the 2', 3', 4' and/or 5' carbon position of the sugar. In some embodiments, a modified sugar may also include non-natural alternative carbon structures such as those present in locked nucleic acids ("LNA"; see, e.g., Koshkin *et al.* (1998) Tetrahedron 54:3607-30), unlocked nucleic acids ("UNA"; see, e.g., Snead *et al.* (2013) Mol. Ther-Nucl. Acids 2:e103) and bridged nucleic acids ("BNA"; see, e.g., Imanishi & Obika (2002) Chem Commun. (Camb) 21:1653-59).

In some embodiments, a nucleotide modification in a sugar comprises a 2'-modification. In some embodiments, a 2'-modification may be 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-fluoro (2'-F), 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA) or 2'-deoxy-2'-fluoro- β -D-arabinonucleic acid (2'-FANA). In some embodiments, the modification is 2'-F, 2'-OMe or 2'-MOE. In some embodiments, a modification in a sugar comprises a modification of the sugar ring, which may comprise modification of one or more carbons of the sugar ring. For example, a modification of a sugar of a nucleotide may comprise a 2'-oxygen of a sugar linked to a 1'-carbon or 4'-carbon of the sugar, or a 2'-oxygen linked to the 1'-carbon or 4'-carbon *via* an ethylene or methylene bridge. In some embodiments, a modified nucleotide has an acyclic

sugar that lacks a 2'-carbon to 3'-carbon bond. In some embodiments, a modified nucleotide has a thiol group, e.g., in the 4' position of the sugar.

In some embodiments, an oligonucleotide (e.g., an RNAi oligonucleotide) described herein comprises at least about 1 modified nucleotide (e.g., at least 1, at least 5, at least 10, at least 15, at least 20, at least 25, at least 30, at least 35, at least 40, at least 45, at least 50, at least 55, at least 60, or more). In some embodiments, the sense strand of the oligonucleotide comprises at least about 1 modified nucleotide (e.g., at least 1, at least 5, at least 10, at least 15, at least 20, at least 25, at least 30, at least 35, or more). In some embodiments, the antisense strand of the oligonucleotide comprises at least about 1 modified nucleotide (e.g., at least 1, at least 5, at least 10, at least 15, at least 20, or more).

In some embodiments, all the nucleotides of the sense strand of the oligonucleotide are modified. In some embodiments, all the nucleotides of the antisense strand of the oligonucleotide are modified. In some embodiments, all the nucleotides of the oligonucleotide (i.e., both the sense strand and the antisense strand) are modified. In some embodiments, the modified nucleotide comprises a 2'-modification (e.g., a 2'-F or 2'-OMe, 2'-MOE, and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid).

In some embodiments, the disclosure provides oligonucleotides having different modification patterns. In some embodiments, an oligonucleotide herein comprises a sense strand having a modification pattern as set forth in the Examples and Sequence Listing and an antisense strand having a modification pattern as set forth in the Examples and Sequence Listing.

In some embodiments, an oligonucleotide disclosed herein (e.g., an RNAi oligonucleotide) comprises an antisense strand having nucleotides that are modified with 2'-F. In some embodiments, an oligonucleotide herein comprises an antisense strand comprising nucleotides that are modified with 2'-F and 2'-OMe. In some embodiments, an oligonucleotide disclosed herein comprises a sense strand having nucleotides that are modified with 2'-F. In some embodiments, an oligonucleotide disclosed herein comprises a sense strand comprising nucleotides that are modified with 2'-F and 2'-OMe.

In some embodiments, an oligonucleotide described herein comprises a sense strand with about 10-15%, 10%, 11%, 12%, 13%, 14% or 15% of the nucleotides of the sense strand comprising a 2'-fluoro modification. In some embodiments, about 11% of the nucleotides of the sense strand comprise a 2'-fluoro modification. In some embodiments, an oligonucleotide described herein comprises an antisense strand with about 25-35%, 25%, 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34% or 35% of the nucleotides of the antisense strand comprising a 2'-fluoro modification. In some embodiments, about 32% of the nucleotides of the antisense

strand comprise a 2'-fluoro modification. In some embodiments, the oligonucleotide has about 15-25%, 15%, 16%, 17%, 18%, 19%, 20%, 21%, 22%, 23%, 24%, or 25% of its nucleotides comprising a 2'-fluoro modification. In some embodiments, about 19% of the nucleotides in the oligonucleotide comprise a 2'-fluoro modification.

5 As used herein, oligonucleotide numbering of the sense and antisense strand, respectively, starts at the 5' end with "position 1".

 In some embodiments, one or more of positions 8, 9, 10 or 11 of the sense strand is modified with a 2'-F group. In some embodiments, one or more of positions 3, 8, 9, 10, 12, 13 and 17 of the sense strand is modified with a 2'-F group. In some embodiments, one or more
10 of positions 2, 3, 4, 5, 7, 10 and 14 of the antisense strand is modified with a 2'-F group. In some embodiments, one or more of positions 2, 3, 4, 5, 7, 8, 10, 14, 16 and 19 is modified with a 2'-F group. In some embodiments, the sugar moiety at each of nucleotides at positions 1-7 and 12-20 in the sense strand is modified with a 2'-OMe. In some embodiments, the sugar moiety at each of nucleotides at positions 1-7, 12-27 and 31-36 in the sense strand is modified
15 with a 2'-OMe. In some embodiments, the sugar moiety at each of nucleotides at positions 6, 9, 11-13, 15, 17, 18 and 20-22 in the sense strand is modified with a 2'-OMe.

 In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- 20 b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- 25 g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

 wherein one or more of positions 8, 9, 10 or 11 of the sense strand is modified with a 2'-F group.

30 In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- 35 d) SEQ ID NOs: 597 and 618, respectively; and,

e) SEQ ID NOs: 586 and 607, respectively,
wherein one or more of positions 8, 9, 10 or 11 of the sense strand is modified with a 2'-F group.

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 5, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -D-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 1, 2, 5, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -D-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 4, 5, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -D-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 1, 2, 3, 5, 7, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -D-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 3, 4, 5, 7, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group

consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 1, 2, 3, 5, 10, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 3, 4, 5, 10, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 3, 5, 7, 10, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 3, 4, 5, 7, 10, and 14 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety of each of the nucleotides at positions 2, 3, 4, 5, 7, 8, 10, 14, 16 and 19 of the antisense strand modified with 2'-F and the sugar moiety of each of the remaining nucleotides of the antisense strand modified with a modification selected from the

group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, or position 22 modified with 2'-F.

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, or position 22 modified with 2'-OMe.

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, or position 22 modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises an antisense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, or position 22 modified with a modification selected from the group consisting of 2'-fluoro (2'-F), 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at positions 8-11 modified with 2'-F. In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at positions 3, 8, 9, 10, 12, 13 and 17 modified with 2'-F. In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at positions 1-7 and 12-17 or 12-20 modified with 2'OMe. In some embodiments, an oligonucleotide provided herein

comprises a sense strand having the sugar moiety at positions 1-7, 12-27 and 31-36 modified with 2'OMe. In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety of each of the nucleotides at positions 1-7 and 12-17 or 12-20 of the sense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA). In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at positions 1-2, 4-7, 11, 14-16 and 18-20 modified with 2'OMe. In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety of each of the nucleotides at positions 1-2, 4-7, 11, 14-16 and 18-20 of the sense strand modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, position 22, position 23, position 24, position 25, position 26, position 27, position 28, position 29, position 30, position 31, position 32, position 33, position 34, position 35, or position 36 modified with 2'-F.

In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, position 22, position 23, position 24, position 25, position 26, position 27, position 28, position 29, position 30, position 31, position 32, position 33, position 34, position 35, or position 36 modified with 2'-OMe.

In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, position 22, position 23, position 24, position 25, position 26, position 27, position 28, position 29, position 30, position 31, position 32, position 33, position 34, position 35, or position 36 modified with a modification selected from the group consisting of 2'-O-propargyl, 2'-O-

propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

In some embodiments, an oligonucleotide provided herein comprises a sense strand having the sugar moiety at position 1, position 2, position 3, position 4, position 5, position 6, position 7, position 8, position 9, position 10, position 11, position 12, position 13, position 14, position 15, position 16, position 17, position 18, position 19, position 20, position 21, position 22, position 23, position 24, position 25, position 26, position 27, position 28, position 29, position 30, position 31, position 32, position 33, position 34, position 35, or position 36 modified with a modification selected from the group consisting of 2'-fluoro (2'-F), 2'-O-propargyl, 2'-O-propylamin, 2'-amino, 2'-ethyl, 2'-aminoethyl (EA), 2'-O-methyl (2'-OMe), 2'-O-methoxyethyl (2'-MOE), 2'-O-[2-(methylamino)-2-oxoethyl] (2'-O-NMA), and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid (2'-FANA).

5'-Terminal Phosphate

In some embodiments, an oligonucleotide described herein (e.g., an RNAi oligonucleotide) comprises a sense strand and an antisense strand, wherein the antisense strand comprises a 5'-terminal phosphate. In some embodiments, 5'-terminal phosphate groups of an RNAi oligonucleotide enhance the interaction with Ago2. However, oligonucleotides comprising a 5'-phosphate group may be susceptible to degradation *via* phosphatases or other enzymes, which can limit their performance and/or bioavailability *in vivo*. In some embodiments, an oligonucleotide herein includes analogs of 5' phosphates that are resistant to such degradation. In some embodiments, the phosphate analog is oxymethyl phosphonate, vinyl phosphonate or malonyl phosphonate, or a combination thereof. In certain embodiments, the 5' terminus of an oligonucleotide strand is attached to chemical moiety that mimics the electrostatic and steric properties of a natural 5'-phosphate group ("phosphate mimic"). In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;

h) SEQ ID NOs: 586 and 607, respectively; and,

i) SEQ ID NOs: 587 and 608, respectively,

wherein the oligonucleotide comprises a 5'-terminal phosphate, optionally a 5'-terminal phosphate analog.

5 In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

a) SEQ ID NOs: 579 and 600, respectively;

b) SEQ ID NOs: 580 and 601, respectively;

c) SEQ ID NOs: 590 and 611, respectively;

10 d) SEQ ID NOs: 597 and 618, respectively; and,

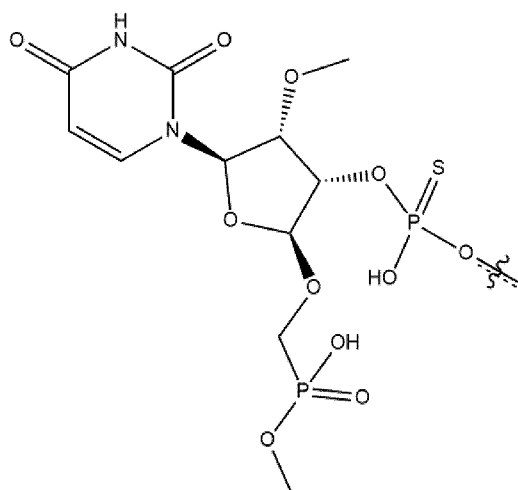
e) SEQ ID NOs: 586 and 607, respectively,

wherein the oligonucleotide comprises a 5'-terminal phosphate, optionally a 5'-terminal phosphate analog.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) has
15 a phosphate analog at a 4'-carbon position of the sugar (referred to as a "4'-phosphate analog"). See, e.g., Intl. Patent Application Publication No. WO 2018/045317. In some embodiments, an oligonucleotide herein comprises a 4'-phosphate analog at a 5'-terminal nucleotide. In some embodiments, a phosphate analog is an oxymethyl phosphonate, in which the oxygen atom of the oxymethyl group is bound to the sugar moiety (e.g., at its 4'-carbon) or
20 analog thereof. In other embodiments, a 4'-phosphate analog is a thiomethylphosphonate or an aminomethylphosphonate, in which the sulfur atom of the thiomethyl group or the nitrogen atom of the amino methyl group is bound to the 4'-carbon of the sugar moiety or analog thereof. In certain embodiments, a 4'-phosphate analog is an oxymethyl phosphonate. In some
25 embodiments, an oxymethyl phosphonate is represented by the formula $-O-CH_2-PO(OH)_2$, $-O-CH_2-PO(OR)_2$, or $-O-CH_2-PO(OH)(R)$, in which R is independently selected from H, CH_3 , an alkyl group, CH_2CH_2CN , $CH_2OCOC(CH_3)_3$, $CH_2OCH_2CH_2Si(CH_3)_3$ or a protecting group. In certain embodiments, the alkyl group is CH_2CH_3 . More typically, R is independently selected from H, CH_3 or CH_2CH_3 . In some embodiment, R is CH_3 . In some embodiments, the 4'-phosphate analog is 4'-oxymethyl phosphonate.

30 In some embodiments, an oligonucleotide provided herein comprises an antisense strand comprising a 4'-phosphate analog at the 5'-terminal nucleotide, wherein 5'-terminal nucleotide comprises the following structure:

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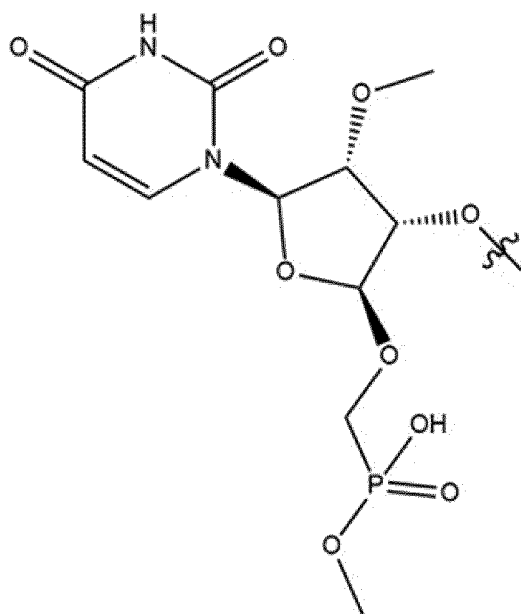
(Chem. 1)

4'-O-monomethylphosphonate-2'-O-methyluridine phosphorothioate

[MePhosphonate-4O-mUs].

5

In some embodiments, an oligonucleotide provided herein comprises an antisense strand comprising a 4'-phosphate analog at the 5'-terminal nucleotide, wherein 5'-terminal nucleotide comprises the following structure:



10

(Chem. 1a)

4'-O-monomethylphosphonate-2'-O-methyluridine [MePhosphonate-4O-mU].

Chem. 1a may be referred to as 4'-O-monomethylphosphonate-2'-O-methyluridine phosphorothioate [MePhosphonate-4O-mUs] when a phosphorothioate internucleotide linkage is provided.

5 **Modified Internucleotide Linkage**

In some embodiments, an oligonucleotide provided herein (e.g., a RNAi oligonucleotide) comprises a modified internucleotide linkage. In some embodiments, phosphate modifications or substitutions result in an oligonucleotide that comprises at least about 1 (e.g., at least 1, at least 2, at least 3 or at least 5) modified internucleotide linkage. In some embodiments, any one of the oligonucleotides disclosed herein comprises about 1 to about 10 (e.g., 1 to 10, 2 to 8, 4 to 6, 3 to 10, 5 to 10, 1 to 5, 1 to 3 or 1 to 2) modified internucleotide linkages. In some embodiments, any one of the oligonucleotides disclosed herein comprises 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 modified internucleotide linkages.

A modified internucleotide linkage may be a phosphorodithioate linkage, a phosphorothioate linkage, a phosphotriester linkage, a thionoalkylphosphonate linkage, a thionoalkylphosphotriester linkage, a phosphoramidite linkage, a phosphonate linkage or a boranophosphate linkage. In some embodiments, at least one modified internucleotide linkage of any one of the oligonucleotides as disclosed herein is a phosphorothioate linkage.

In some embodiments, an oligonucleotide provided herein (e.g., a RNAi oligonucleotide) has a phosphorothioate linkage between one or more of positions 1 and 2 of the sense strand, positions 1 and 2 of the antisense strand, positions 2 and 3 of the antisense strand, positions 3 and 4 of the antisense strand, positions 20 and 21 of the antisense strand, and positions 21 and 22 of the antisense strand. In some embodiments, the oligonucleotide described herein has a phosphorothioate linkage between each of positions 1 and 2 of the sense strand, positions 1 and 2 of the antisense strand, positions 2 and 3 of the antisense strand, positions 20 and 21 of the antisense strand, and positions 21 and 22 of the antisense strand. In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;

- h) SEQ ID NOs: 586 and 607, respectively; and,
 - i) SEQ ID NOs: 587 and 608, respectively,
- wherein the oligonucleotide comprises a modified internucleotide linkage.

In some embodiments, the sense and antisense strands of an oligonucleotide
5 comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- 10 e) SEQ ID NOs: 586 and 607, respectively,

wherein the oligonucleotide comprises a modified internucleotide linkage.

Base Modifications

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi
15 oligonucleotides) comprises one or more modified nucleobases. In some embodiments, modified nucleobases (also referred to herein as base analogs) are linked at the 1' position of a nucleotide sugar moiety. In certain embodiments, a modified nucleobase is a nitrogenous base. In some embodiments, a modified nucleobase does not contain nitrogen atom. See, e.g., US Patent Application Publication No. 2008/0274462. In some embodiments, a modified
20 nucleotide comprises a universal base. In some embodiments, a modified nucleotide does not contain a nucleobase (abasic). In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of: a) SEQ ID NOs: 579 and 600, respectively;

- b) SEQ ID NOs: 580 and 601, respectively;
- 25 c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- 30 h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein the oligonucleotide comprises one or more modified nucleobases.

In some embodiments, the sense and antisense strands of an oligonucleotide
comprise nucleotides sequences selected from the group consisting of:

- 35 a) SEQ ID NOs: 579 and 600, respectively;

- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

5 wherein the oligonucleotide comprises one or more modified nucleobases.

In some embodiments, a universal base is a heterocyclic moiety located at the 1' position of a nucleotide sugar moiety in a modified nucleotide, or the equivalent position in a nucleotide sugar moiety substitution, that, when present in a duplex, can be positioned opposite more than one type of base without substantially altering structure of the duplex. In some embodiments, compared to a reference single-stranded nucleic acid (e.g., oligonucleotide) that is fully complementary to a target nucleic acid (e.g., a *TMPRSS6* mRNA), a single-stranded nucleic acid containing a universal base forms a duplex with the target nucleic acid that has a lower T_m than a duplex formed with the complementary nucleic acid. In some embodiments, when compared to a reference single-stranded nucleic acid in which the universal base has been replaced with a base to generate a single mismatch, the single-stranded nucleic acid containing the universal base forms a duplex with the target nucleic acid that has a higher T_m than a duplex formed with the nucleic acid comprising the mismatched base.

Non-limiting examples of universal-binding nucleotides include, but are not limited to, inosine, 1- β -D-ribofuranosyl-5-nitroindole and/or 1- β -D-ribofuranosyl-3-nitropyrrole (see, US Patent Application Publication No. 2007/0254362; Van Aerschot *et al.* (1995) *Nucleic Acids Res.* 23:4363-4370; Loakes *et al.* (1995) *Nucleic Acids Res.* 23:2361-66; and Loakes & Brown (1994) *Nucleic Acids Res.* 22:4039-43).

25 **Targeting Ligands**

In some embodiments, it is desirable to target an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) to one or more cells or cell type, tissues, organs, or anatomical regions or compartments. Such a strategy may help to avoid undesirable effects to the organism treated and/or to avoid undue loss of the oligonucleotide to cells, tissues, organs, or anatomical regions or compartments that would not benefit from the oligonucleotide or its effects (e.g., inhibition or reduction of *TMPRSS6* expression). Accordingly, in some embodiments, oligonucleotides disclosed herein (e.g., RNAi oligonucleotides) are modified to facilitate targeting and/or delivery to particular cells or cell types, tissues, organs, or anatomical regions or compartments (e.g., to facilitate delivery of the oligonucleotide to the liver). In some embodiments, an oligonucleotide comprises at least one nucleotide (e.g., 1, 2, 3, 4, 5, 6 or

more nucleotides) conjugated to one or more targeting ligand(s). In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- 5 b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- 10 g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein the oligonucleotide comprises a targeting ligand conjugated to at least one nucleotide.

- 15 In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- 20 d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

wherein the oligonucleotide comprises a targeting ligand conjugated to at least one nucleotide.

- 25 In some embodiments, the targeting ligand comprises a carbohydrate, amino sugar, cholesterol, peptide, polypeptide, protein, or part of a protein (e.g., an antibody or antibody fragment), or lipid. In certain embodiments, the targeting ligand is a carbohydrate comprising at least one GalNAc moiety.

- 30 In some embodiments, 1 or more (e.g., 1, 2, 3, 4, 5 or 6) nucleotides of an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) are each conjugated to a separate targeting ligand (e.g., a GalNAc moiety). In some embodiments, 2 to 4 nucleotides of an oligonucleotide are each conjugated to a separate targeting ligand. In some embodiments, targeting ligands are conjugated to 2 to 4 nucleotides at either ends of the sense or antisense strand (e.g., targeting ligands are conjugated to a 2 to 4 nucleotide overhang or extension on the 5' or 3' terminus of the sense or antisense strand) such that the targeting ligands resemble
35 bristles of a toothbrush and the oligonucleotide resembles a toothbrush. For example, an

oligonucleotide may comprise a stem-loop at either the 5' or 3' terminus of the sense strand and 1, 2, 3 or 4 nucleotides of the loop of the stem may be individually conjugated to a targeting ligand. In some embodiments, an oligonucleotide provided by the disclosure (e.g., a RNAi oligonucleotide) comprises a stem-loop at the 3' terminus of the sense strand, wherein the loop of the stem-loop comprises a triloop or a tetraloop, and wherein the 3 or 4 nucleotides comprising the triloop or tetraloop, respectively, are individually conjugated to a targeting ligand. In some embodiments, an oligonucleotide provided by the disclosure (e.g., a RNAi oligonucleotide) comprises a stem-loop at the 3' terminus of the sense strand, wherein the loop of the stem-loop comprises a tetraloop, and wherein 3 nucleotides of the tetraloop are individually conjugated to a targeting ligand.

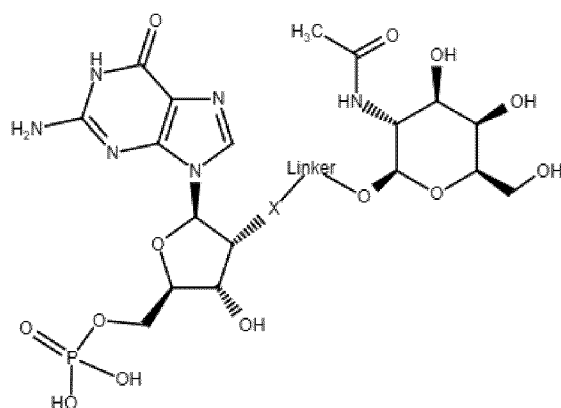
GalNAc is a high affinity carbohydrate ligand for the asialoglycoprotein receptor (ASGPR), which is primarily expressed on the surface of hepatocyte cells and has a major role in binding, internalizing and subsequent clearing circulating glycoproteins that contain terminal galactose or GalNAc residues (asialoglycoproteins). Conjugation (either indirect or direct) of GalNAc moieties to oligonucleotides of the instant disclosure can be used to target these oligonucleotides to the ASGPR expressed on cells. In some embodiments, an oligonucleotide of the instant disclosure (e.g., an RNAi oligonucleotide) is conjugated to at least one or more GalNAc moieties, wherein the GalNAc moieties target the oligonucleotide to an ASGPR expressed on human liver cells (e.g., human hepatocytes). In some embodiments, the GalNAc moiety target the oligonucleotide to the liver.

In some embodiments, an oligonucleotide of the instant disclosure (e.g., an RNAi oligonucleotide) is conjugated directly or indirectly to a monovalent GalNAc moiety. In some embodiments, the oligonucleotide is conjugated directly or indirectly to more than one monovalent GalNAc (i.e., is conjugated to 2, 3 or 4 monovalent GalNAc moieties and is typically conjugated to 3 or 4 monovalent GalNAc moieties). In some embodiments, an oligonucleotide is conjugated to one or more bivalent GalNAc, trivalent GalNAc or tetravalent GalNAc moieties. In some embodiments, a bivalent, trivalent or tetravalent GalNAc moiety is conjugated to an oligonucleotide *via* a branched linker. In some embodiments, a monovalent GalNAc moiety is conjugated to a first nucleotide and a bivalent, trivalent, or tetravalent GalNAc moiety is conjugated to a second nucleotide *via* a branched linker.

In some embodiments, one (1) or more (e.g., 1, 2, 3, 4, 5 or 6) nucleotides of an oligonucleotide described herein (e.g., an RNAi oligonucleotide) are each conjugated to a GalNAc moiety. In some embodiments, two (2) to four (4) nucleotides of a tetraloop are each conjugated to a separate GalNAc moiety. In some embodiments, one (1) to three (3) nucleotides of a triloop are each conjugated to a separate GalNAc moiety. In some

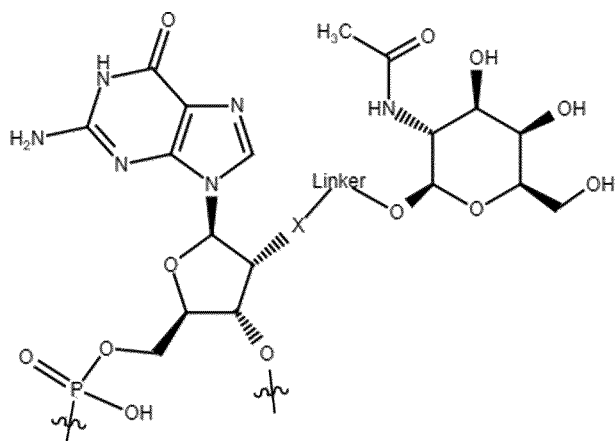
embodiments, targeting ligands are conjugated to two (2) to four (4) nucleotides at either ends of the sense or antisense strand (e.g., ligands are conjugated to a two (2) to four (4) nucleotide overhang or extension on the 5' or 3' terminus of the sense or antisense strand) such that the GalNAc moieties resemble bristles of a toothbrush and the oligonucleotide resembles a toothbrush. In some embodiments, GalNAc moieties are conjugated to a nucleotide of the sense strand. For example, three (3) or four (4) GalNAc moieties can be conjugated to nucleotides in the tetraloop of the sense strand where each GalNAc moiety is conjugated to one (1) nucleotide.

In some embodiments, an oligonucleotide described herein (e.g., an RNAi oligonucleotide) comprises a tetraloop, wherein the tetraloop (tetraLp) is any combination of adenine (A) and guanine (G) nucleotides. In some embodiments, the tetraloop (tetraLp) comprises a monovalent GalNAc moiety attached to any one or more guanine (G) nucleotides of the tetraloop *via* any linker described herein, as depicted below in Chem. 2 (X = heteroatom):



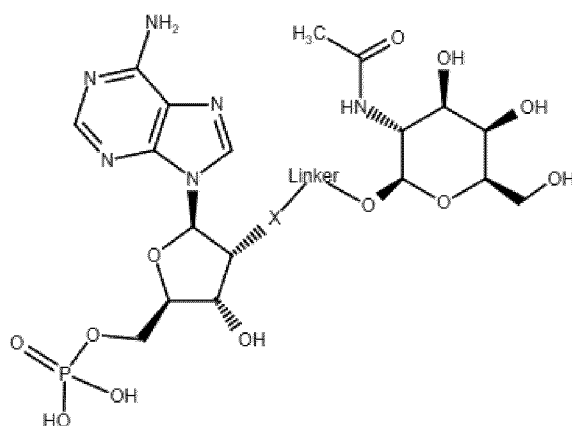
(Chem. 2)

It is understood that when comprised in an oligonucleotide, Chem. 2 may be covalently linked to neighboring nucleotides. In some embodiments, the tetraloop (tetraLp) comprises a monovalent GalNAc moiety attached to any one or more guanine (G) nucleotides of the tetraloop *via* any linker described herein, as depicted below in Chem. 2a (X = heteroatom):



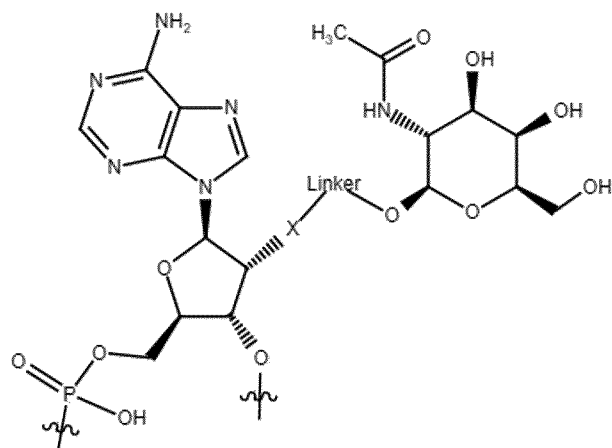
(Chem. 2a)

In some embodiments, the tetraloop (tetraLp) has a monovalent GalNAc attached to any one or more adenine (A) nucleotides of the tetraloop *via* any linker described herein, as depicted below Chem. 3 (X = heteroatom):



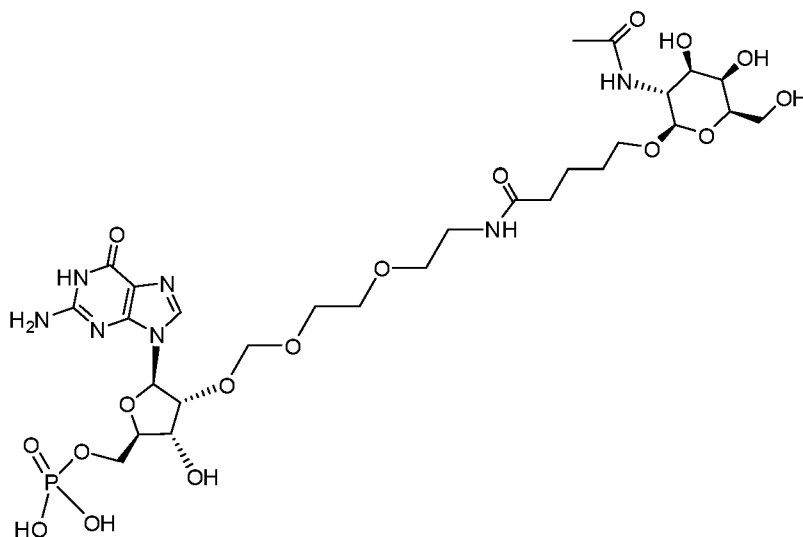
(Chem. 3)

It is understood that when comprised in an oligonucleotide, Chem. 3 may be covalently linked to neighboring nucleotides. In some embodiments, the tetraloop (tetraLp) has a monovalent GalNAc attached to any one or more adenine (A) nucleotides of the tetraloop *via* any linker described herein, as depicted below Chem. 3a (X = heteroatom):



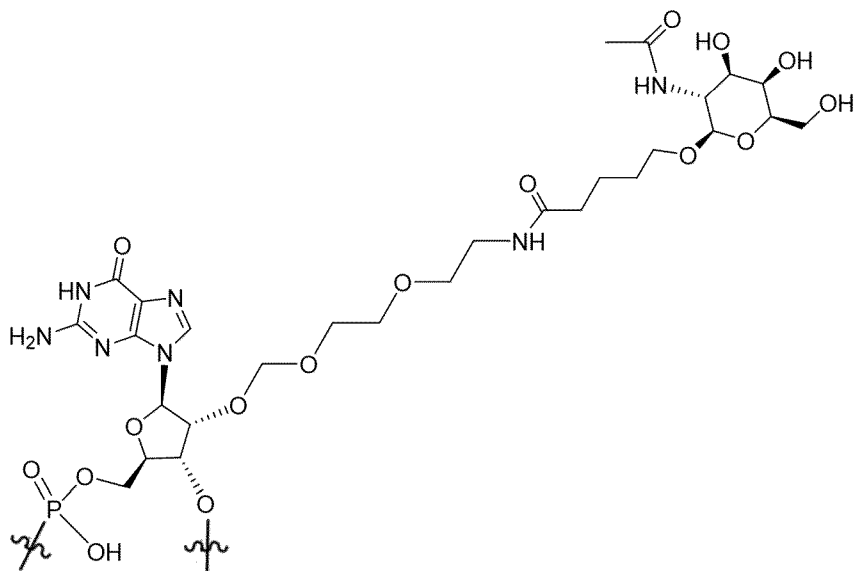
(Chem. 3a)

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide) comprises a monovalent GalNAc moiety attached to a guanine (G) nucleotide referred to as [ademG-GalNAc] or 2'-aminodiethoxymethanol-Guanine-GalNAc, as depicted below (Chem. 4):



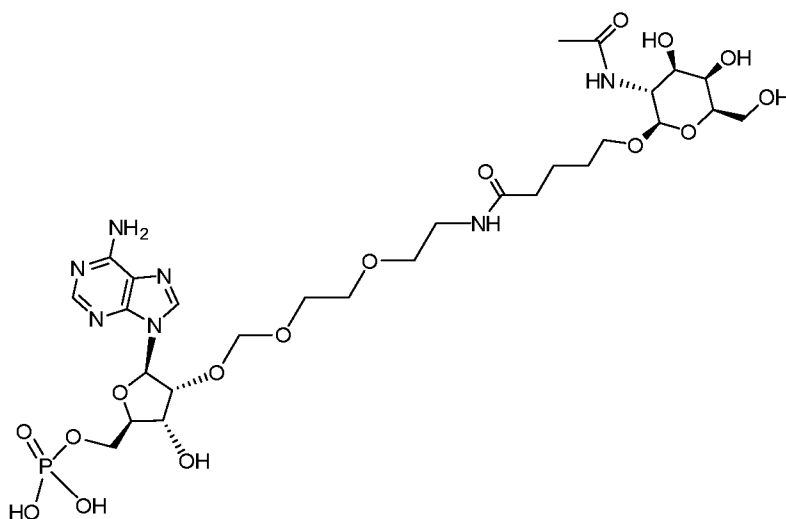
(Chem. 4)

It is understood that when comprised in an oligonucleotide, Chem. 4 may be linked to neighboring nucleotides such as for instance shown in Chem 4a below:



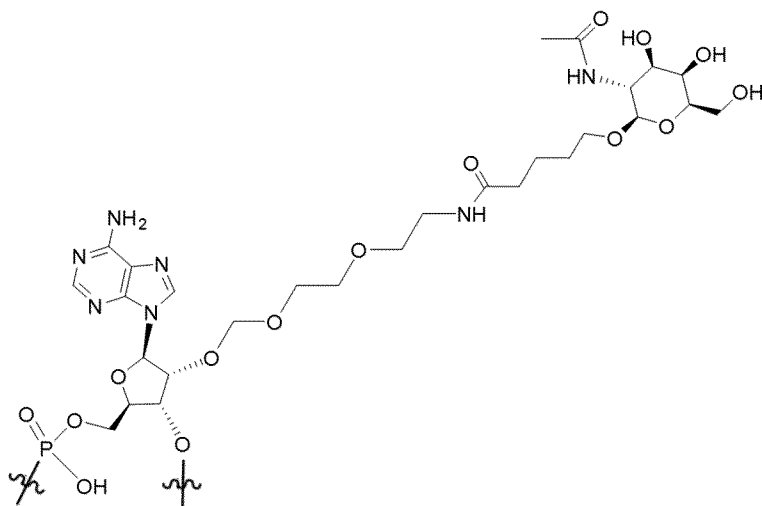
(Chem. 4a)

In some embodiments, an oligonucleotide herein comprises a monovalent GalNAc moiety attached to an adenine nucleotide, referred to as [ademA-GalNAc] or 2'-aminodiethoxymethanol-Adenine-GalNAc, as depicted below (Chem. 5):



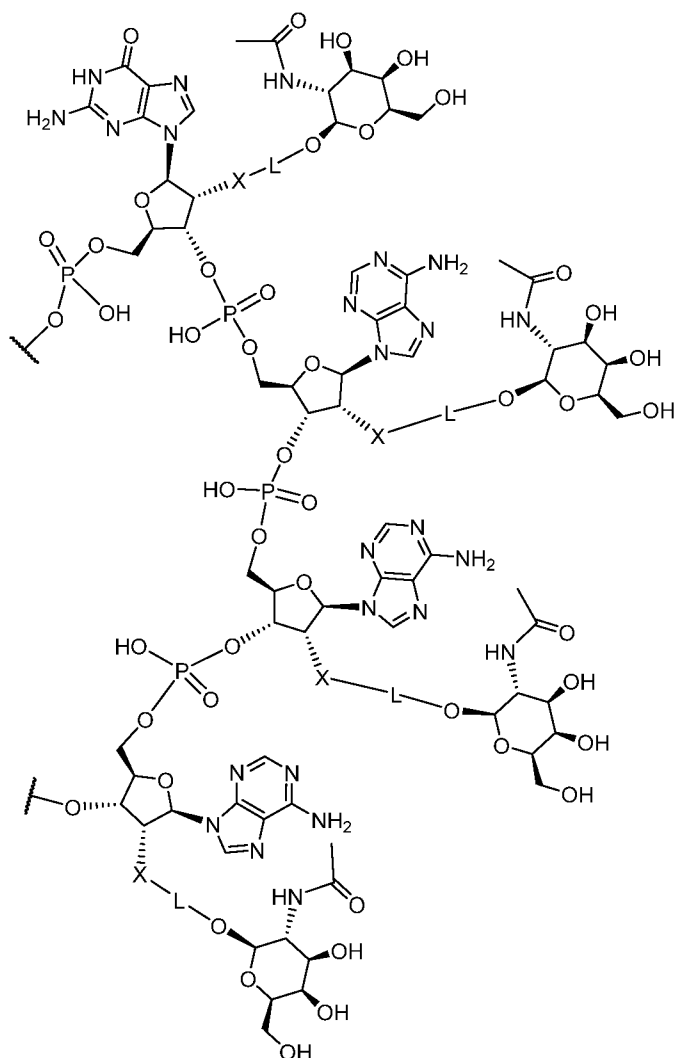
(Chem. 5)

It is understood that when comprised in an oligonucleotide, Chem. 5 may be linked to neighboring nucleotides such as for instance shown in Chem 5a below:



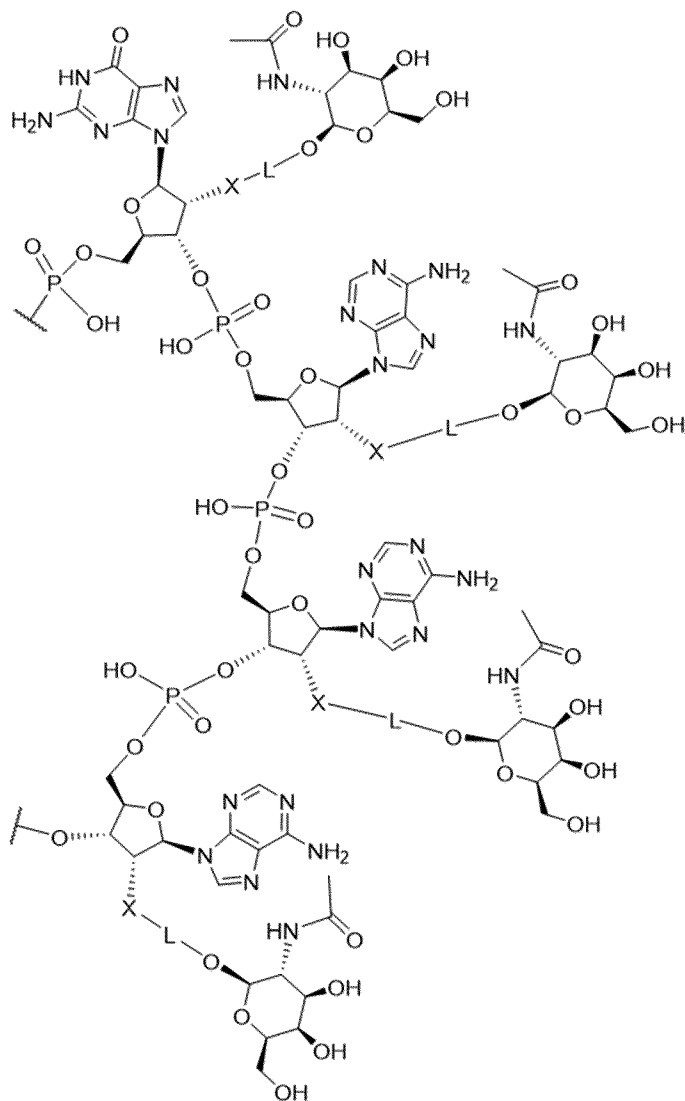
(Chem. 5a)

An example of such conjugation is shown below (Chem. 6) for a loop comprising from 5' to 3' the nucleotide sequence GAAA (L = linker, X = heteroatom). Such a loop may be present, for example, at positions 27-30 of a sense strand provided herein. In the chemical formula, $\frac{3}{2}$ is used to describe an attachment point to the oligonucleotide strand (Chem. 6).



(Chem. 6)

Another example of such conjugation is shown below (Chem. 6a) for a loop comprising from 5' to 3' the nucleotide sequence GAAA (L = linker, X = heteroatom). Such a
 5 loop may be present, for example, at positions 27-30 of a sense strand provided herein. In the chemical formula, $\frac{\text{X}}{\text{L}}$ is used to describe an attachment point to the oligonucleotide strand.

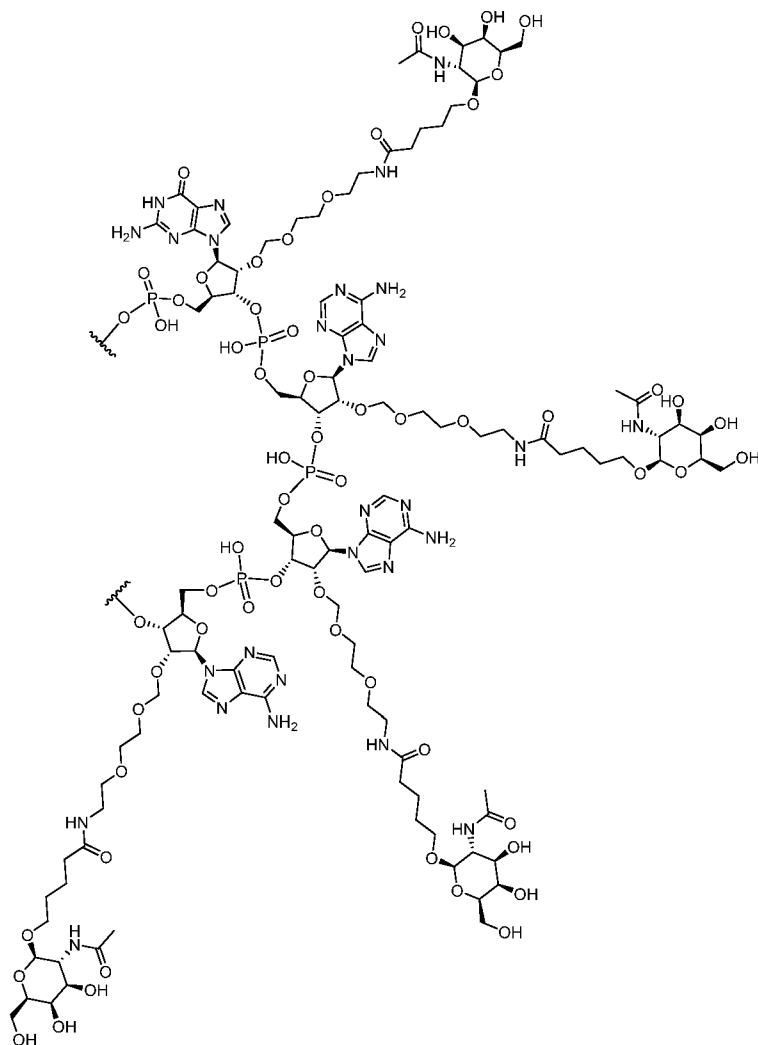


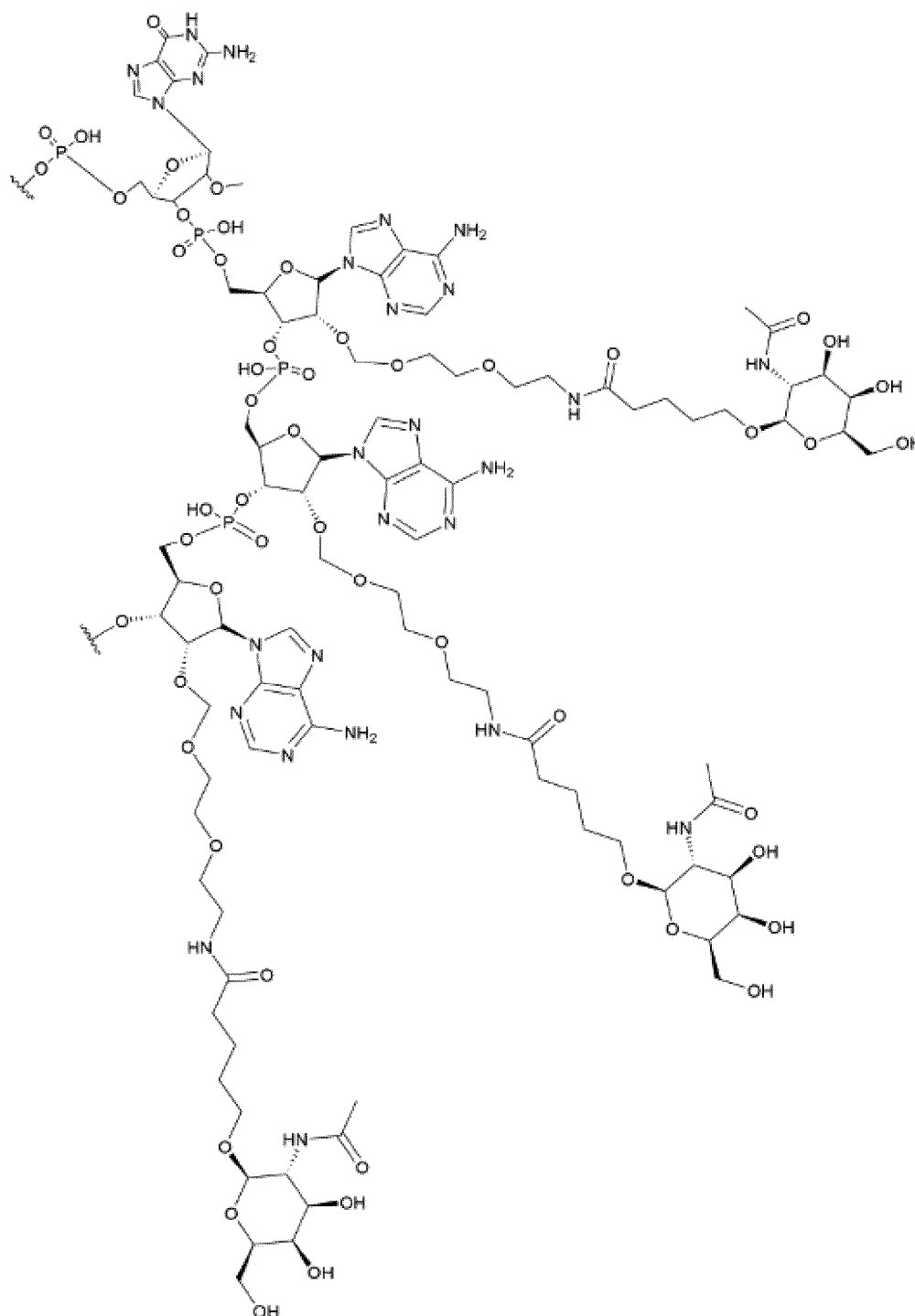
(Chem. 6a)

Appropriate methods or chemistry (e.g., click chemistry) can be used to link a targeting ligand to a nucleotide. In some embodiments, a targeting ligand is conjugated to a nucleotide comprising an oligonucleotide herein (e.g., an RNAi oligonucleotide) using a click linker. In some embodiments, an acetal-based linker is used to conjugate a targeting ligand to a nucleotide of any one of the oligonucleotides described herein. Acetal-based linkers are disclosed, for example, in Intl. Patent Application Publication No. WO2016/100401. In some embodiments, the linker is a labile linker. However, in other embodiments, the linker is stable.

10 An example is shown below for a loop comprising from 5' to 3' the nucleotides GAAA, in which GalNAc moieties are attached to nucleotides of the loop using an acetal linker (Chem. 7 and Chem. 8). Such a loop may be present, for example, at positions 27-30 of the any one of the

sense strands. In the chemical formula,  is an attachment point to the oligonucleotide strand (Chem. 7 and Chem. 8).

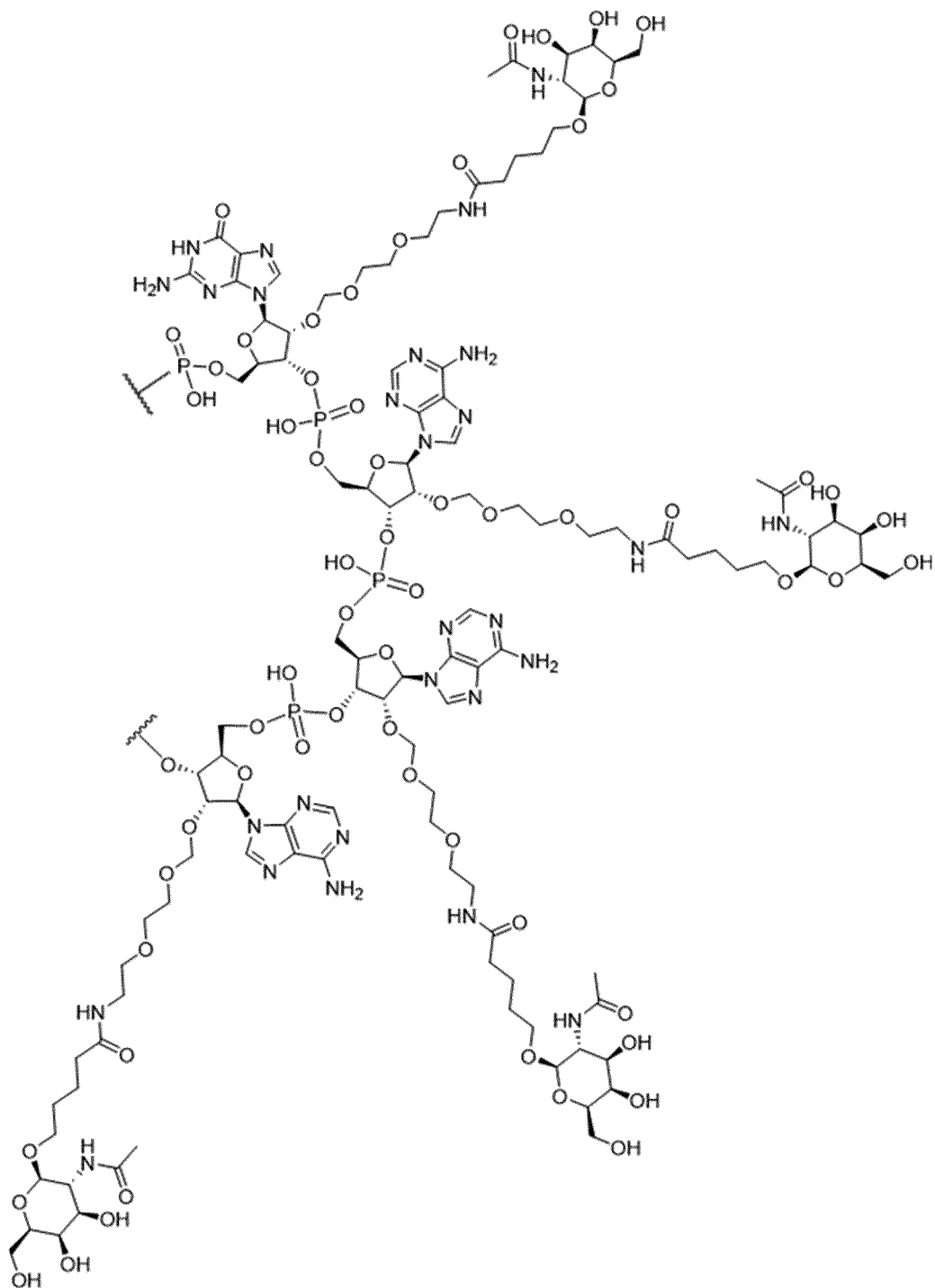




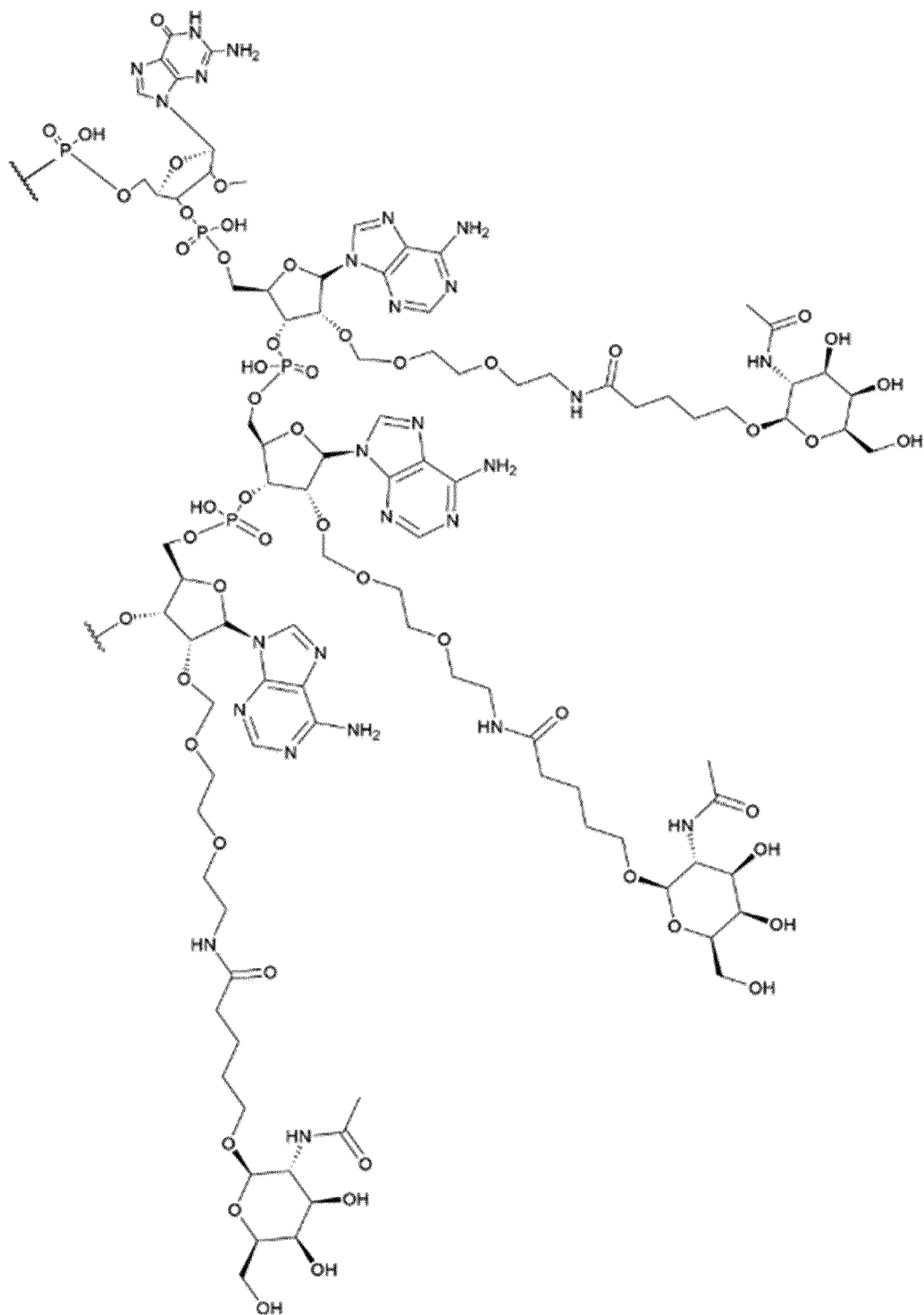
(Chem. 8)

An example is shown below for a loop comprising from 5' to 3' the nucleotides GAAA, in which GalNAc moieties are attached to nucleotides of the loop using an acetal linker (Chem.

- 5 7a and Chem. 8a). Such a loop may be present, for example, at positions 27-30 of the any one of the sense strands. In the chemical formula,  is an attachment point to the oligonucleotide strand (Chem. 7a and Chem. 8a):



(Chem. 7a), or



(Chem. 8a)

As mentioned, various appropriate methods or chemistry synthetic techniques (e.g., click
5 chemistry) can be used to link a targeting ligand to a nucleotide. In some embodiments, a
targeting ligand is conjugated to a nucleotide using a click linker. In some embodiments, an

acetal-based linker is used to conjugate a targeting ligand to a nucleotide of any one of the oligonucleotides described herein. Acetal-based linkers are disclosed, for example, in Intl. Patent Application Publication No. WO 2016/100401. In some embodiments, the linker is a labile linker. However, in other embodiments, the linker is a stable linker.

5 In some embodiments, the oligonucleotides herein (e.g., RNAi oligonucleotides) do not have a GalNAc conjugated thereto.

In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- 10 b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- 15 g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively,

wherein the oligonucleotide comprises at least one GalNAc moiety conjugated to a nucleotide.

20 In some embodiments, the sense and antisense strands of an oligonucleotide comprise nucleotides sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- 25 d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively,

wherein the oligonucleotide comprises at least one GalNAc moiety conjugated to a nucleotide.

30 ***Exemplary Oligonucleotides for Reducing TMPRSS6 Expression***

In some embodiments, the *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression provided by the disclosure comprise a sense strand and an antisense strand, wherein all nucleotides comprising the sense strand and antisense strand are modified, wherein the antisense strand comprises a region of
35 complementarity to a *TMPRSS6* mRNA target sequence of any one of SEQ ID NOs: 661-852

and wherein the region of complementarity is at least 15 contiguous nucleotides in length. In some embodiments, the 5'-terminal nucleotide of the antisense strand comprises 4'-O-monomethylphosphonate-2'-O-methyluridine [MePhosphonate-4O-mU], as described herein. In some embodiments, the 5'-terminal nucleotide of the antisense strand comprises a phosphorothioate linkage. In some embodiments, the antisense strand and the sense strand comprise one or more 2'-fluoro (2'-F) and 2'-O-methyl (2'-OMe) modified nucleotides and at least one phosphorothioate linkage. In some embodiments, the antisense strand comprises four (4) phosphorothioate linkages and the sense strand comprises one (1) phosphorothioate linkage. In some embodiments, the antisense strand comprises five (5) phosphorothioate linkages and the sense strand comprises one (1) phosphorothioate linkage.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand having a sequence of any one of SEQ ID NOs: 193-384 and an antisense strand comprising a complementary sequence selected from SEQ ID NOs: 385-576.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand having a sequence of any one of SEQ ID NOs: 577-597 and an antisense strand comprising a complementary sequence selected from SEQ ID NOs: 598-618.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) comprises a sense strand having a sequence of any one of SEQ ID NOs: 619-639 and an antisense strand comprising a complementary sequence selected from SEQ ID NOs: 640-660.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises:

a sense strand of 36 nucleotides comprising a 2'-F modified nucleotide at positions 8-11, a 2'-OMe modified nucleotide at positions 1-7, 12-27, and 31-36, a GalNAc-conjugated nucleotide at position 28, 29 and 30; and a phosphorothioate linkage between positions 1 and 2;

an antisense strand of 22 nucleotides comprising a 2'-F modified nucleotide at positions 2, 3, 4, 5, 7, 10 and 14, a 2'-OMe at positions 1, 6, 8, 9, 11-13, and 15-22, a phosphorothioate linkage between positions 1 and 2, positions 2 and 3, positions 3 and 4, positions 20 and 21, and positions 21 and 22, and a 5'-terminal nucleotide at position 1 comprising a 4'-phosphate analog, optionally wherein the 5'-terminal nucleotide comprises 4'-O-monomethylphosphonate-2'-O-methyluridine [MePhosphonate-4O-mU]; wherein positions 1-20 of the antisense strand form a duplex region with positions 1-20 of the sense strand,

wherein positions 21-36 of the sense strand form a stem-loop, wherein positions 27-30 form the loop of the stem-loop, optionally wherein positions 27-30 comprise a tetraloop, wherein positions 21 and 22 of the antisense strand comprise an overhang, and wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively.

In some embodiments, the *TPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TPRSS6* expression comprise:

a sense strand of 36 nucleotides comprising a 2'-F modified nucleotide at positions 8-11, a 2'-OMe modified nucleotide at positions 1-7, 12-27, and 31-36, a GalNAc-conjugated nucleotide at position 28, 29 and 30; and a phosphorothioate linkage between positions 1 and 2;

an antisense strand of 22 nucleotides comprising a 2'-F modified nucleotide at positions 2, 3, 4, 5, 7, 10 and 14, a 2'-OMe at positions 1, 6, 8, 9, 11-13, and 15-22, a phosphorothioate linkage between positions 1 and 2, positions 2 and 3, positions 3 and 4, positions 20 and 21, and positions 21 and 22, and a 5'-terminal nucleotide at position 1 comprising a 4'-phosphate analog, optionally wherein the 5'-terminal nucleotide comprises 4'-O-monomethylphosphonate-2'-O-methyluridine [MePhosphonate-4O-mU]; wherein positions 1-20 of the antisense strand form a duplex region with positions 1-20 of the sense strand, wherein positions 21-36 of the sense strand form a stem-loop, wherein positions 27-30 form the loop of the stem-loop, optionally wherein positions 27-30 comprise a tetraloop, wherein positions 21 and 22 of the antisense strand comprise an overhang, and wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;

d) SEQ ID NOs: 597 and 618, respectively; and,

e) SEQ ID NOs: 586 and 607, respectively.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 579 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 600. In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 580 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 601. In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 590 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 611. In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 597 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 618. In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 586 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 607.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 184; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 181; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein

the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 158; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 134; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 102; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 184; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an

asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 181; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 158; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 134; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 102; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 184; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 844, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 181; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 841, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 158; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein

the region of complementarity to the antisense strand is set forth in SEQ ID NO: 818, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 134; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 794, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 102; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 762, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 184; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 844, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-

30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 181; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 841, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 158; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 818, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 134; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 794, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, a *TMPRSS6*-targeting oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression comprises (i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is set forth in SEQ ID NO: 102; and (ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand and a stem-loop at the 3' terminus, wherein the region of complementarity to the antisense strand is set forth in SEQ ID NO: 762, wherein the stem-loop is set forth as S1-Lp-S2, wherein S1 is complementary to S2 and wherein Lp forms a loop between S1 and S2 of 3 to 5 nucleotides in length, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

In some embodiments, the disclosure provides an oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression, wherein the oligonucleotide comprises a sense strand and an antisense strand according to:

Sense Strand: 5'-mX-S-mX-mX-mX-mX-mX-fX-fX-fX-mX-mX-mX-mX-mX-mX-mX-mX-mX-mX-mX-[ademX-GalNAc]-[ademX-GalNAc]-[ademX-GalNAc]-mX-mX-mX-mX-mX-mX-3';

hybridized to:

Antisense Strand: 5'-[MePhosphonate-4O-mX]-S-fX-S-fX-S-fX-fX-mX-fX-mX-mX-fX-mX-mX-mX-fX-mX-mX-mX-mX-S-mX-S-mX-3';

wherein mX= 2'-O-methyl modified nucleotide,

fX = 2'- fluoro modified nucleotide,

-S- = phosphorothioate linkage,

- = phosphodiester linkage,

[MePhosphonate-4O-mX] = 4'-O-monomethylphosphonate-2'-O-methyl modified nucleotide, and

ademX-GalNAc = GalNAc attached to a nucleotide.

In some embodiments, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' - [mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mU][mC][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 621), and wherein the antisense strand

comprises the sequence and all of the modifications of 5' [MePhosphonate-4O-mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG]-3' (SEQ ID NO: 642), wherein mC, mA, mG, mU = 2'-OMe ribonucleosides; fA, fC, fG, fU = 2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc = GalNAc modified adenine nucleotide.

In some embodiments, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' [mGs][mC][mU][mA][mC][mU][mC][fU][fG][fG][fU][mA][mU][mU][mU][mC][mC][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 622), and wherein the antisense strand comprises the sequence and all of the modifications of 5' [MePhosphonate-4O-mUs][fUs][fAs][fG][fG][mA][fA][mA][mU][fA][mC][mC][mA][fG][mA][mG][mU][mA][mG][mCs][mGs][mG]-3' (SEQ ID NO: 643), wherein mC, mA, mG, mU = 2'-OMe ribonucleosides; fA, fC, fG, fU = 2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc = GalNAc modified adenine nucleotide.

In some embodiments, the disclosure provides an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' - [mCs][mU][mC][mA][mC][mC][mU][fG][fC][fU][fU][mC][mU][mU][mC][mU][mG][mG][mU][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 632), and wherein the antisense strand comprises the sequence and all of the modifications of 5' -[MePhosphonate-4O-mUs][fAs][fCs][fC][fA][mG][fA][mA][mG][fA][mA][mG][mC][fA][mG][mG][mU][mG][mA][mGs][mGs][mG]-3' (SEQ ID NO: 653), wherein mC, mA, mG, mU = 2'-OMe ribonucleosides; fA, fC, fG, fU = 2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc = GalNAc modified adenine nucleotide.

In some embodiments, the disclosure provides, an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' -

[mAs][mG][mU][mG][mU][mG][mA][fA][fA][fG][fA][mC][mA][mU][mA][mG][mC][mU][mG][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 639), and wherein the antisense strand comprises the sequence and all of the modifications of 5'- [MePhosphonate-4O-

mUs][fCs][fAs][fG][fC][mU][fA][mU][mG][fU][mC][mU][mU][fU][mC][mA][mC][mA][mC][mUs][mGs][mG] -3' (SEQ ID NO: 660), wherein mC, mA, mG, mU = 2'-OMe ribonucleosides; fA, fC, fG, fU = 2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc= GalNAc modified adenine nucleotide.

5 In some embodiments, the disclosure provides, an RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5' -

[mGs][mG][mG][mU][mG][mC][mA][fC][fU][fA][fU][mG][mG][mC][mU][mU][mG][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]3' (SEQ ID NO: 628), and wherein the antisense strand comprises the sequence and all of the modifications of 5'- [MePhosphonate-4O-mUs][fUs][fAs][fC][fA][mA][fG][mC][mC][fA][mU][mA][mG][fU][mG][mC][mA][mC][mC][mCs][mGs][mG] -3' (SEQ ID NO: 649), wherein mC, mA, mG, mU = 2'-OMe ribonucleosides; fA, fC, fG, fU = 2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc = GalNAc modified adenine nucleotide.

In some embodiments, the disclosure provides an oligonucleotide (e.g., an RNAi oligonucleotide) for reducing *TMPRSS6* expression, wherein the oligonucleotide comprises a sense strand and an antisense strand comprising nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 621 and 642, respectively;
- b) SEQ ID NOs: 622 and 643, respectively;
- c) SEQ ID NOs: 637 and 658, respectively;
- d) SEQ ID NOs: 632 and 653, respectively;
- e) SEQ ID NOs: 638 and 659, respectively;
- f) SEQ ID NOs: 639 and 660, respectively;
- g) SEQ ID NOs: 627 and 648, respectively;
- h) SEQ ID NOs: 628 and 649, respectively; and,
- i) SEQ ID NOs: 629 and 650, respectively.

30 In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 621 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 642. In some embodiments, a *TMPRSS6*-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 622 and an

antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 643. In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 632 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 653. In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 639 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 660. In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 628 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 649.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 621 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 642, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14A.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 621 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 642, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 10A-B.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 632 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 653, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14B.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 632 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 653, the antisense strand comprising a region of

complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 11A-B.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 639 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 660, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14C.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 639 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 660, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 12A-B.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 628 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 649, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Fig. 14D.

In some embodiments, a TMPRSS6-targeting oligonucleotide for reducing *TMPRSS6* expression provided by the disclosure comprises a sense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 628 and an antisense strand comprising the nucleotide sequence as set forth in SEQ ID NO: 649, the antisense strand comprising a region of complementarity to a TMPRSS6 RNA transcript, wherein said RNAi is in the form of a conjugate having the structure as shown in Figs. 13A-B.

Formulations

Various formulations (e.g., pharmaceutical formulations) have been developed for oligonucleotide use. For example, oligonucleotides (e.g., RNAi oligonucleotides) can be delivered to a subject or a cellular environment using a formulation that minimizes degradation, facilitates delivery and/or uptake, or provides another beneficial property to the oligonucleotides in the formulation. In some embodiments, provided herein are compositions comprising oligonucleotides (e.g., RNAi oligonucleotides) reduce the expression of *TMPRSS6*.

Such compositions can be suitably formulated such that when administered to a subject, either into the immediate environment of a target cell or systemically, a sufficient portion of the oligonucleotides enter the cell to reduce *TMPRSS6* expression. Any variety of suitable oligonucleotide formulations can be used to deliver oligonucleotides for the reduction of *TMPRSS6* as disclosed herein. In some embodiments, an oligonucleotide is formulated in buffer solutions such as phosphate buffered saline solutions, liposomes, micellar structures, and capsids. Any of the oligonucleotides described herein may be provided not only as nucleic acids, but also in the form of a pharmaceutically acceptable salt.

Formulations of oligonucleotides with cationic lipids can be used to facilitate transfection of the oligonucleotides into cells. For example, cationic lipids, such as lipofectin, cationic glycerol derivatives, and polycationic molecules (e.g., polylysine), can be used. Suitable lipids include Oligofectamine, Lipofectamine (Life Technologies), NC388 (Ribozyme Pharmaceuticals, Inc., Boulder, Colo.), or FuGene 6 (Roche) all of which can be used according to the manufacturer's instructions.

Accordingly, in some embodiments, a formulation comprises a lipid nanoparticle. In some embodiments, an excipient comprises a liposome, a lipid, a lipid complex, a microsphere, a microparticle, a nanosphere or a nanoparticle, or may be otherwise formulated for administration to the cells, tissues, organs, or body of a subject in need thereof (see, e.g., Remington: **THE SCIENCE AND PRACTICE OF PHARMACY**, 22nd edition, Pharmaceutical Press, 2013).

In some embodiments, the formulations herein comprise an excipient. In some embodiments, an excipient confers to a composition improved stability, improved absorption, improved solubility and/or therapeutic enhancement of the active ingredient. In some embodiments, an excipient is a buffering agent (e.g., sodium citrate, sodium phosphate, a tris base, or sodium hydroxide) or a vehicle (e.g., a buffered solution, petrolatum, dimethyl sulfoxide, or mineral oil). In some embodiments, an oligonucleotide is lyophilized for extending its shelf-life and then made into a solution before use (e.g., administration to a subject). Accordingly, an excipient in a composition comprising any one of the oligonucleotides described herein may be a lyoprotectant (e.g., mannitol, lactose, polyethylene glycol or polyvinylpyrrolidone) or a collapse temperature modifier (e.g., dextran, Ficoll™ or gelatin).

In some embodiments, a pharmaceutical composition is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral (e.g., intravenous, intramuscular, intraperitoneal, intradermal, subcutaneous), oral (e.g., inhalation), transdermal (e.g., topical), transmucosal and rectal administration.

Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersions. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, N.J.) or phosphate buffered saline (PBS). The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (e.g., glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as mannitol, sorbitol, sodium chloride in the composition. Sterile injectable solutions can be prepared by incorporating the oligonucleotides in a required amount in a selected solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization.

In some embodiments, a composition may contain at least about 0.1% of the therapeutic agent (e.g., a RNAi oligonucleotide for reducing *TMPRSS6* expression) or more, although the percentage of the active ingredient(s) may be between about 1% to about 80% or more of the weight or volume of the total composition. Factors such as solubility, bioavailability, biological half-life, route of administration, product shelf life, as well as other pharmacological considerations will be contemplated by one skilled in the art of preparing such pharmaceutical formulations, and as such, a variety of dosages and treatment regimens may be desirable.

Methods of Use

Reducing *TMPRSS6* Expression

In some embodiments, the disclosure provides methods for contacting or delivering to a cell or population of cells an effective amount of oligonucleotides provided herein (e.g., RNAi oligonucleotides) to reduce *TMPRSS6* expression. In some embodiments, a reduction of *TMPRSS6* expression is determined by measuring a reduction in the amount or level of *TMPRSS6* mRNA, matriptase-2 protein, or matriptase-2 activity in a cell. The methods include those described herein and known to one of ordinary skill in the art.

Methods provided herein are useful in any appropriate cell type. In some embodiments, a cell is any cell that expresses *TMPRSS6* mRNA (e.g., hepatocytes). In some embodiments, the cell is a primary cell obtained from a subject. In some embodiments, the primary cell has undergone a limited number of passages such that the cell substantially maintains its natural phenotypic properties. In some embodiments, a cell to which the

oligonucleotide is delivered is *ex vivo* or *in vitro* (*i.e.*, can be delivered to a cell in culture or to an organism in which the cell resides).

In some embodiments, the oligonucleotides herein (*e.g.*, RNAi oligonucleotides) are delivered to a cell or population of cells using a nucleic acid delivery method known in the art including, but not limited to, injection of a solution containing the oligonucleotides, bombardment by particles covered by the oligonucleotides, exposing the cell or population of cells to a solution containing the oligonucleotides, or electroporation of cell membranes in the presence of the oligonucleotides. Other methods known in the art for delivering oligonucleotides to cells may be used, such as lipid-mediated carrier transport, chemical-mediated transport, and cationic liposome transfection such as calcium phosphate, and others.

In some embodiments, reduction of *TMPRSS6* expression is determined by an assay or technique that evaluates one or more molecules, properties, or characteristics of a cell or population of cells associated with *TMPRSS6* expression, or by an assay or technique that evaluates molecules that are directly indicative of *TMPRSS6* expression in a cell or population of cells (*e.g.*, *TMPRSS6* mRNA or matriptase-2 protein). In some embodiments, the extent to which an oligonucleotide provided herein reduces *TMPRSS6* expression is evaluated by comparing *TMPRSS6* expression in a cell or population of cells contacted with the oligonucleotide to an appropriate control (*e.g.*, an appropriate cell or population of cells not contacted with the oligonucleotide or contacted with a control oligonucleotide). In some embodiments, a control amount or level of *TMPRSS6* expression in a control cell or population of cells is predetermined, such that the control amount or level need not be measured in every instance the assay or technique is performed. The predetermined level or value can take a variety of forms. In some embodiments, a predetermined level or value can be single cut-off value, such as a median or mean.

In some embodiments, contacting or delivering an oligonucleotide described herein (*e.g.*, an RNAi oligonucleotide) to a cell or a population of cells results in a reduction in *TMPRSS6* expression in a cell or population of cells not contacted with the oligonucleotide or contacted with a control oligonucleotide. In some embodiments, the reduction in *TMPRSS6* expression is about 1% or lower, about 5% or lower, about 10% or lower, about 15% or lower, about 20% or lower, about 25% or lower, about 30% or lower, about 35% or lower, about 40% or lower, about 45% or lower, about 50% or lower, about 55% or lower, about 60% or lower, about 70% or lower, about 80% or lower, or about 90% or lower relative to a control amount or level of *TMPRSS6* expression. In some embodiments, the control amount or level of *TMPRSS6* expression is an amount or level of *TMPRSS6* mRNA and/or matriptase-2 protein in a cell or population of cells that has not been contacted with an oligonucleotide herein. In some

embodiments, *TMPRSS6* mRNA expression is measured using methods known in the art. In some embodiments, *TMPRSS6* mRNA expression is measured by qPCR. In some embodiments, *TMPRSS6* protein expression is measured using methods known in the art. In some embodiments, *TMPRSS6* protein expression is measured by ELISA. In some
5 embodiments, *TMPRSS6* protein expression is measured by western blot. In some embodiments, the effect of delivery of an oligonucleotide herein to a cell or population of cells according to a method herein is assessed after any finite period or amount of time (e.g., minutes, hours, days, weeks, months). For example, in some embodiments, *TMPRSS6* expression is determined in a cell or population of cells at least about 4 hours, about 8 hours,
10 about 12 hours, about 18 hours, about 24 hours; or at least about 1 day, about 2 days, about 3 days, about 4 days, about 5 days, about 6 days, about 7 days, about 8 days, about 9 days, about 10 days, about 11 days, about 12 days, about 13 days, about 14 days, about 21 days, about 28 days, about 35 days, about 42 days, about 49 days, about 56 days, about 63 days, about 70 days, about 77 days, or about 84 days or more after contacting or delivering the
15 oligonucleotide to the cell or population of cells. In some embodiments, *TMPRSS6* expression is determined in a cell or population of cells at least about 1 month, about 2 months, about 3 months, about 4 months, about 5 months, or about 6 months or more after contacting or delivering the oligonucleotide to the cell or population of cells.

In some embodiments, an oligonucleotide provided herein (e.g., an RNAi
20 oligonucleotide) is delivered in the form of a transgene that is engineered to express in a cell the oligonucleotide or strands comprising the oligonucleotide (e.g., its sense and antisense strands). In some embodiments, an oligonucleotide herein is delivered using a transgene engineered to express any oligonucleotide disclosed herein. Transgenes may be delivered using viral vectors (e.g., adenovirus, retrovirus, vaccinia virus, poxvirus, adeno-associated
25 virus, or herpes simplex virus) or non-viral vectors (e.g., plasmids or synthetic mRNAs). In some embodiments, transgenes can be injected directly to a subject.

Treatment Methods

The disclosure provides oligonucleotides (e.g., RNAi oligonucleotides) for use as a
30 medicament, in particular for use in a method for the treatment of diseases, disorders, and conditions associated with hepcidin deficiency or suppression. The disclosure also provides oligonucleotides for use, or adaptable for use, to treat a subject (e.g., a human having a disease, disorder or condition associated with hepcidin deficiency or suppression) that would benefit from reducing *TMPRSS6* expression. In some respects, the disclosure provides
35 oligonucleotides for use, or adapted for use, to treat a subject having a disease, disorder or

condition associated with hepcidin deficiency or suppression. In some embodiments, the subject in need of *TMPRSS6* reduction has, or is at risk for, an iron accumulation disease, disorder or condition. In some embodiments, compositions, compounds and methods described herein are provided for use in reducing iron levels in an individual. In some
5 embodiments, the iron accumulation is due to a disease, disorder, or condition in the subject. In some embodiments, the disease, disorder and/or condition is hemochromatosis such as hereditary hemochromatosis. In some embodiments, the disease, disorder and/or condition is β -thalassemia. In some embodiments, the disease, disorder and/or condition is polycythemia vera. The disclosure also provides oligonucleotides for use, or adaptable for use, in the
10 manufacture of a medicament or pharmaceutical composition for treating a disease, disorder or condition associated with hepcidin deficiency or suppression. In some embodiments, the oligonucleotides for use, or adaptable for use, target *TMPRSS6* mRNA and reduce *TMPRSS6* expression (e.g., via the RNAi pathway). In some embodiments, the oligonucleotides for use, or adaptable for use, target *TMPRSS6* mRNA and reduce the amount or level of *TMPRSS6*
15 mRNA, matriptase-2 protein and/or *TMPRSS6* activity.

The disclosure also provides methods of treating a subject having, suspected of having, or at risk of developing a disease, disorder or condition associated with a hepcidin deficiency or suppression with an oligonucleotide provided herein. In some aspects, the disclosure provides methods of treating or attenuating the onset or progression of a disease,
20 disorder or condition associated with hepcidin deficiency or suppression using the oligonucleotides herein. In other aspects, the disclosure provides methods to achieve one or more therapeutic benefits in a subject having a disease, disorder, or condition associated with hepcidin deficiency or suppression using the oligonucleotides provided herein. In some embodiments of the methods herein, the subject is treated by administering a therapeutically
25 effective amount of any one or more of the oligonucleotides provided herein. In some embodiments, treatment comprises reducing *TMPRSS6* expression. In some embodiments, the subject is treated therapeutically. In some embodiments, the subject is treated prophylactically.

In some embodiments of the methods herein, one or more oligonucleotides herein
30 (e.g., RNAi oligonucleotides), or a pharmaceutical composition comprising one or more oligonucleotides, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that *TMPRSS6* expression is reduced in the subject, thereby treating the subject. In some embodiments, an amount or level of *TMPRSS6* mRNA is reduced in the subject. In some embodiments, an amount or level of

matriptase-2 protein is reduced in the subject. In some embodiments, an amount or level of matriptase-2 activity is reduced in the subject.

In some embodiments of the methods herein, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide), or a pharmaceutical composition comprising the oligonucleotide, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that *TMPRSS6* expression is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to *TMPRSS6* expression prior to administration of one or more oligonucleotides or pharmaceutical composition. In some embodiments, *TMPRSS6* expression is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to *TMPRSS6* expression in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or pharmaceutical composition or receiving a control oligonucleotide or oligonucleotides, pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide or oligonucleotides herein (e.g., RNAi oligonucleotides), or a pharmaceutical composition comprising the oligonucleotide or oligonucleotides, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that an amount or level of *TMPRSS6* mRNA is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to the amount or level of *TMPRSS6* mRNA prior to administration of the oligonucleotide or pharmaceutical composition. In some embodiments, an amount or level of *TMPRSS6* mRNA is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to an amount or level of *TMPRSS6* mRNA in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or pharmaceutical composition or receiving a control oligonucleotide or oligonucleotides, pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide or oligonucleotides herein, or a pharmaceutical composition comprising the oligonucleotide or oligonucleotides, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that an amount or level of matriptase-2 protein is reduced in

the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to the amount or level of matriptase-2 protein prior to administration of the oligonucleotide or pharmaceutical composition. In some
5 embodiments, an amount or level of matriptase-2 protein is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to an amount or level of matriptase-2 protein in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or
10 pharmaceutical composition or receiving a control oligonucleotide, oligonucleotides or pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide or oligonucleotides (e.g., RNAi oligonucleotides) herein, or a pharmaceutical composition comprising the oligonucleotide or oligonucleotides, is administered to a subject having a disease, disorder or
15 condition associated with hepcidin deficiency or suppression such that an amount or level of *TMPRSS6* gene activity/expression is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to the amount or level of *TMPRSS6* activity prior to administration of the
20 oligonucleotide or pharmaceutical composition. In some embodiments, an amount or level of *TMPRSS6* activity is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to an amount or level of *TMPRSS6* activity in a subject (e.g., a reference or control subject) not
25 receiving the oligonucleotide or pharmaceutical composition or receiving a control oligonucleotide, pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide), or a pharmaceutical composition comprising the oligonucleotide, is administered to a subject having a disease, disorder or condition associated
30 with hepcidin deficiency or suppression such that hepcidin production is increased in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to hepcidin production prior to administration of one or more oligonucleotides or pharmaceutical composition. In some
35 embodiments, hepcidin production is increased in the subject by at least about 30%, about

35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to hepcidin production in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or pharmaceutical composition or receiving a control oligonucleotide or oligonucleotides, pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide), or a pharmaceutical composition comprising the oligonucleotide, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that serum iron is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to serum iron prior to administration of one or more oligonucleotides or pharmaceutical composition. In some embodiments, serum iron is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to serum iron in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or pharmaceutical composition or receiving a control oligonucleotide or oligonucleotides, pharmaceutical composition or treatment.

In some embodiments of the methods herein, an oligonucleotide provided herein (e.g., an RNAi oligonucleotide), or a pharmaceutical composition comprising the oligonucleotide, is administered to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression such that serum iron saturation is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to serum iron saturation prior to administration of one or more oligonucleotides or pharmaceutical composition. In some embodiments, serum iron saturation is reduced in the subject by at least about 30%, about 35%, about 40%, about 45%, about 50%, about 55%, about 60%, about 65%, about 70%, about 75%, about 80%, about 85%, about 90%, about 95%, about 99% or greater than 99% when compared to serum iron saturation in a subject (e.g., a reference or control subject) not receiving the oligonucleotide or oligonucleotides or pharmaceutical composition or receiving a control oligonucleotide or oligonucleotides, pharmaceutical composition or treatment.

Suitable methods for determining *TMPRSS6* expression, the amount or level of *TMPRSS6* mRNA, matriptase-2 protein, matriptase-2 activity, or a biomarker related to or

affected by modulation of *TMPRSS6* expression (e.g., a plasma biomarker), in the subject, or in a sample from the subject, are known in the art. Further, the Examples set forth herein illustrate methods for determining *TMPRSS6* expression.

In some embodiments, *TMPRSS6* expression, the amount or level of *TMPRSS6* mRNA, matriptase-2 protein, matriptase-2 activity, or a biomarker related to or affected by modulation of *TMPRSS6* expression, or any combination thereof, is reduced in a cell (e.g., a hepatocyte), a population or a group of cells (e.g., an organoid), an organ (e.g., liver), blood or a fraction thereof (e.g., plasma), a tissue (e.g., liver tissue), a sample (e.g., a liver biopsy sample), or any other appropriate biological material obtained or isolated from the subject. In some embodiments, *TMPRSS6* expression, the amount or level of *TMPRSS6* mRNA, matriptase-2 protein, matriptase-2 activity, or a biomarker related to or affected by modulation of *TMPRSS6* expression, or any combination thereof, is reduced in more than one type of cell (e.g., a hepatocyte and one or more other type(s) of cell), more than one groups of cells, more than one organ (e.g., liver and one or more other organ(s)), more than one fraction of blood (e.g., plasma and one or more other blood fraction(s)), more than one type of tissue (e.g., liver tissue and one or more other type(s) of tissue), or more than one type of sample (e.g., a liver biopsy sample and one or more other type(s) of biopsy sample).

Because of their high specificity, the oligonucleotides provided herein (e.g., RNAi oligonucleotides) specifically target mRNA of target genes (e.g., *TMPRSS6* mRNA) of cells and tissue(s), or organs(s) (e.g., in the liver). In preventing disease, the target gene may be one which is required for initiation or maintenance of the disease or which has been identified as being associated with a higher risk of contracting the disease. In treating disease, the oligonucleotide can be brought into contact with the cells, tissue(s), or organ(s) (e.g., liver) exhibiting or responsible for mediating the disease. For example, an oligonucleotide (e.g., an RNAi oligonucleotide) substantially identical to all or part of a wild-type (i.e., native) or mutated gene associated with a disorder or condition associated with hepcidin deficiency or suppression may be brought into contact with or introduced into a cell or tissue type of interest such as a hepatocyte or other liver cell.

Examples of a disease, disorder or condition associated with hepcidin deficiency or suppression include, but are not limited to hemochromatosis (e.g. hereditary hemochromatosis), beta-thalassemia, Polycythemia vera, iron-refractory iron deficiency anemia.

In some embodiments, the target gene may be a target gene from any mammal, such as a human target. Any target gene may be silenced according to the method described herein.

Methods described herein typically involve administering to a subject an effective amount of an oligonucleotide herein (e.g., a RNAi oligonucleotide), that is, an amount that produces or generates a desirable therapeutic result. A therapeutically acceptable amount may be an amount that therapeutically treats a disease or disorder. The appropriate dosage for any one subject will depend on certain factors, including the subject's size, body surface area, age, the composition to be administered, the active ingredient(s) in the composition, time and route of administration, general health, and other drugs being administered concurrently.

In some embodiments, a subject is administered any one of the compositions herein (e.g., a composition comprising an RNAi oligonucleotide described herein) either enterally (e.g., orally, by gastric feeding tube, by duodenal feeding tube, *via* gastrostomy or rectally), parenterally (e.g., subcutaneous injection, intravenous injection or infusion, intra-arterial injection or infusion, intraosseous infusion, intramuscular injection, intracerebral injection, intracerebroventricular injection, intrathecal), topically (e.g., epicutaneous, inhalational, *via* eye drops, or through a mucous membrane), or by direct injection into a target organ (e.g., the liver of a subject). Typically, oligonucleotides herein are administered intravenously or subcutaneously.

In some embodiments, an oligonucleotide herein (e.g., an RNAi oligonucleotide), or a pharmaceutical composition comprising the oligonucleotide, is administered alone or in combination. In some embodiments, the oligonucleotides herein are administered in combination concurrently, sequentially (in any order), or intermittently. For example, two oligonucleotides may be co-administered concurrently. Alternatively, one oligonucleotide may be administered and followed any amount of time later (e.g., one hour, one day, one week or one month) by the administration of a second oligonucleotide.

In some embodiments, the subject to be treated is a human or non-human primate or other mammalian subject. Other exemplary subjects include domesticated animals such as dogs and cats; livestock such as horses, cattle, pigs, sheep, goats, and chickens; and animals such as mice, rats, guinea pigs, and hamsters.

Kits

In some embodiments, the disclosure provides a kit comprising an oligonucleotide herein (e.g., an RNAi oligonucleotide), and instructions for use. In some embodiments, the kit comprises an oligonucleotide herein, and a package insert containing instructions for use of the kit and/or any component thereof. In some embodiments, the kit comprises, in a suitable container, an oligonucleotide herein, one or more controls, and various buffers, reagents, enzymes and other standard ingredients well known in the art. In some embodiments, the

container comprises at least one vial, well, test tube, flask, bottle, syringe, or other container means, into which the oligonucleotide is placed, and in some instances, suitably aliquoted. In some embodiments where an additional component is provided, the kit contains additional containers into which this component is placed. The kits can also include a means for containing the oligonucleotide and any other reagent in close confinement for commercial sale. Such containers may include injection or blow-molded plastic containers into which the desired vials are retained. Containers and/or kits can include labeling with instructions for use and/or warnings.

In some embodiments, a kit comprises an oligonucleotide herein (e.g., an RNAi oligonucleotide), and a pharmaceutically acceptable carrier, or a pharmaceutical composition comprising the oligonucleotide and instructions for treating or delaying progression of a disease, disorder or condition associated with hepcidin deficiency or suppression in a subject in need thereof.

Definitions

As used herein, the term “antisense oligonucleotide” encompasses a nucleic acid-based molecule which has a sequence complementary to all or part of the target mRNA, in particular seed sequence thereby capable of forming a duplex with a mRNA. Thus, the term “antisense oligonucleotide”, as used herein, may be referred to as a “complementary nucleic acid-based inhibitor” or “guide strand”.

As used herein, “approximately” or “about,” as applied to one or more values of interest, refers to a value that is similar to a stated reference value. In certain embodiments, “about” refers to a range of values that fall within 25%, 20%, 19%, 18%, 17%, 16%, 15%, 14%, 13%, 12%, 11%, 10%, 9%, 8%, 7%, 6%, 5%, 4%, 3%, 2%, 1% or less in either direction (greater than or less than) of the stated reference value unless otherwise stated or otherwise evident from the context (except where such number would exceed 100% of a possible value).

As used herein, “administer,” “administering,” “administration” and the like refers to providing a substance (e.g., an oligonucleotide) to a subject in a manner that is pharmacologically useful (e.g., to treat a disease, disorder, or condition in the subject).

As used herein, “attenuate,” “attenuating,” “attenuation” and the like refers to reducing or effectively halting. As a non-limiting example, one or more of the treatments herein may reduce or effectively halt the onset or progression of iron-refractory iron deficiency anemia, hemochromatosis or beta-thalassemia in a subject. This attenuation may be exemplified by, for example, a decrease in one or more aspects (e.g., symptoms, tissue characteristics, and cellular, inflammatory, or immunological activity, etc.) of iron-refractory iron deficiency anemia,

hemochromatosis, or beta-thalassemia, no detectable progression (worsening) of one or more aspects of hemochromatosis or beta-thalassemia, or no detectable aspects of iron-refractory iron deficiency anemia, hemochromatosis, or beta-thalassemia in a subject when they might otherwise be expected.

5 As used herein, “complementary” refers to a structural relationship between two nucleotides (e.g., on two opposing nucleic acids or on opposing regions of a single nucleic acid strand) that permits the two nucleotides to form base pairs with one another. For example, a purine nucleotide of one nucleic acid that is complementary to a pyrimidine nucleotide of an opposing nucleic acid may base pair together by forming hydrogen bonds with one another. In
10 some embodiments, complementary nucleotides can base pair in the Watson-Crick manner or in any other manner that allows for the formation of stable duplexes. In some embodiments, two nucleic acids may have regions of multiple nucleotides that are complementary with each other to form regions of complementarity, as described herein.

As used herein, “deoxyribonucleotide” refers to a nucleotide having a hydrogen in
15 place of a hydroxyl at the 2’ position of its pentose sugar when compared with a ribonucleotide. A modified deoxyribonucleotide is a deoxyribonucleotide having one or more modifications or substitutions of atoms other than at the 2’ position, including modifications or substitutions in or of the sugar, phosphate group or base.

As used herein, “double-stranded oligonucleotide” or “ds oligonucleotide” refers to an
20 oligonucleotide that is substantially in a duplex form. In some embodiments, the complementary base-pairing of duplex region(s) of a double-stranded oligonucleotide is formed between antiparallel sequences of nucleotides of covalently separate nucleic acid strands. In some embodiments, complementary base-pairing of duplex region(s) of a double-stranded oligonucleotide is formed between antiparallel sequences of nucleotides of nucleic
25 acid strands that are covalently linked. In some embodiments, complementary base-pairing of duplex region(s) of a double-stranded oligonucleotide is formed from single nucleic acid strand that is folded (e.g., *via* a hairpin) to provide complementary antiparallel sequences of nucleotides that base pair together. In some embodiments, a double-stranded oligonucleotide comprises two covalently separate nucleic acid strands that are fully duplexed with one
30 another. However, in some embodiments, a double-stranded oligonucleotide comprises two covalently separate nucleic acid strands that are partially duplexed (e.g., having overhangs at one or both ends). In some embodiments, a double-stranded oligonucleotide comprises antiparallel sequence of nucleotides that are partially complementary, and thus, may have one or more mismatches, which may include internal mismatches or end mismatches.

As used herein, “duplex,” in reference to nucleic acids (e.g., oligonucleotides), refers to a structure formed through complementary base pairing of two antiparallel sequences of nucleotides.

As used herein, “excipient” refers to a non-therapeutic agent that may be included in a composition, for example, to provide or contribute to a desired consistency or stabilizing effect.

As used herein, “hepatocyte” or “hepatocytes” refers to cells of the parenchymal tissues of the liver. These cells make up about 70%-85% of the liver’s mass and manufacture serum albumin, FBN and the prothrombin group of clotting factors (except for Factors 3 and 4). Markers for hepatocyte lineage cells include, but are not limited to, transthyretin (Ttr), glutamine synthetase (Glul), hepatocyte nuclear factor 1a (Hnf1a) and hepatocyte nuclear factor 4a (Hnf4a). Markers for mature hepatocytes may include, but are not limited to, cytochrome P450 (Cyp3a11), cytochrome P450 3A4 (CYP3A4), fumarylacetoacetate hydrolase (Fah), glucose 6-phosphate (G6p), albumin (Alb) and OC2-2F8. See, e.g., Huch *et al.* (2013) Nature 494:247-50.

As used herein, a “hepatotoxic agent” refers to a chemical compound, virus or other substance that is itself toxic to the liver or can be processed to form a metabolite that is toxic to the liver. Hepatotoxic agents may include, but are not limited to, carbon tetrachloride (CCl₄), acetaminophen (paracetamol), vinyl chloride, arsenic, chloroform, nonsteroidal anti-inflammatory drugs (such as aspirin and phenylbutazone).

As used herein, the term “*TMPRSS6*” refers to transmembrane protease serine 6. The *TMPRSS6* gene encodes the matriptase-2 protein which functions in a signaling pathway with hepcidin to regulate iron balance in the body. matriptase-2

As used herein, “labile linker” refers to a linker that can be cleaved (e.g., by acidic pH). A “fairly stable linker” refers to a linker that cannot be cleaved.

As used herein, “modified internucleotide linkage” refers to an internucleotide linkage having one or more chemical modifications when compared with a reference internucleotide linkage comprising a phosphodiester bond. In some embodiments, a modified nucleotide is a non-naturally occurring linkage. Typically, a modified internucleotide linkage confers one or more desirable properties to a nucleic acid in which the modified internucleotide linkage is present. For example, a modified internucleotide linkage may improve thermal stability, resistance to degradation, nuclease resistance, solubility, bioavailability, bioactivity, reduced immunogenicity, *etc.*

As used herein, “modified nucleotide” refers to a nucleotide having one or more chemical modifications when compared with a corresponding reference nucleotide selected

from: adenine ribonucleotide, guanine ribonucleotide, cytosine ribonucleotide, uracil ribonucleotide, adenine deoxyribonucleotide, guanine deoxyribonucleotide, cytosine deoxyribonucleotide and thymidine deoxyribonucleotide. In some embodiments, a modified nucleotide is a non-naturally occurring nucleotide. In some embodiments, a modified nucleotide has one or more chemical modification in its sugar, nucleobase and/or phosphate group. In some embodiments, a modified nucleotide has one or more chemical moieties conjugated to a corresponding reference nucleotide. Typically, a modified nucleotide confers one or more desirable properties to a nucleic acid in which the modified nucleotide is present. For example, a modified nucleotide may improve thermal stability, resistance to degradation, nuclease resistance, solubility, bioavailability, bioactivity, reduced immunogenicity, *etc.* When referring to an oligonucleotide being modified, it may be understood to refer to an oligonucleotide that comprises at least one modified nucleotide therein. When referring to an oligonucleotide being fully modified, it may be understood to refer to an oligonucleotide wherein all nucleotides therein are modified nucleotides. Said modified nucleotides need not comprise the same modifications.

As used herein, “nicked tetraloop structure” refers to a structure of a RNAi oligonucleotide that is characterized by separate sense (passenger) and antisense (guide) strands, in which the sense strand has a region of complementarity with the antisense strand, and in which at least one of the strands, generally the sense strand, has a tetraloop configured to stabilize an adjacent stem region formed within the at least one strand. The structure is said to be nicked by a discontinuity between the backbone of the sense and antisense strand, typically by a discontinuity between the pentose sugars of the adjacent nucleotides of the sense and antisense strands. A “nicked structure” may generally be referred to with this same definition when the loop may or may not be a tetraloop (e.g., one may refer to a nicked structure when the sense strand forms a triloop, tetraloop or other type of loop as disclosed herein).

As used herein, “oligonucleotide” refers to a short nucleic acid (e.g., less than about 100 nucleotides in length). An oligonucleotide may be single-stranded (ss) or double-stranded (ds). An oligonucleotide may comprise deoxyribonucleosides, ribonucleosides, or a combination of both. In some embodiments, a double-stranded oligonucleotide comprising ribonucleosides is referred to as “dsRNA”. An oligonucleotide may or may not have duplex regions. As a set of non-limiting examples, an oligonucleotide may be, but is not limited to, a small interfering RNA (siRNA), microRNA (miRNA), short hairpin RNA (shRNA), dicer substrate interfering RNA (DsiRNA), antisense oligonucleotide, short siRNA or ss siRNA.

As used herein, “overhang” refers to terminal non-base pairing nucleotide(s) resulting from one strand or region extending beyond the terminus of a complementary strand with which

the one strand or region forms a duplex. In some embodiments, an overhang comprises one or more unpaired nucleotides extending from a duplex region at (or proximal to) the 5' terminus or 3' terminus of an oligonucleotide. In certain embodiments, the overhang is a 3' or 5' overhang on the antisense strand or sense strand of an oligonucleotide.

5 As used herein, features may be described as being provided "in", "on" or "at" the 3' end or 5' end of a strand. Nucleotide features described at a given strand end, such as sugar modifications, internucleotide modifications, nucleotide mismatches and overhangs for instance, are understood to refer to the nucleotide(s) of that strand proximal to the defined strand end (e.g., at 3' end of the sense strand).

10 As used herein, "phosphate analog" refers to a chemical moiety that mimics the electrostatic and/or steric properties of a phosphate group. In some embodiments, the phosphate analog mimics the electrostatic and/or steric properties of a phosphate group in biologic systems. In some embodiments, a phosphate analog is positioned at the 5' terminal nucleotide of an oligonucleotide in place of a 5'-phosphate, which is often susceptible to
15 enzymatic removal. In some embodiments, a 5' phosphate analog contains a phosphatase-resistant linkage. Examples of phosphate analogs include, but are not limited to, 5' phosphonates, such as 5' methylene phosphonate (5'-MP) and 5'-(E)-vinylphosphonate (5'-VP). In some embodiments, an oligonucleotide has a phosphate analog at a 4'-carbon position of the sugar (referred to as a "4'-phosphate analog") at a 5'-terminal nucleotide. An example of
20 a 4'-phosphate analog is oxymethyl phosphonate, in which the oxygen atom of the oxymethyl group is bound to the sugar moiety (e.g., at its 4'-carbon) or analog thereof. See, e.g., US Patent Publication No. 2019-0177729. Other modifications have been developed for the 5' end of oligonucleotides (see, e.g., Intl. Patent Application No. WO 2011/133871; US Patent No. 8,927,513; and Prakash *et al.* (2015) NUCLEIC ACIDS RES. 43:2993-3011).

25 As used herein, "reduced expression" of a gene (e.g., *TMPRSS6*) refers to a decrease in the amount or level of RNA transcript (e.g., *TMPRSS6* mRNA) or protein encoded by the gene and/or a decrease in the amount or level of activity of the gene in a cell, a population of cells, a sample, or a subject, when compared to an appropriate reference (e.g., a reference cell, population of cells, sample or subject). For example, the act of contacting a cell with an
30 oligonucleotide herein (e.g., an oligonucleotide comprising an antisense strand having a nucleotide sequence that is complementary to a nucleotide sequence comprising *TMPRSS6* mRNA) may result in a decrease in the amount or level of *TMPRSS6* mRNA, matriptase-2 protein and/or activity (e.g., via degradation of *TMPRSS6*mRNA by the RNAi pathway) when compared to a cell that is not treated with the oligonucleotide. Similarly, and as used herein,

“reducing expression” refers to an act that results in reduced expression of a gene (e.g., *TMPRSS6*).

As used herein, “reduction of *TMPRSS6* expression” refers to a decrease in the amount or level of *TMPRSS6* mRNA, matriptase-2 protein and/or matriptase-2 activity in a cell, a population of cells, a sample or a subject when compared to an appropriate reference (e.g., a reference cell, population of cells, sample, or subject).

As used herein, “region of complementarity” refers to a sequence of nucleotides of a nucleic acid (e.g., an oligonucleotide) that is sufficiently complementary to an antiparallel sequence of nucleotides to permit hybridization between the two sequences of nucleotides under appropriate hybridization conditions (e.g., in a phosphate buffer, in a cell, etc.). In some embodiments, an oligonucleotide herein comprises a targeting sequence having a region of complementarity to a mRNA target sequence. A region of complementarity may be of a given length and be identified by a number of contiguous nucleotides (e.g., at least 15 contiguous nucleotides in length), referring to a number of nucleotides contiguously linked together through internucleotide linkages.

As used herein, “ribonucleotide” refers to a nucleotide having a ribose as its pentose sugar, which contains a hydroxyl group at its 2' position. A modified ribonucleotide is a ribonucleotide having one or more modifications or substitutions of atoms other than at the 2' position, including modifications or substitutions in or of the ribose, phosphate group or base.

As used herein, “RNAi oligonucleotide” refers to either (a) a double-stranded oligonucleotide having a sense strand (passenger) and antisense strand (guide), in which the antisense strand or part of the antisense strand is used by the *Argonaute 2* (Ago2) endonuclease in the cleavage of a target mRNA (e.g., *TMPRSS6* mRNA) or (b) a single-stranded oligonucleotide having a single antisense strand, where that antisense strand (or part of that antisense strand) is used by the Ago2 endonuclease in the cleavage of a target mRNA (e.g., *TMPRSS6* mRNA).

As used herein, “strand” refers to a single, contiguous sequence of nucleotides linked together through internucleotide linkages (e.g., phosphodiester linkages or phosphorothioate linkages). In some embodiments, a strand has two free ends (e.g., a 5' end and a 3' end).

As used herein, “subject” means any mammal, including mice, rabbits, non-human primates (NHP) and humans. In one embodiment, the subject is a human or NHP. Moreover, “individual” or “patient” may be used interchangeably with “subject.”

As used herein, “synthetic” refers to a nucleic acid or other molecule that is artificially synthesized (e.g., using a machine (e.g., a solid-state nucleic acid synthesizer)) or that is

otherwise not derived from a natural source (e.g., a cell or organism) that normally produces the molecule.

As used herein, “targeting ligand” refers to a molecule (e.g., a carbohydrate, amino sugar, cholesterol, polypeptide, or lipid, such as a GalNAc moiety for instance) that selectively binds to a cognate molecule (e.g., a receptor) of a tissue or cell of interest and that is conjugatable to another substance for purposes of targeting the other substance to the tissue or cell of interest. For example, in some embodiments, a targeting ligand may be conjugated to an oligonucleotide for purposes of targeting the oligonucleotide to a specific tissue or cell of interest. In some embodiments, a targeting ligand selectively binds to a cell surface receptor. Accordingly, in some embodiments, a targeting ligand when conjugated to an oligonucleotide facilitates delivery of the oligonucleotide into a particular cell through selective binding to a receptor expressed on the surface of the cell and endosomal internalization by the cell of the complex comprising the oligonucleotide, targeting ligand and receptor. In some embodiments, a targeting ligand is conjugated to an oligonucleotide *via* a linker that is cleaved following or during cellular internalization such that the oligonucleotide is released from the targeting ligand in the cell.

As used herein, “target sequence” refers to a contiguous portion of the nucleotide sequence of an mRNA molecule formed during the transcription of a *TMPRSS6* gene (e.g., SEQ ID NOs: 853, 854, and 855) including mRNA that is a product of RNA processing of a primary transcription product. In some embodiments, the target portion of the sequence will be at least long enough to serve as a substrate for RNAi-directed cleavage at or near that portion of the nucleotide sequence of an mRNA molecule formed during the transcription of a *TMPRSS6* gene. In some embodiments, the target sequence is within the protein coding region of the *TMPRSS6* gene. In some embodiments, the target sequence is within the 3' UTR of the *TMPRSS6* gene.

As used herein, “targeting sequence” refers to a nucleotide sequence that is fully or partially complementary to a target sequence.

As used herein, “loop”, “triloop”, or “tetraloop” refers to an unpaired region of a nucleic acid (e.g., oligonucleotide) that is flanked by two antiparallel regions of the nucleic acid that are sufficiently complementary to one another, such that under appropriate hybridization conditions (e.g., in a phosphate buffer, in a cell), the two antiparallel regions, which flank the unpaired region, hybridize to form a duplex (referred to as a “stem”). A loop increases stability of an adjacent duplex formed by hybridization of flanking sequences of nucleotides. The increase in stability is detectable as an increase in melting temperature (T_m) of an adjacent stem duplex that is higher than the T_m of the adjacent stem duplex expected, on average, from

a set of loops of comparable length consisting of randomly selected sequences of nucleotides. For example, a loop (e.g., a tetraloop or triloop) can confer a T_m of at least about 50°C, at least about 55°C, at least about 56°C, at least about 58°C, at least about 60°C, at least about 65°C or at least about 75°C in 10 mM Na_2HPO_4 to a hairpin comprising a duplex of at least 2 base pairs (bp) in length. In some embodiments, a tetraloop can confer a T_m of at least about 50°C, at least about 55°C, at least about 56°C, at least about 58°C, at least about 60°C, at least about 65°C or at least about 75°C in 10 mM NaH_2PO_4 to a hairpin comprising a duplex of at least 2 base pairs (bp) in length. In some embodiments, a loop may stabilize a bp in an adjacent stem duplex by stacking interactions. In addition, interactions among the nucleotides in a loop include, but are not limited to, non-Watson-Crick base pairing, stacking interactions, hydrogen bonding and contact interactions (Cheong *et al.* (1990) *Nature* 346:680-82; Heus & Pardi (1991) *Science* 253:191-94). In some embodiments, a loop comprises or consists of 3 to 6 nucleotides and is typically 4 to 5 nucleotides. In certain embodiments, a loop comprises or consists of 3, 4, 5 or 6 nucleotides, which may or may not be modified (e.g., which may or may not be conjugated to a targeting moiety/targeting ligand). In one embodiment, a loop consisting of 3 nucleotides is a triloop. In one embodiment, a loop consisting of 4 nucleotides is a tetraloop. Any nucleotide may be used in the tetraloop and standard IUPAC-IUB symbols for such nucleotides may be used as described in Cornish-Bowden (1985) *Nucleic Acids Res.* 13:3021-30. For example, the letter "N" may be used to mean that any base may be in that position, the letter "R" may be used to show that A (adenine) or G (guanine) may be in that position, and "B" may be used to show that C (cytosine), G (guanine), or T (thymine) may be in that position. Examples of tetraloops include the UNCG family of tetraloops (e.g., UUCG), the GNRA family of tetraloops (e.g., GAAA), and the CUUG tetraloop (Woese *et al.* (1990) *Proc. Natl. Acad. Sci. USA* 87:8467-71; Antao *et al.* (1991) *Nucleic Acids Res.* 19:5901-05). Examples of DNA tetraloops include the d(GNNA) family of tetraloops (e.g., d(GTTA), the d(GNRA)) family of tetraloops, the d(GNAB) family of tetraloops, the d(CNNG) family of tetraloops, and the d(TNCG) family of tetraloops (e.g., d(TTCG)). See, e.g., Nakano *et al.* (2002) *Biochem.* 41:14281-92; Shinji *et al.* (2000) *Nippon Kagakkai Koen Yokoshu* 78:731. In some embodiments, the tetraloop is contained within a nicked tetraloop structure.

As used herein, "treat" or "treating" refers to the act of providing care to a subject in need thereof, for example, by administering a therapeutic agent (e.g., an oligonucleotide herein) to the subject, for purposes of improving the health and/or well-being of the subject with respect to an existing condition (e.g., a disease, disorder) or to prevent or decrease the likelihood of the occurrence of a condition. In some embodiments, treatment involves reducing

the frequency or severity of at least one sign, symptom or contributing factor of a condition (e.g., disease, disorder) experienced by a subject.

“Pharmaceutically acceptable” indicates that the substance or composition must be chemically and/or toxicologically suitable for the treatment of mammals.

5 As used herein, the symbol $\frac{3}{2}$ is used to describe an attachment point.

List of further embodiments of the invention

1. An RNAi oligonucleotide for reducing transmembrane serine protease 6 (*TMPRSS6*) expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand and the antisense strand form a duplex region, wherein the antisense strand
10 comprises a region of complementarity to a *TMPRSS6* mRNA target sequence of any one of SEQ ID NOs: 661-852, and wherein the region of complementarity is at least 15 contiguous nucleotides in length.
2. An RNAi oligonucleotide for reducing transmembrane serine protease 6 (*TMPRSS6*)
15 expression, the oligonucleotide comprising a sense strand and an antisense strand forming a duplex region, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* mRNA target sequence as set forth in any one of SEQ ID NOs: 661-852, and wherein the region of complementarity is at least 15 contiguous nucleotides in length.
- 20 3. The RNAi oligonucleotide according to embodiments 1 or 2, wherein the sense strand is 15 to 50 nucleotides in length.
4. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand is 18 to 36 nucleotides in length.
25
5. The RNAi oligonucleotide according to any one of the preceding embodiments , wherein the antisense strand is 15 to 30 nucleotides in length.
6. The RNAi oligonucleotide according to any one of the preceding embodiments,
30 wherein the antisense strand is 22 nucleotides in length and wherein antisense strand and the sense strand form a duplex region of at least 19 nucleotides in length, optionally at least 20 nucleotides in length.

7. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand is 22 nucleotides in length and wherein antisense strand and the sense strand form a duplex region of at least 20 nucleotides in length.

8. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the region of complementarity is at least 18 contiguous nucleotides in length, optionally the region of complementarity is at least 19 contiguous nucleotides in length.

9. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the region of complementarity is at least 19 contiguous nucleotides in length.

10. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the region of complementarity is at least 19 contiguous nucleotides in length.

11. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the region of complementarity is at least 20 contiguous nucleotides in length.

12. A double stranded RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising:

(i) an antisense strand of 19-30 nucleotides in length, wherein the antisense strand comprises a nucleotide sequence comprising a region of complementarity to a *TMPRSS6* mRNA target sequence, wherein the region of complementarity is selected from SEQ ID NOs: 1-192, and

(ii) a sense strand of 19-50 nucleotides in length comprising a region of complementarity to the antisense strand, wherein the antisense and sense strands are separate strands which form an asymmetric duplex region having an overhang of 1-4 nucleotides at the 3' terminus of the antisense strand.

13. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the 3' end of the sense strand comprises a stem-loop set forth as S1-Lp-S2, wherein S1 is complementary to S2, and wherein Lp forms a loop between S1 and S2 of 3-5 nucleotides in length.

14. The RNAi oligonucleotide according to any one of embodiments 1-12, wherein the sense strand comprises a stem-loop set forth as S1-Lp-S2 proximal the 3' end, wherein S1 is

complementary to S2, and wherein Lp forms a loop of 3-5 nucleotides in length between S1 and S2.

15. The RNAi oligonucleotide according to any one of embodiments 1-12, wherein the sense strand proximal the 3' end comprises a stem-loop set forth as S1-Lp-S2, wherein S1 is complementary to S2, and wherein Lp forms a loop of 3-5 nucleotides in length between S1 and S2.

16. The RNAi oligonucleotide according to any one of embodiments 13-15, wherein Lp is a triloop or a tetraloop.

17. The RNAi oligonucleotide according to any one of embodiments 13-16, wherein Lp is a tetraloop.

18. The RNAi oligonucleotide according to embodiment 17, wherein the tetraloop comprises the sequence 5'-GAAA-3'.

19. The RNAi oligonucleotide according to any one of embodiments 13-18, wherein the loop is a tetraloop comprising the sequence 5'-GAAA-3'.

20. The RNAi oligonucleotide according to any one of embodiments 13-19, wherein S1 and S2 are 1 nucleotide, 2 nucleotides, 3 nucleotides, 4 nucleotides, 5 nucleotides, 6 nucleotides, 7 nucleotides, 8 nucleotides, 9 nucleotides, or 10 nucleotides in length.

21. The RNAi oligonucleotide according to any one of embodiments 13-19, wherein S1 and S2 are each 1 nucleotide, 2 nucleotides, 3 nucleotides, 4 nucleotides, 5 nucleotides, 6 nucleotides, 7 nucleotides, 8 nucleotides, 9 nucleotides, or 10 nucleotides in length.

22. The RNAi oligonucleotide according to any one of embodiments 13-21, wherein the S1 and S2 are 1-10 nucleotides in length and have the same length.

23. The RNAi oligonucleotide according to any one of embodiments 13-22, wherein S1 and S2 are 6 nucleotides in length.

24. The RNAi oligonucleotide according to any one of embodiments 13-23, wherein the stem-loop comprises the sequence 5'-GCAGCCGAAAGGCUGC-3' (SEQ ID NO: 856).

25. The RNAi oligonucleotide according to any one of embodiments 13-24, wherein a discontinuity is formed between the sense strand and antisense strand, forming a nicked structure.

26. The RNAi oligonucleotide according to any one of embodiments 13-25, wherein a discontinuity is formed between the sense strand and antisense strand, forming a nicked tetraloop structure.

27. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises a 3' overhang sequence of one or more nucleotides in length.

28. The RNAi oligonucleotide according to embodiment 27, wherein the overhang comprises purine nucleotides.

29. The RNAi oligonucleotide according to any one of embodiments 27-28, wherein the 3' overhang sequence is 2 nucleotides in length.

30. The RNAi oligonucleotide according to any one of embodiments 27-29, wherein the 3' overhang is selected from AA, GG, AG, and GA.

31. The RNAi oligonucleotide according to embodiment 30, wherein the overhang is GG or AA.

32. The RNAi oligonucleotide according to any one of embodiments 30-31, wherein the overhang is GG.

33. The RNAi oligonucleotide according to any one of embodiments 27-29, wherein the 3' overhang is selected from 5'-AA-3', 5'-GG-3', 5'-AG-3', and 5'-GA-3'.

34. The RNAi oligonucleotide according to embodiment 33, wherein the overhang is 5'-GG-3' or 5'-AA-3'.

35. The RNAi oligonucleotide according to any one of embodiments 33-34, wherein the overhang is 5'-GG-3'.

5 36. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the oligonucleotide comprises at least one modified nucleotide.

37. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the oligonucleotide is fully modified.

10

38. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the all the nucleotides of the oligonucleotide are modified nucleotides.

15 39. The RNAi oligonucleotide according to any one of embodiments 1-36, wherein the oligonucleotide is partially modified.

40. The RNAi oligonucleotide according to any one of embodiments 36-39, wherein the modified oligonucleotide comprises a targeting ligand conjugated nucleotide.

20 41. The RNAi oligonucleotide according to any one of embodiments 36-40, wherein the modified nucleotide comprises a targeting ligand conjugated nucleotide.

42. The RNAi oligonucleotide according to any one of embodiments 36-41, wherein the oligonucleotide comprises a 2'-modification.

25

43. The RNAi oligonucleotide according to any one of embodiment 36-42, wherein the modified nucleotide comprises a 2'-modification.

30 44. The RNAi oligonucleotide according to any one of embodiments 42-43, wherein the 2'-modification is a modification selected from 2'-aminoethyl, 2'-fluoro, 2'-O-methyl, 2'-O-methoxyethyl, and 2'-deoxy-2'-fluoro- β -d-arabinonucleic acid.

45. The RNAi oligonucleotide according to any one of embodiments 42-44, wherein the 2'-modification is selected from 2'-fluoro (2'-F) and 2'-O-methyl (2'-OMe).

35

46. The RNAi oligonucleotide according to any one of embodiments 36-45, wherein the modification is a 2'-modification selected from 2'-fluoro (2'-F) and 2'-O-methyl (2'-OMe).

47. The RNAi oligonucleotide according to any one of embodiments 36-46, wherein about 10-15%, 10%, 11%, 12%, 13%, 14% or 15% of the nucleotides of the sense strand comprise a 2'-fluoro (2'-F) modification.

48. The RNAi oligonucleotide according to any one of embodiments 36-47, wherein about 25-35%, 25%, 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34% or 35% of the nucleotides of the antisense strand comprise a 2'-fluoro (2'-F) modification.

49. The RNAi oligonucleotide according to any one of embodiments 36-48, wherein about 25-35%, 25%, 26%, 27%, 28%, 29%, 30%, 31%, 32%, 33%, 34% or 35% of the nucleotides of the oligonucleotide comprise a 2'-fluoro (2'-F) modification.

50. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand comprises 36 nucleotides with positions 1-36 from 5' to 3', wherein positions 8-11 comprise a 2'-fluoro (2'-F) modification.

51. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein
the sense strand comprises 36 nucleotides, numbered 5' to 3'; and
all of positions 8-11 of the sense strand comprise a 2'-fluoro (2'-F) modification.

52. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein
the sense strand is 36 nucleotides in length, numbered 5' to 3'; and
all of positions 8-11 of the sense strand comprise a 2'-fluoro (2'-F) modification.

53. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises 22 nucleotides with positions 1-22 from 5' to 3', and wherein positions 2, 3, 4, 5, 7, 10 and 14 comprise a 2'-fluoro (2'-F) modification.

54. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein

the antisense strand comprises 22 nucleotides, numbered 5' to 3'; and

all of positions 2, 3, 4, 5, 7, 10 and 14 of the antisense strand comprise a 2'-fluoro (2'-F) modification.

55. The RNAi oligonucleotide according to any one of the preceding embodiments,
5 wherein

the antisense strand is 22 nucleotides in length, numbered 5' to 3'; and

all of positions 2, 3, 4, 5, 7, 10 and 14 of the antisense strand comprise a 2'-fluoro (2'-F) modification.

56. The RNAi oligonucleotide according to any one of the preceding embodiments,
10 wherein the sense strand comprises 36 nucleotides with positions 1-36 from 5' to 3', and wherein positions 1-7, 12-27, and 31-36 comprise a 2'-O-methyl modification.

57. The RNAi oligonucleotide according to any one of the preceding embodiments,
15 wherein

the sense strand comprises 36 nucleotides, numbered 5' to 3'; and

all of positions 1-7, 12-27, and 31-36 of the sense strand comprise a 2'-O-methyl modification.

58. The RNAi oligonucleotide according to any one of the preceding embodiments,
20 wherein

the sense strand is 36 nucleotides in length, numbered 5' to 3'; and

all of positions 1-7, 12-27, and 31-36 of the sense strand comprise a 2'-O-methyl modification.

59. The RNAi oligonucleotide according to any one of the preceding embodiments,
25 wherein the antisense strand comprises 22 nucleotides with positions 1-22 from 5' to 3', and wherein positions 1, 6, 8, 9, 11-13, and 15-22 comprise a 2'-O-methyl modification.

60. The RNAi oligonucleotide according to any one of the preceding embodiments,
30 wherein

the antisense strand comprises 22 nucleotides, numbered 5' to 3'; and

all of positions 1, 6, 8, 9, 11-13, and 15-22 of the antisense strand comprise a 2'-O-methyl modification.

61. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein

the antisense strand is 22 nucleotides in length, numbered 5' to 3'; and

all of positions 1, 6, 8, 9, 11-13, and 15-22 of the antisense strand comprise a 2'-O-methyl
5 modification.

62. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein

the sense strand comprises 36 nucleotides and the antisense strand comprises 22

10 nucleotides, the nucleotides of each one of the strands being numbered 5' to 3';

all of positions 1-7, 12-27, and 31-36 of the sense strand and positions 1, 6, 8, 9, 11-13, and 15-22 of the antisense strand comprise a 2'-O-methyl modification; and

all of positions 8-11 of the sense strand and 2, 3, 4, 5, 7, 10 and 14 of the antisense strand comprise a 2'-fluoro modification.

63. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the oligonucleotide comprises at least one modified internucleotide linkage.

64. The RNAi oligonucleotide according to embodiment 63, wherein the at least one
20 modified internucleotide linkage is a phosphorothioate linkage.

65. The RNAi oligonucleotide according to any one of the preceding embodiments, the oligonucleotide comprises at least one phosphorothioate linkage.

25 66. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises a phosphorothioate linkage (i) between positions 1 and 2, and between positions 2 and 3; or (ii) between positions 1 and 2, between positions 2 and 3, and between positions 3 and 4, wherein positions are numbered 1-4 from 5' to 3'.

30 67. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand is 22 nucleotides in length, and wherein the antisense strand comprises a phosphorothioate linkage between positions 20 and 21 and between positions 21 and 22, wherein positions are numbered 1-22 from 5' to 3'.

68. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein

the antisense strand comprises 22 nucleotides, numbered 5' to 3'; and

a phosphorothioate linkage is provided between positions 1 and 2, between positions 2
5 and 3, and between positions 3 and 4, between positions 20 and 21 and between positions
21 and 22 of the antisense strand.

69. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand comprises a phosphorothioate linkage between positions 1 and 2,
10 wherein positions are numbered 5' to 3'.

70. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein

the antisense strand comprises 22 nucleotides;

15 the nucleotides of each one of the strands are numbered 5' to 3';

a phosphorothioate linkage is provided between positions 1 and 2 of the sense strand,
and between positions 1 and 2, between positions 2 and 3, and between positions 3 and 4,
between positions 20 and 21 and between positions 21 and 22 of the antisense strand.

20 71. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the 4'-carbon of the sugar of the 5'-nucleotide of the antisense strand comprises a phosphate analog.

72. The RNAi oligonucleotide according to embodiment 71, wherein the phosphate
25 analog is oxymethyl phosphonate, vinyl phosphonate or malonyl phosphonate, optionally wherein the phosphate analog is a 4'-phosphate analog comprising 4'-oxymethylphosphonate.

73. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the 5'-terminal nucleotide of the antisense strand comprises a structure according to
30 Chem. 1a (MePhosphonate-4O-mU).

74. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein at least one nucleotide of the oligonucleotide is conjugated to one or more targeting
ligands.

75. The RNAi oligonucleotide according to embodiment 74, wherein each targeting ligand comprises a carbohydrate, amino sugar, cholesterol, or polypeptide.

76. The RNAi oligonucleotide according to any one of embodiments 13-75, wherein the stem-loop comprises one or more targeting ligands conjugated to one or more nucleotides of the stem-loop.

77. The RNAi oligonucleotide according to any one of embodiments 74-76, wherein the one or more targeting ligands is conjugated to one or more nucleotides of the loop.

78. The RNAi oligonucleotide according to any one of embodiments 13-77, wherein the loop (Lp) comprises 4 nucleotides numbered 1-4 from 5' to 3', wherein nucleotides at positions 2, 3, and 4 each comprise one or more targeting ligands, wherein the targeting ligands are the same or different.

79. The RNAi oligonucleotide according to any one of embodiments 74-78, wherein each targeting ligand comprises a N-acetylgalactosamine (GalNAc) moiety.

80. The RNAi oligonucleotide according to embodiment 79, wherein the GalNAc moiety is a monovalent GalNAc moiety, a bivalent GalNAc moiety, a trivalent GalNAc moiety or a tetravalent GalNAc moiety.

81. The RNAi oligonucleotide according to any one of embodiments 79-80, wherein the GalNAc moiety is a monovalent GalNAc moiety.

82. The RNAi oligonucleotide according to any one of embodiments 13-81, wherein up to 4 nucleotides of Lp of the stem-loop are each conjugated to a monovalent GalNAc moiety.

83. The RNAi oligonucleotide according to any one of embodiments 13-82, wherein the loop Lp is 4 nucleotides in length numbered 1-4 from 5' to 3', wherein the loop Lp nucleotides at positions 2, 3, and 4 are each conjugated to a monovalent N-acetylgalactosamine (GalNAc) moiety.

84. The RNAi oligonucleotide according to any one of embodiments 13-82, wherein the loop Lp is 4 nucleotides in length, and wherein the second, third and fourth nucleotides of the

loop Lp from 5' to 3' are each conjugated to a monovalent N-acetylgalactosamine (GalNAc) moiety.

85. The RNAi oligonucleotide according to any one of the preceding embodiments,
5 wherein the region of complementarity is fully complementary to the mRNA target sequence.

86. The RNAi oligonucleotide according to any one of embodiments 1-84, wherein the region of complementarity is partially complementary to the mRNA target sequence.

10 87. The RNAi oligonucleotide according to any one of embodiments 1-84 and 86, wherein the region of complementarity comprises no more than four mismatches to the mRNA target sequence.

88. The RNAi oligonucleotide according to any one of the preceding embodiments,
15 wherein the region of complementarity is fully complementary to the *TMPRSS6* mRNA target sequence at nucleotide positions 2-8 of the antisense strand, wherein nucleotide positions are numbered 5' to 3'.

89. The RNAi oligonucleotide according to any one of the preceding embodiments,
20 wherein the region of complementarity is fully complementary to the *TMPRSS6* mRNA target sequence at nucleotide positions 2-11 of the antisense strand, wherein nucleotide positions are numbered 5' to 3'.

90. The RNAi oligonucleotide according to any one of the preceding embodiments,
25 wherein the *TMPRSS6* mRNA target sequence is as set forth in SEQ ID NO: 844.

91. The RNAi oligonucleotide according to any one of the preceding embodiments,
wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO:
184, and optionally wherein the sense strand comprises a nucleotide sequence as set forth in
30 SEQ ID NO: 844.

92. The RNAi oligonucleotide according to any one of the preceding embodiments,
wherein the sense strand comprises a nucleotide sequence of any one of SEQ ID NOs: 579-
580, 585-587, 590 and 595-597.

93. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand comprises a nucleotide sequence selected from SEQ ID NOs: 579-580, 585-587, 590, and 595-597.

5 94. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises a nucleotide sequence of any one of SEQ ID NOs: 600-601, 606-608, 611 and 616-618.

10 95. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises a nucleotide sequence selected from SEQ ID NOs: 600-601, 606-608, 611, and 616-618.

15 96. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 595 and 616, respectively;
- d) SEQ ID NOs: 590 and 611, respectively;
- 20 e) SEQ ID NOs: 596 and 617, respectively;
- f) SEQ ID NOs: 597 and 618, respectively;
- g) SEQ ID NOs: 585 and 606, respectively;
- h) SEQ ID NOs: 586 and 607, respectively; and,
- i) SEQ ID NOs: 587 and 608, respectively.

25 97. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 579 and 600, respectively;
- 30 b) SEQ ID NOs: 580 and 601, respectively;
- c) SEQ ID NOs: 590 and 611, respectively;
- d) SEQ ID NOs: 597 and 618, respectively; and,
- e) SEQ ID NOs: 586 and 607, respectively.

98. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 600, and optionally wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 579.

5

99. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 579, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 600.

10

100. The RNAi oligonucleotide according to any one of embodiments 1-97, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 580, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 601.

15

101. The RNAi oligonucleotide according to any one of embodiments 1-97, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 590, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 611.

20

102. The RNAi oligonucleotide according to any one of embodiments 1-97, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 597, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 618.

25

103. The RNAi oligonucleotide according to any one of embodiments 1-97, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 586, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 607.

104. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the antisense strand is 22 nucleotides in length.

30

105. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand is 36 nucleotides in length.

35

106. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 621 and 642, respectively;
- b) SEQ ID NOs: 622 and 643, respectively;
- c) SEQ ID NOs: 637 and 658, respectively;
- d) SEQ ID NOs: 632 and 653, respectively;
- e) SEQ ID NOs: 638 and 659, respectively;
- f) SEQ ID NOs: 639 and 660, respectively;
- g) SEQ ID NOs: 627 and 648, respectively;
- h) SEQ ID NOs: 628 and 649, respectively; and,
- i) SEQ ID NOs: 629 and 650, respectively.

107. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand and antisense strands comprise nucleotide sequences selected from the group consisting of:

- a) SEQ ID NOs: 621 and 642, respectively;
- b) SEQ ID NOs: 622 and 643, respectively;
- c) SEQ ID NOs: 632 and 653, respectively;
- d) SEQ ID NOs: 639 and 660, respectively; and,
- e) SEQ ID NOs: 628 and 649, respectively.

108. The RNAi oligonucleotide according to any one of the preceding embodiments, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 621, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 642.

109. The RNAi oligonucleotide according to any one of embodiments 1-107, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 642, and optionally the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 621.

110. The RNAi oligonucleotide according to any one of embodiments 1-107, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 622, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 643.

111. The RNAi oligonucleotide according to any one of embodiments 1-107, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 632, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 653.

112. The RNAi oligonucleotide according to any one of embodiments 1-107, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 639, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 660.

5

113. The RNAi oligonucleotide according to any one of embodiments 1-107, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 628, wherein the antisense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 649.

10 114. An RNAi oligonucleotide for reducing transmembrane serine protease 6 (*TMPRSS6*) expression, the oligonucleotide comprising a sense strand and an antisense strand forming a duplex region, wherein

the antisense strand comprises 22 nucleotides and comprises a nucleotide sequence as set forth in SEQ ID NO: 600, and the sense strand comprises 36 nucleotides and comprises a nucleotide sequence as set forth in SEQ ID NO: 579, the nucleotides of each one of the strands being numbered 5' to 3';

15

all of positions 1-7, 12-27, and 31-36 of the sense strand and positions 1, 6, 8, 9, 11-13, and 15-22 of the antisense strand comprise a 2'-O-methyl (2'-OMe) modification, and all of positions 8-11 of the sense strand and 2, 3, 4, 5, 7, 10 and 14 of the antisense strand comprise a 2'-Fluoro (2'-F) modification;

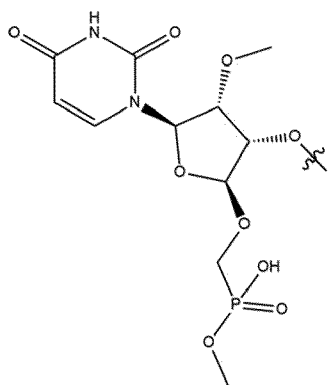
20

a phosphorothioate linkage is provided between positions 1 and 2 of the sense strand, and between positions 1 and 2, between positions 2 and 3, between positions 3 and 4, between positions 20 and 21 and between positions 21 and 22 of the antisense strand;

the sense strand proximal the 3' end comprises a stem-loop set forth as S1-Lp-S2, S1 being complementary to S2, Lp forming a loop of 4 nucleotides in length, and wherein the second, third and fourth nucleotides of the loop Lp from 5' to 3' are each conjugated to a monovalent N-acetylgalactosamine (GalNAc) moiety; and

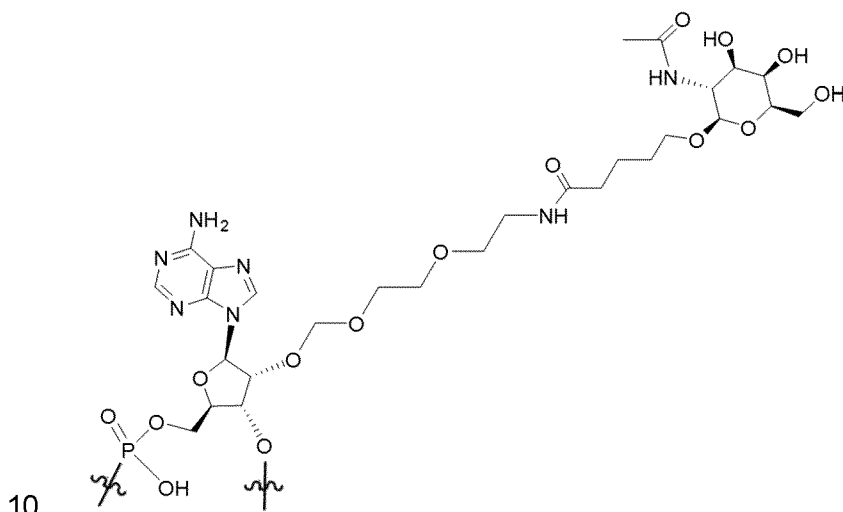
25

the 5'-terminal nucleotide of the antisense strand comprises a structure according to Chem. 1a (MePhosphonate-4O-mU):



115. The RNAi oligonucleotide according to embodiment 114, wherein the antisense strand comprises a 3' overhang of one or more purine nucleotides in length, and optionally
5 wherein the 3' overhang is 5'-GG-3'.

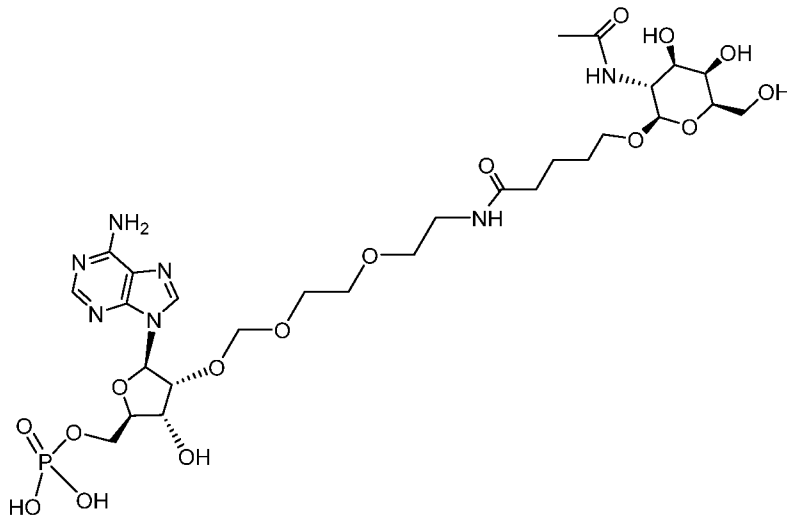
116. The RNAi oligonucleotide according to any one of embodiments 114-115, wherein the nucleotides of the loop Lp conjugated to the monovalent N-acetylgalactosamine (GalNAc) moiety each comprise a structure according to Chem. 5a:



10

117. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5'-
15 [mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mC][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 621), and wherein the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-4O-

mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG]-3' (SEQ ID NO: 642), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



5 (Chem. 5)

118. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

the sense strand comprises the sequence and all of the modifications of 5'-

10 [mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mU][mC][mA][
mG][mC][mA][mG][mC][mC][mG][adema-GalNAc][adema-GalNAc][adema-
GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 621);

the antisense strand comprises the sequence and all of the modifications of 5'-

[MePhosphonate-4O-

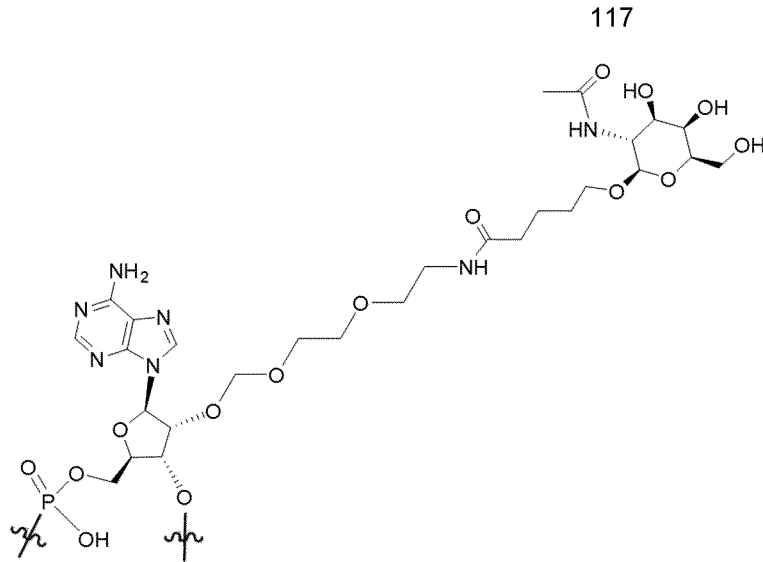
15 mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG]-3' (SEQ ID NO: 642);

mC, mA, mG, mU indicate 2'-O-methyl (2'-OMe) modified nucleotides;

fA, fC, fG, fU indicate 2'-Fluoro (2'-F) modified nucleotides;

s indicates a phosphorothioate internucleotide linkage; and

20 ademA-GalNAc comprises a structure according to Chem. 5a:



119. An RNAi oligonucleotide for reducing TMPRSS6 expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

5 the sense strand comprises the sequence and all of the modifications of 5'-[mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mU][mC][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 621);

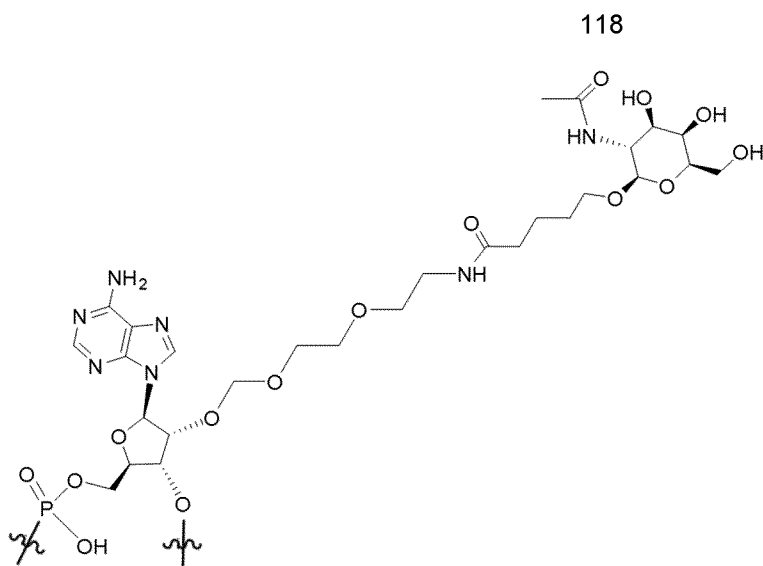
10 the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-4O-mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG]-3' (SEQ ID NO: 642);

mC, mA, mG, mU indicate 2'-O-methyl (2'-OMe) modified nucleotides;

fA, fC, fG, fU indicate 2'-fluoro (2'-F) modified nucleotides;

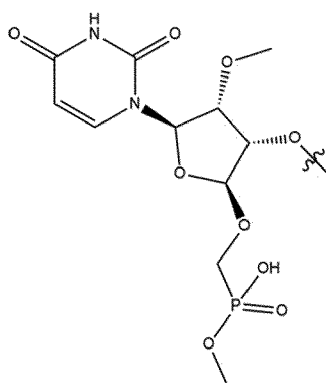
15 s indicates a phosphorothioate internucleotide linkage;

ademA-GalNAc comprises a structure according to Chem. 5a:

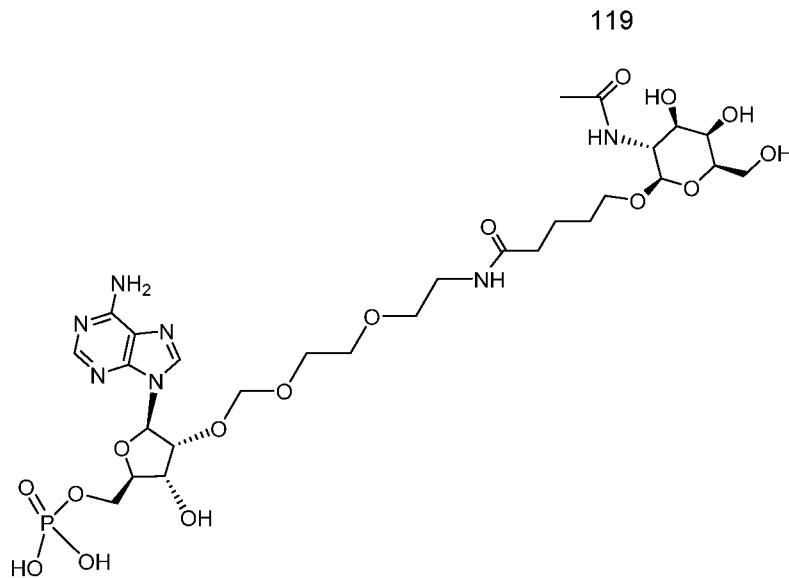


; and

MePhosphonate-4O-mU comprises a structure according to Chem. 1a:



120. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5'-[mGs][mC][mU][mA][mC][mU][mC][fU][fG][fG][fU][mA][mU][mU][mU][mC][mC][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][adema-GalNAc][adema-GalNAc][adema-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 622), and wherein the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-4O-mUs][fUs][fAs][fG][fG][mA][fA][mA][mU][fA][mC][mC][mA][fG][mA][mG][mU][mA][mG][mCs][mGs][mG]-3' (SEQ ID NO: 643), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein adema-GalNAc =



(Chem. 5)

121. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

the sense strand comprises the sequence and all of the modifications of 5'-[mGs][mC][mU][mA][mC][mU][mC][fU][fG][fG][fU][mA][mU][mU][mU][mC][mC][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 622);

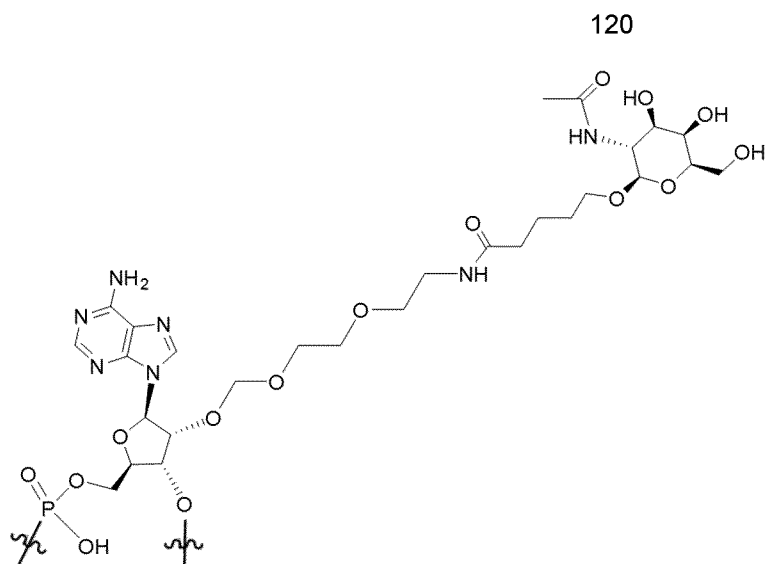
the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-4O-mUs][fUs][fAs][fG][fG][mA][fA][mA][mU][fA][mC][mC][mA][fG][mA][mG][mU][mA][mG][mCs][mGs][mG]-3' (SEQ ID NO: 643)

mC, mA, mG, mU indicate 2'-O-methyl (2'-OMe) modified nucleotides;

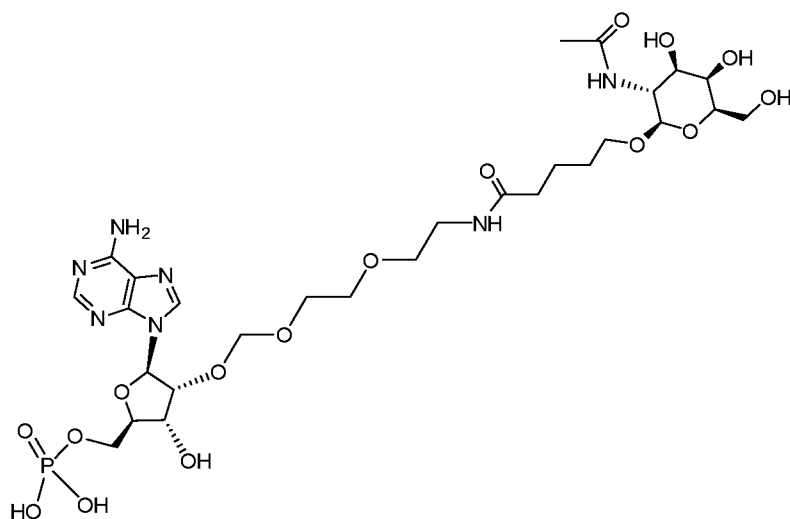
fA, fC, fG, fU indicate 2'-Fluoro (2'-F) modified nucleotides;

s indicates a phosphorothioate internucleotide linkage; and

ademA-GalNAc comprises a structure according to Chem 5a:

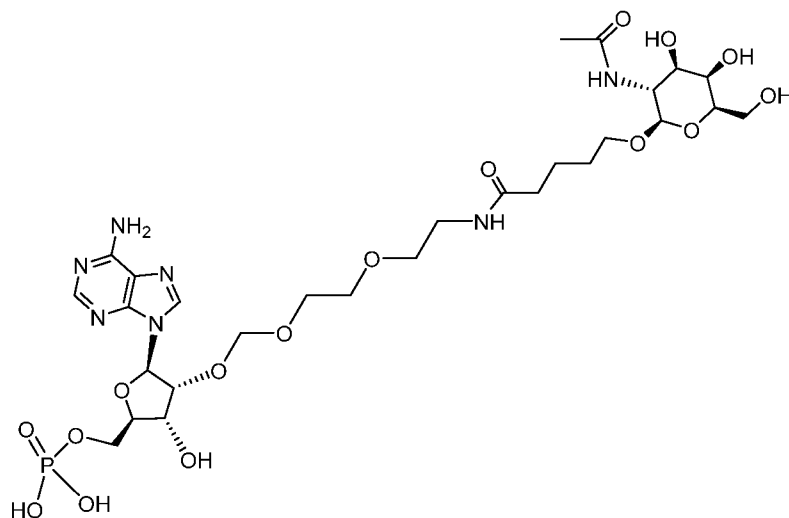


122. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5'-[mCs][mU][mC][mA][mC][mU][fG][fC][fU][fU][mC][mU][mU][mC][mU][mG][mG][mU][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 632), and wherein the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-40-mUs][fAs][fCs][fC][fA][mG][fA][mA][mG][fA][mA][mG][mC][fA][mG][mG][mU][mG][mA][mGs][mGs][mG]-3' (SEQ ID NO: 653), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



(Chem. 5)

Gs][mG]-3' (SEQ ID NO: 660), wherein mC, mA, mG, mU=2'-Ome ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



(Chem. 5)

5

125. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

the sense strand comprises the sequence and all of the modifications of 5'-
[mAs][mG][mU][mG][mU][mG][mA][fA][fA][fG][fA][mC][mA][mU][mA][mG][mC][mU][mG][mA][
10 mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-
GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 639);

the antisense strand comprises the sequence and all of the modifications of 5'-
[MePhosphonate-4O-

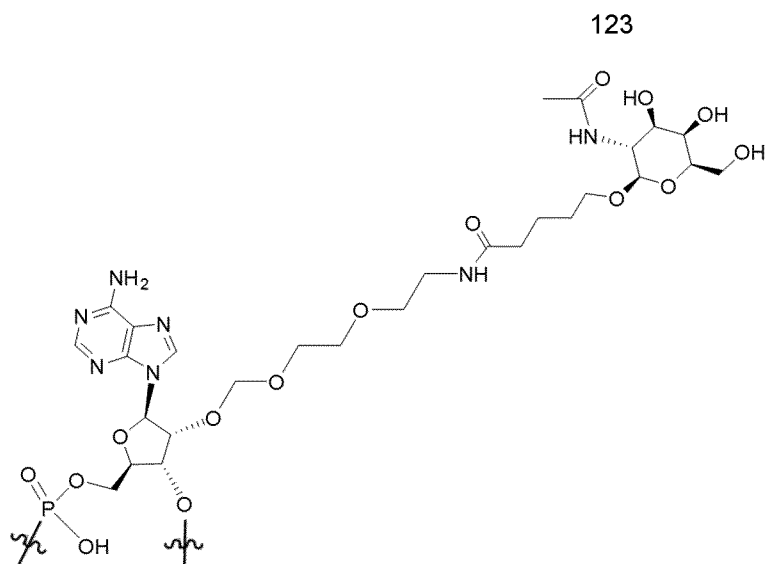
mUs][fCs][fAs][fG][fC][mU][fA][mU][mG][fU][mC][mU][mU][fU][mC][mA][mC][mA][mC][mUs][m
15 Gs][mG]-3' (SEQ ID NO: 660);

mC, mA, mG, mU indicate 2'-O-methyl (2'-OMe) modified nucleotides;

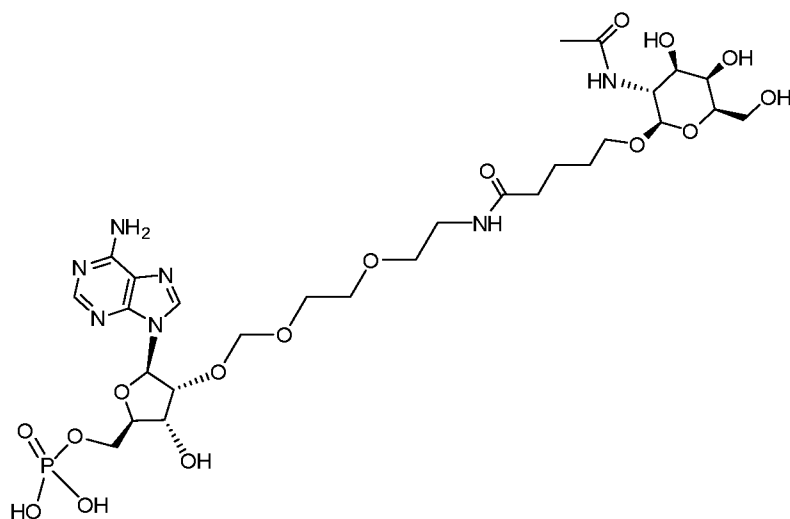
fA, fC, fG, fU indicate 2'-Fluoro (2'-F) modified nucleotides;

s indicates a phosphorothioate internucleotide linkage; and

ademA-GalNAc comprises a structure according to Chem. 5a:



126. An RNAi oligonucleotide for reducing *TMPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand comprises the sequence and all of the modifications of 5'-
 5 [mGs][mG][mG][mU][mG][mC][mA][fC][fU][fA][fU][mG][mG][mC][mU][mU][mG][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 628), and wherein the antisense strand comprises the sequence and all of the modifications of 5'-
 10 [MePhosphonate-40-mUs][fUs][fAs][fC][fA][mA][fG][mC][mC][fA][mU][mA][mG][fU][mG][mC][mA][mC][mC][mCs][mGs][mG]-3' (SEQ ID NO: 649), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'-F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



(Chem. 5)

127. An RNAi oligonucleotide for reducing *TPRSS6* expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

the sense strand comprises the sequence and all of the modifications of 5'-[mGs][mG][mG][mU][mG][mC][mA][fC][fU][fA][fU][mG][mG][mC][mU][mU][mG][mU][mA][mA][mG][mC][mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC]-3' (SEQ ID NO: 628);

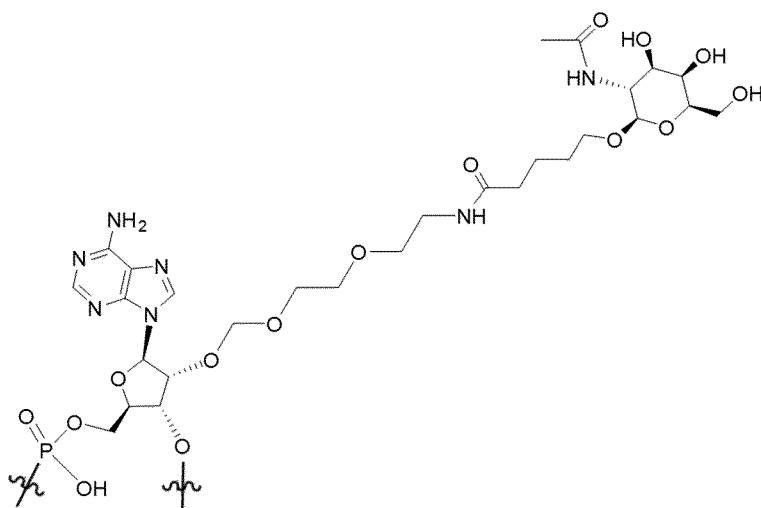
the antisense strand comprises the sequence and all of the modifications of 5'-[MePhosphonate-4O-mUs][fUs][fAs][fC][fA][mA][fG][mC][mC][fA][mU][mA][mG][fU][mG][mC][mA][mC][mC][mCs][mGs][mG]-3' (SEQ ID NO: 649);

mC, mA, mG, mU indicate 2'-O-methyl (2'-OMe) modified nucleotides;

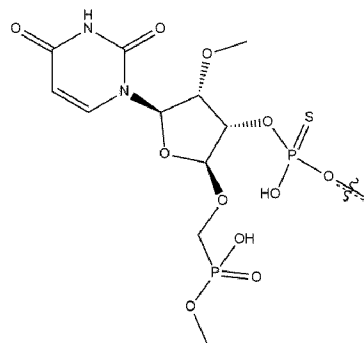
fA, fC, fG, fU indicate 2'-Fluoro (2'-F) modified nucleotides;

s indicates a phosphorothioate internucleotide linkage; and

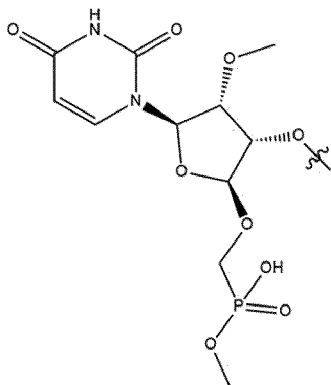
ademA-GalNAc comprises a structure according to Chem. 5a:



128. The RNAi oligonucleotide according to any one of embodiments 116-127, wherein MePhosphonate-4O-mUs comprises a structure according to Chem. 1:



129. The RNAi oligonucleotide according to any one of embodiments 116-127, wherein MePhosphonate-4O-mU comprises a structure according to Chem. 1a:



5

130. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 621 and the antisense strand comprises SEQ ID NO: 642, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 10A-B.

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131. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 621 and the antisense strand comprises SEQ ID NO: 642, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 14A.

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132. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 632 and the antisense strand comprises SEQ ID NO: 653, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 11A-B.

20

133. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 632 and the antisense strand comprises SEQ ID NO: 653, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 14B.

25

134. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 639 and the antisense strand comprises SEQ ID NO: 660, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 12A-B.

135. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 639 and the antisense strand comprises SEQ ID NO: 660, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Figs. 14C.

136. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 628 and the antisense strand comprises SEQ ID NO: 649, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Fig. 13A-B.

137. An RNAi oligonucleotide for reducing *TMPRSS6* expression comprising a sense strand and an antisense strand, wherein the sense strand comprises SEQ ID NO: 628 and the antisense strand comprises SEQ ID NO: 649, wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* RNA transcript, and wherein the oligonucleotide is in the form of a conjugate having the structure as shown in Fig. 14D.

138. A pharmaceutical composition comprising the RNAi oligonucleotide according to any one of the preceding embodiments, and a pharmaceutically acceptable carrier, delivery agent or excipient.

139. A method for treating a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression, the method comprising administering to the subject a therapeutically effective amount of the RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to embodiment 138, thereby treating the subject.

140. The method according to embodiment 139, wherein (i) hepcidin expression is increased; (ii) serum iron levels are decreased; (iii) serum iron saturation is decreased; or (iv) any combination of (i)-(iii), after administering the RNAi oligonucleotide.

5 141. A method of delivering an oligonucleotide to a subject, the method comprising administering pharmaceutical composition of embodiment 138 to the subject.

142. A method for reducing *TMPRSS6* expression in a cell, a population of cells or a subject, the method comprising the step of:

- 10 i) contacting the cell or the population of cells with the RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition of embodiment 138; or
- ii) administering to the subject the RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition of embodiment 138.

15

143. The method according to embodiment 142, wherein reducing *TMPRSS6* expression comprises reducing an amount or level of *TMPRSS6* mRNA, an amount or level of matriptase-2 protein, or both.

20 144. The method according to embodiment 142 or 143, wherein reducing *TMPRSS6* expression results in (i) an increase in hepcidin production; (ii) a decrease in serum iron saturation; (iii) a decrease in serum iron; or (iv) any combination of (i)-(iii).

25 145. The method according to any one of embodiments 142-144, wherein the subject has a disease, disorder or condition associated with hepcidin deficiency or suppression.

146. The method according to any one of embodiments 139-140 and 145, wherein the disease, disorder or condition associated with hepcidin deficiency is hemochromatosis such hereditary hemochromatosis.

30

147. The method according to any one of embodiments 139-140 and 145, wherein the disease, disorder or condition associated with hepcidin deficiency is beta-thalassemia.

35 148. The method according to any one of embodiments 139-140 and 145, wherein the disease, disorder or condition associated with hepcidin suppression is polycythaemia vera.

149. The method according to any one of embodiments 139-148, wherein the RNAi oligonucleotide, or pharmaceutical composition, is administered in combination with a second composition or therapeutic agent.

5

150. Use of the RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to embodiment 138, in the manufacture of a medicament for the treatment of a disease, disorder or condition associated with hepcidin deficiency or suppression, optionally for the treatment of hemochromatosis such as hereditary hemochromatosis, polycythaemia vera, or beta-thalassemia.

10

151. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to embodiment 138, for use as a medicament.

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152. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to embodiment 138, for use as a medicament.

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153. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition of embodiment 138, for use, or adaptable for use, in the treatment of a disease, disorder or condition associated with hepcidin deficiency or suppression, optionally for the treatment of hemochromatosis such as hereditary hemochromatosis, polycythaemia vera, or beta-thalassemia.

25

154. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to 138, for use in the treatment of hemochromatosis such as hereditary hemochromatosis.

30

155. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to 138, for use in the treatment of polycythaemia vera.

156. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to 138, for use in the treatment of beta-thalassemia.

157. The RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition according to 138, for use in the treatment of hemochromatosis such as hereditary hemochromatosis or beta-thalassemia.

5 158. A kit comprising the RNAi oligonucleotide according to any one of embodiments 1-137, an optional pharmaceutically acceptable carrier, and a package insert comprising instructions for administration to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression.

10 159. A kit comprising the RNAi oligonucleotide according to any one of embodiments 1-137, or the pharmaceutical composition of embodiment 138, and a package insert comprising instructions for administration to a subject having a disease, disorder or condition associated with hepcidin deficiency or suppression.

15 160. The use of embodiment 150, the RNAi oligonucleotide or pharmaceutical composition for use, or adaptable for use, according to any one of embodiments 151-157, or the kit according to any one of embodiments 158-159, wherein the disease, disorder or condition associated with hepcidin deficiency or suppression is hemochromatosis such as hereditary hemochromatosis, polycythaemia vera, or beta-thalassemia.

Examples

Example 1: Preparation of RNAi Oligonucleotides

Oligonucleotide Synthesis and Purification

The oligonucleotides (RNAi oligonucleotides) described in the foregoing Examples were chemically synthesized using methods described herein. Generally, RNAi oligonucleotides are synthesized using solid phase oligonucleotide synthesis methods as described for 19-23mer siRNAs (see, e.g., Scaringe *et al.* (1990) *Nucleic Acids Res.* 18:5433-5441 and Usman *et al.* (1987) *J. Am. Chem. Soc.* 109:7845-45; see *also*, US Patent Nos. 5,804,683; 5,831,071; 5,998,203; 6,008,400; 6,111,086; 6,117,657; 6,353,098; 6,362,323; 6,437,117 and 6,469,158) in addition to using known phosphoramidite synthesis (see, e.g. Hughes and Ellington (2017) *Cold Spring Harb Perspect Biol.* 9(1):a023812; Beaucage S.L., Caruthers M.H. *Studies on Nucleotide Chemistry V: Deoxynucleoside Phosphoramidites — A New Class of Key Intermediates for Deoxypolynucleotide Synthesis*, *Tetrahedron Lett.* 1981;22:1859–62. Doi: 10.1016/S0040-4039(01)90461-7). dsRNAi oligonucleotides having a 19mer core sequence were formatted into constructs having a 25mer sense strand and a 27mer antisense strand to allow for processing by the RNAi machinery. The 19mer core sequence is complementary to a region in the *TMPRSS6* mRNA.

Individual RNA strands were synthesized and HPLC purified according to standard methods (Integrated DNA Technologies; Coralville, IA). For example, RNA oligonucleotides were synthesized using solid phase phosphoramidite chemistry, deprotected and desalted on NAP-5 columns (Amersham Pharmacia Biotech; Piscataway, NJ) using standard techniques (Damha & Olgivie (1993) *Methods Mol. Biol.* 20:81-114; Wincott *et al.* (1995) *Nucleic Acids Res.* 23:2677-84). The oligomers were purified using ion-exchange high performance liquid chromatography (IE-HPLC) on an Amersham Source 15Q column (1.0 cm×25 cm; Amersham Pharmacia Biotech) using a 15 min. step-linear gradient. The gradient varied from 90:10 Buffers A:B to 52:48 Buffers A:B, where Buffer A is 100 mM Tris pH 8.5 and Buffer B is 100 mM Tris pH 8.5, 1 M NaCl. Samples were monitored at 260 nm and peaks corresponding to the full-length oligonucleotide species were collected, pooled, desalted on NAP-5 columns, and lyophilized.

The purity of each oligomer was determined by capillary electrophoresis (CE) on a Beckman PACE 5000 (Beckman Coulter, Inc.; Fullerton, CA). The CE capillaries have a 100 µm inner diameter and contain ssDNA 100R Gel (Beckman-Coulter). Typically, about 0.6 nmole of oligonucleotide was injected into a capillary, run in an electric field of 444 V/cm and was detected by UV absorbance at 260 nm. Denaturing Tris-Borate-7 M-urea running buffer

was purchased from Beckman-Coulter. Oligoribonucleotides were obtained that were at least 90% pure as assessed by CE for use in experiments described below. Compound identity was verified by matrix-assisted laser desorption ionization time-of-flight (MALDI-TOF) mass spectroscopy on a Voyager DE™ Biospectrometry Work Station (Applied Biosystems; Foster City, CA) following the manufacturer's recommended protocol. Relative molecular masses of all oligomers were obtained, often within 0.2% of expected molecular mass.

Preparation of Duplexes

Single strand RNA oligomers were resuspended (e.g., at 100 µM concentration) in duplex buffer consisting of 100 mM potassium acetate, 30 mM HEPES, pH 7.5. Complementary sense and antisense strands were mixed in equal molar amounts to yield a final solution of, for example, 50 µM duplex. Samples were heated to 100°C for 5 minutes in RNA buffer (IDT) and were allowed to cool to room temperature before use. The RNAi oligonucleotides were stored at -20° C. Single strand RNA oligomers were stored lyophilized or in nuclease-free water at -80° C.

Example 2: Generation of TMPRSS6-Targeting GalNAc-Conjugated RNAi Oligonucleotides

Transmembrane protease, serine 6 (TMPRSS6) is a type II transmembrane serine protease found on the cell surface. The protein functions in a signaling pathway with hepcidin to regulate iron balance in the body.

Identification of TMPRSS6 mRNA Target Sequences

To generate TMPRSS6 RNAi oligonucleotides, a computer-based algorithm was used to computationally identify TMPRSS6 mRNA target sequences suitable for assaying inhibition of TMPRSS6 expression by the RNAi pathway. The algorithm provided RNAi oligonucleotide guide (antisense) strand sequences each having a region of complementarity to a suitable TMPRSS6 mRNA target sequence of human (Hs) or murine (Mm) mRNA (e.g., SEQ ID NOs: 853 and 854, respectively; Table 1). Due to sequence conservation across species, some of the TMPRSS6 mRNA target sequences identified for human TMPRSS6 mRNA are homologous to the corresponding TMPRSS6 mRNA target sequence of murine (Mm) TMPRSS6 mRNA (SEQ ID NO:854; Table 1) and/or cynomolgus monkey (Mf) TMPRSS6 mRNA (SEQ ID NO:855; Table 1). TMPRSS6 RNAi oligonucleotides comprising a region of complementarity to homologous TMPRSS6 mRNA target sequences with nucleotide sequence

similarity are predicted to have the ability to target homologous *TMPRSS6* mRNAs (e.g., human *TMPRSS6* and monkey *TMPRSS6* mRNAs).

Table 1. Exemplary Human *TMPRSS6*, Monkey *TMPRSS6*, and Murine *TMPRSS6* mRNA Sequences

Species	GenBank Ref Seq #	SEQ ID NO
Human (Hs)	NM_001289000.2	853
Murine (Mm)	NM_001355601.1	854
Cynomolgus monkey (Mf)	XM_005567384.2	855

Specifically, oligonucleotides synthesized as described in Example 1 were used to generate double-stranded RNAi oligonucleotides comprising a nicked tetraloop GalNAc-conjugated structure (referred to herein as “GalNAc-conjugated *TMPRSS6* oligonucleotides” or “GalNAc- *TMPRSS6* oligonucleotides”) having a 36-mer passenger strand and a 22-mer guide strand. Further, the nucleotide sequences comprising the passenger strand and guide strand have a distinct pattern of modified nucleotides and phosphorothioate linkages. Three of the nucleotides comprising the tetraloop were each conjugated to a GalNAc moiety (CAS#14131-60-3). The modification pattern of each strand is illustrated below:

Sense Strand: 5'-[mXs][mX][mX][mX][mX][mX][fX][fX][fX][fX][mX][mX][mX][mX]
[mX][mX][mX][mX][mX][mX][mX][mX][mX][mX][mX][ademX-GalNAc][ademX-
GalNAc][ademX-GalNAc][mX][mX][mX][mX][mX][mX]- 3'

Hybridized to:

Antisense Strand: 5'-[MePhosphonate-4O-mXs][fXs][fXs][fX][fX][mX][fX][mX][mX][fX][mX][mX][fX][mX][mX][mX][mX][mX][mXs][mXs][mX]- 3'

Table 2. Modification key

Symbol	Modification/linkage
[MePhosphonate-4O-mXs]	4'-O-monomethylphosphonate-2'-O-methyl modified nucleotide with a phosphorothioate linkage to the neighboring nucleotide
[ademX-GalNAc]	GalNAc attached to a nucleotide

[mXs]	2'-O-methyl modified nucleotide with a phosphorothioate linkage to the neighboring nucleotide
[fXs]	2'- fluoro modified nucleotide with a phosphorothioate linkage to the neighboring nucleotide
[mX]	2'-O-methyl modified nucleotide with phosphodiester linkages to neighboring nucleotides
[fX]	2'- fluoro modified nucleotide with phosphodiester linkages to neighboring nucleotides

It is understood that "X" in the above modification patterns and modification key refers to nucleobases.

In Vitro Cell-Based Assays

The ability of GalNAc-conjugated TMPRSS6 oligonucleotides to reduce *TMPRSS6* mRNA was measured using *in vitro* cell-based assays. Briefly, human Hep3B cells expressing endogenous human *TMPRSS6* gene were transfected with GalNAc-conjugated TMPRSS6 oligonucleotides at 1 nM in separate wells of a multi-well cell-culture plate. Cells were maintained for 24 hours following transfection with the modified GalNAc-conjugated TMPRSS6 oligonucleotides and then the amount of remaining *TMPRSS6* mRNA from the transfected cells was determined using TAQMAN®-based qPCR assays. Two qPCR assays, a 3' assay and a 5' assay, were used to determine *TMPRSS6* mRNA levels as measured using PCR probes conjugated to 6-carboxy-fluorescein (FAM). These assays are identified in Table 3 below. Primer pairs were assayed for percent (%) remaining mRNA.

Table 3. qPCR Assays

3' Assay	Forward-1652 (F1652)	AGCCTGATTGTCTCAACGG	SEQ ID NO: 857
	Reverse-1725	CTGGAAGGTGAATGTCCCAC	SEQ ID NO: 858
	Probe-1676	ACGAAGAGCAGTGCCAGGAAGG	SEQ ID NO: 859
5' Assay	Forward-394 (F394)	GTA CTCAATCGCCACTTCTCC	SEQ ID NO: 860
	Reverse-539	GAATAGACGGAGCTGGAGTTG	SEQ ID NO: 861
	Probe-450	CAGTGAAACCGCCAAAGCCCAG	SEQ ID NO: 862

The results indicated that GalNAc-conjugated TMPRSS6 oligonucleotides designed to target *TMPRSS6* mRNA inhibited *TMPRSS6* expression in cells, as determined by a reduced amount of *TMPRSS6* mRNA in GalNAc-conjugated TMPRSS6 oligonucleotide-

transfected cells relative to control cells, and indicated that the nucleotide sequences comprising the GalXC-conjugated oligonucleotides are useful for generating RNAi oligonucleotides to inhibit *TMPRSS6* expression.

5 Example 3: GalNAc-Conjugated *TMPRSS6* RNAi Oligonucleotides Inhibit Human and Murine *TMPRSS6* Expression *in vivo*

To evaluate the ability of RNAi oligonucleotides to reduce *TMPRSS6* expression *in vivo*, an HDI mouse model was used.

10 Nine GalNAc-conjugated *TMPRSS6* oligonucleotides shown in Table 4 were evaluated. The oligonucleotides selected were based on the nucleotide sequences that were used to generate RNAi oligonucleotides to inhibit *TMPRSS6* expression in the screen of Example 2.

Oligonucleotides were evaluated in mice engineered to transiently express human *TMPRSS6* mRNA in hepatocytes of the mouse liver. Briefly, 6-8 week-old female CD-1 mice (n = 5) were subcutaneously administered the indicated GalNAc-conjugated *TMPRSS6* oligonucleotides at a concentration of 1 mg/kg or 2 mg/kg formulated in PBS. A control group of mice (n = 5) were administered only PBS. Three days later (72 hours), the mice were hydrodynamically injected (HDI) with 25 µg of DNA plasmid encoding the open reading frame (ORF) human *TMPRSS6* gene (pCMV6_*TMPRSS6* containing NM_153609 (Cat #: SC306623, Origene)) under control of a ubiquitous cytomegalovirus (CMV) promoter sequence. One day after introduction of the DNA plasmid, liver samples from HDI mice were collected. Total RNA derived from these HDI mice were subjected to qRT-PCR analysis to determine *TMPRSS6* mRNA levels. Specifically, RNA was extracted from liver tissue to determine human and endogenous murine *TMPRSS6* mRNA levels by qPCR (normalized to the neoR gene). The levels of human *TMPRSS6* mRNA were determined using 5' and 3' PrimeTime™ qPCR Probe Assays (IDT), which consisted of a primer pair and fluorescently labeled probe specific to human *TMPRSS6* mRNA. The levels of murine *TMPRSS6* were similarly measured. The percentage of human and endogenous murine *TMPRSS6* mRNA remaining in the samples from treated mice was determined using the $2^{-\Delta\Delta C_t}$ ("delta-delta Ct") method (Livak and Schmittgen (2001) Methods 25:402–408). The values were normalized for transfection efficiency using the NeoR gene included on the DNA plasmid.

Table 4. GalNAc-Conjugated Human *TMPRSS6* RNAi Oligonucleotides for HDI screen

	Species Targets	Unmodified Sense Strand (SEQ ID NO)	Unmodified Antisense strand (SEQ ID NO)	Modified Sense Strand (SEQ ID NO)	Modified Antisense strand (SEQ ID NO)
TMPRSS6-416	Hs/Mf	579	600	621	642
TMPRSS6-0419	Hs/Mf	580	601	622	643
TMPRSS6-0615	Hs/Mf	595	616	637	658
TMPRSS6-0651	Hs/Mf/Mm	590	611	632	653
TMPRSS6-0654	Hs/Mf	596	617	638	659
TMPRSS6-0831	Hs/Mf	597	618	639	660
TMPRSS6-1375	Hs/Mf	585	606	627	648
TMPRSS6-1546	Hs/Mf	586	607	628	649
TMPRSS6-1550	Hs/Mf	587	608	629	650

As shown in the 5' and 3' qPCR assays in FIGs. 1A and 1B, and Table 5, each oligonucleotide reduced TMPRSS6 expression by at least 50% at 2 mg/kg. TMPRSS6-0416, -0831, and -1546 were the most potent oligonucleotides and reduced TMPRSS6 expression by more than 50% at the lower 1 mg/kg concentration. This data demonstrated that GalNAc-modified oligonucleotides successfully reduced human *TMPRSS6* expression *in vivo*.

Table 5. Summary of 5' and 3' assays from FIGs. 1A and 1B

Hs <i>TMPRSS6</i> -5'/F394		Hs <i>TMPRSS6</i> -3'/F1652	
1 mg/kg	2 mg/kg	1 mg/kg	2 mg/kg

Construct	% remain- ing	SEM	% remain- ing	SEM	% remain- ing	SEM	% remain- ing	SEM
TMPRSS6-416	36.1	5.7	19.7	3.6	34.9	5.0	18.9	3.6
TMPRSS6-0419	44.0	5.5	19.0	3.0	46.6	7.2	22.0	2.5
TMPRSS6-0615	51.7	3.5	20.5	3.4	53.4	3.8	23.0	4.1
TMPRSS6-0651	46.0	4.0	31.7	3.5	53.9	5.3	31.5	3.7
TMPRSS6-0654	53.1	8.5	32.0	4.7	59.4	8.7	31.2	8.2
TMPRSS6-0831	33.8	2.7	29.1	4.5	33.4	1.8	34.5	5.0
TMPRSS6-1375	61.9	4.2	46.0	6.1	61.2	3.3	46.8	3.2
TMPRSS6-1546	26.4	1.5	26.1	3.9	30.6	1.7	23.5	4.1
TMPRSS6-1550	35.0	10.7	40.8	5.7	34.2	9.2	39.0	4.9

As shown in FIG. 2, GalNAc-conjugated *TMPRSS6* RNAi oligonucleotide *TMPRSS6*-0651, having specificity for murine *TMPRSS6* in addition to human *TMPRSS6*, reduced endogenous murine *TMPRSS6* expression by at least 50% at 2 mg/kg. This data demonstrated that GalNAc-modified oligonucleotides successfully reduced endogenous murine *TMPRSS6* expression *in vivo*.

Example 4: GalNAc-Conjugated *TMPRSS6* RNAi Oligonucleotides Inhibit Monkey *TMPRSS6* Expression *in vivo*

To evaluate the ability of RNAi oligonucleotides to reduce *TMPRSS6* expression *in vivo*, a monkey model was used (*Cynomolgus* macaques).

Four modified GalNAc-conjugated *TMPRSS6* oligonucleotides shown in Table 6 and depicted in FIGs. 3A-3D were evaluated. The oligonucleotides selected were based on the screen in Example 2 and results of Example 3. Briefly, cynomolgus monkeys, generally

referred to herein as monkeys, were subcutaneously administered the indicated GalNAc-conjugated *TMPRSS6* oligonucleotides at a concentration of 1 mg/kg or 4 mg/kg formulated in PBS at Day 0, 28, 56, 84, and 112. A control group of monkeys (n = 5) were administered only PBS. Total RNA derived from these monkeys were subjected to qRT-PCR analysis to determine *TMPRSS6* mRNA levels. Specifically, RNA was extracted from liver tissue to determine monkey *TMPRSS6* mRNA levels by qPCR (normalized to the B2M gene) at Day -7, 28, 56, 84, 112, and 168. The levels of monkey *TMPRSS6* mRNA were determined using a PrimeTime™ qPCR Probe Assay (IDT), which consisted of a primer pair and fluorescently labeled probe specific to monkey *TMPRSS6* mRNA. The percentage of monkey *TMPRSS6* mRNA remaining in the samples from treated monkeys was determined using the $2^{-\Delta\Delta Ct}$ ("delta-delta Ct") method (Livak and Schmittgen (2001) Methods 25:402–408).

Table 6. GalNAc-Conjugated Monkey *TMPRSS6* RNAi Oligonucleotides for NHP screen

	Species Targets	Unmodified Sense Strand (SEQ ID NO)	Unmodified Antisense strand (SEQ ID NO)	Modified Sense Strand (SEQ ID NO)	Modified Antisense strand (SEQ ID NO)
TMPRSS6-416	Hs/Mf	579	600	621	642
TMPRSS6-0651	Hs/Mf/Mm	590	611	632	653
TMPRSS6-0831	Hs/Mf	597	618	639	660
TMPRSS6-1546	Hs/Mf	586	607	628	649

As shown in FIGs. 4A-4F, corresponding to each one of the samples at days -7, 28, 56, 84, 112, and 168 respectively, each oligonucleotide reduced *TMPRSS6* expression by at least 50% at both 1 mg/kg and 4 mg/kg throughout the course of the study (*i.e.*, out to 168 days). This data demonstrated that the GalNAc-modified oligonucleotides successfully reduced monkey *TMPRSS6* expression *in vivo*.

Example 5: GalNAc-Conjugated TMPRSS6 RNAi Oligonucleotides Modulate Iron Homeostasis *in vivo*

Loss of function mutations in *TMPRSS6* result in elevated hepcidin plasma levels and lead to severe disorders including iron-refractory, iron-deficient anemia. Hepcidin protein is a regulator of iron homeostasis and directs entry of iron into circulation. When levels of *hepcidin* are high, serum iron levels decrease which can result in anemia. When hepcidin levels are low, in disease states such as hemochromatosis, iron levels rise and overload can occur. *TMPRSS6* is known to suppress *hepcidin* expression and thus inhibition of *TMPRSS6* may modulate *hepcidin* expression and alter serum iron levels and saturation.

To evaluate changes in iron homeostasis, levels of *hepcidin*, serum iron, and serum iron saturation were measured after inhibition of *TMPRSS6*. The four modified GalNAc-conjugated *TMPRSS6* oligonucleotides shown in Table 6 and depicted in FIGs. 3A-3D were administered to cynomolgus monkeys as described in Example 4. Total RNA derived from these monkeys were subjected to qRT-PCR analysis to determine *hepcidin* mRNA levels. Specifically, RNA was extracted from liver tissue to determine monkey *hepcidin* mRNA levels by qPCR (normalized to the B2M gene) at Day -7, 28, 56, 84, 112, and 168. The levels of monkey *hepcidin* mRNA were determined using a PrimeTime™ qPCR Probe Assay (IDT), which consisted of a primer pair and fluorescently labeled probe specific to monkey *TMPRSS6* mRNA. The percentage of monkey *hepcidin* mRNA remaining in the samples from treated monkeys was determined using the $2^{-\Delta\Delta C_t}$ ("delta-delta Ct") method (Livak and Schmittgen (2001) Methods 25:402–408).

As shown in FIGs. 5A-5F, corresponding to each one of the samples at days -7, 28, 56, 84, 112, and 168 respectively, by Day 56 (FIG. 5C) a significant upregulation in *hepcidin* was observed for all oligonucleotides. Upregulation of *hepcidin* was observed for the remainder of the study to Day 168. This data demonstrates that GalNAc-modified oligonucleotides for inhibiting *TMPRSS6* successfully reduce increase *hepcidin* expression *in vivo*.

To measure serum iron and serum iron saturation, serum was collected from the animals at Day -7, 28, 56, 84, 112, and 168. The levels of iron were measured using an iron panel analysis conducted at Cornell Veterinary Diagnostic Lab.

As shown in FIGs. 6A-6F and FIGs. 7A-7B, a dose dependent reduction of serum iron was observed after Day 28 and generally throughout the 168-day study for each oligonucleotide. Similarly, a dose dependent reduction of serum iron saturation was observed after Day 28 and generally throughout the 168-day study for each oligonucleotide, as shown in FIGs. 8A-8F and FIGs. 9A-9B. Together, this data demonstrated that GalNAc-modified oligonucleotides for inhibiting *TMPRSS6* successfully reduced serum iron and serum iron

saturation *in vivo*. Subsequently, reducing free iron may benefit patients with iron overload diseases, like hereditary haemochromatosis (primary iron overload) and beta-thalassemia (secondary iron overload) and would limit miss-regulated and elevated erythropoiesis as observed in polycythemia vera.

5 While certain features of the invention have been illustrated and described herein, many modifications, substitutions, changes, and equivalents will now occur to those of ordinary skill in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the invention.

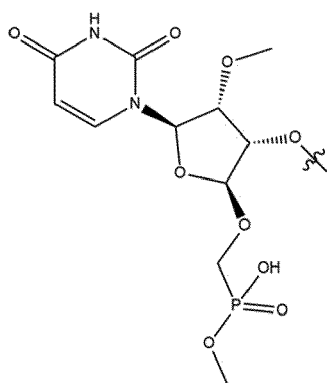
CLAIMS

1. An RNAi oligonucleotide for reducing transmembrane serine protease 6 (*TMPRSS6*) expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein the sense strand and the antisense strand form a duplex region, wherein the antisense strand
5 comprises at least 20 contiguous nucleotides of a nucleotide sequence as set forth in SEQ ID NO: 600, and wherein the antisense strand comprises a region of complementarity to a *TMPRSS6* mRNA target sequence, the region of complementarity being at least 18 contiguous nucleotides.
- 10 2. The RNAi oligonucleotide according to claim 1, wherein the region of complementarity is at least 19 contiguous nucleotides.
3. The RNAi oligonucleotide according to any one of claims 1-2, wherein the sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 844, optionally wherein the
15 sense strand comprises a nucleotide sequence as set forth in SEQ ID NO: 579.
4. The RNAi oligonucleotide according to any one of claims 1-3, wherein the antisense strand comprises at least 21 contiguous nucleotides of the nucleotide sequence set forth in SEQ ID NO: 600, optionally wherein the antisense strand comprises the nucleotide sequence
20 as set forth in SEQ ID NO: 600.
5. The RNAi oligonucleotide according to any one of claims 1-4, wherein the oligonucleotide comprises at least one modified nucleotide, optionally wherein all nucleotides of the oligonucleotide are modified nucleotides.
25
6. The RNAi oligonucleotide according to any one of claims 1-5, wherein
the sense strand comprises 36 nucleotides and the antisense strand comprises 22 nucleotides, the nucleotides of each one of the strands being numbered 5' to 3';
all of positions 1-7, 12-27, and 31-36 of the sense strand and positions 1, 6, 8, 9, 11-
30 13, and 15-22 of the antisense strand comprise a 2'-O-methyl (2'-OMe) modification; and
all of positions 8-11 of the sense strand and 2, 3, 4, 5, 7, 10 and 14 of the antisense strand comprise a 2'-fluoro (2'-F) modification.
7. The RNAi oligonucleotide according to any one of claims 1-6, wherein
35 the antisense strand comprises 22 nucleotides;

the nucleotides of each one of the strands are numbered 5' to 3'; and
 a phosphorothioate linkage is provided between positions 1 and 2 of the sense strand, and between positions 1 and 2, between positions 2 and 3, between positions 3 and 4, between positions 20 and 21 and between positions 21 and 22 of the antisense strand.

5

8. The RNAi oligonucleotide according to any one of claims 1-7, wherein a 5'-terminal nucleotide of the antisense strand comprises a structure according to Chem. 1a (MePhosphonate-4O-mU):



10

9. The RNAi oligonucleotide according to any one of claims 1-8, wherein the sense strand proximal the 3' end comprises a stem-loop set forth as S1-Lp-S2, wherein S1 is complementary to S2, and wherein Lp forms a loop of 3-5 nucleotides in length between S1 and S2.

15

10. The RNAi oligonucleotide according to claim 9 wherein the loop Lp is 4 nucleotides in length, and wherein the second, third and fourth nucleotides of the loop Lp from 5' to 3' are each conjugated to a monovalent N-acetylgalactosamine (GalNAc) moiety.

20

11. The RNAi oligonucleotide according to any one of claims 1-10, wherein the antisense strand comprises a 3' overhang of one or more purine nucleotides in length, and optionally wherein the 3' overhang is 5'-GG-3'.

25

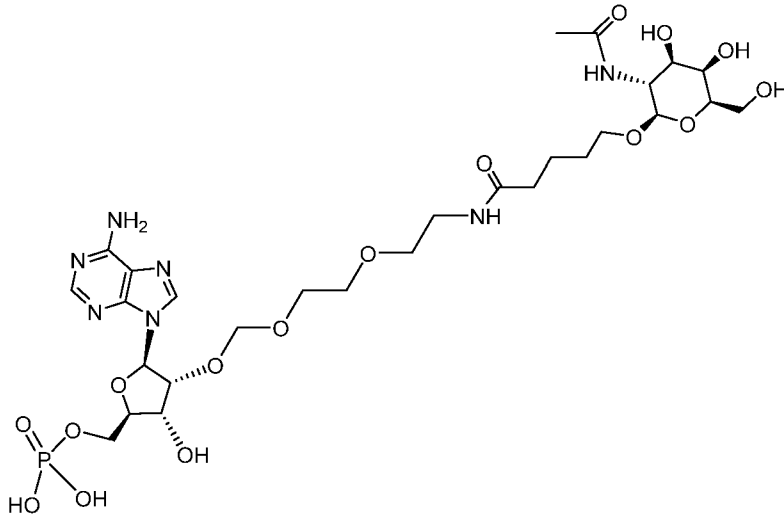
12. An RNAi oligonucleotide for reducing TMPRSS6 expression, the oligonucleotide comprising a sense strand and an antisense strand, wherein

the sense strand comprises the sequence and all of the modifications of 5' -
 [mGs][mG][mU][mG][mC][mU][mA][fC][fU][fC][fU][mG][mG][mU][mA][mU][mU][mU][mC][mA][
 mG][mC]

[mA][mG][mC][mC][mG][ademA-GalNAc][ademA-GalNAc][ademA-GalNAc][mG][mG][mC][mU][mG][mC] - 3' (SEQ ID NO: 621), and

wherein the antisense strand comprises the sequence and all of the modifications of
5' - [MePhosphonate-4O-

5 mUs][fGs][fAs][fA][fA][mU][fA][mC][mC][fA][mG][mA][mG][fU][mA][mG][mC][mA][mC][mCs][mGs][mG] - 3' (SEQ ID NO: 642), wherein mC, mA, mG, mU=2'-OMe ribonucleosides; fA, fC, fG, fU=2'F ribonucleosides; s=phosphorothioate, and wherein ademA-GalNAc =



10 13. A pharmaceutical composition comprising the RNAi oligonucleotide according to any one of claims 1-12, and a pharmaceutically acceptable carrier, delivery agent or excipient.

14. The RNAi oligonucleotide according to any one of claims 1-12, or the pharmaceutical composition according to claim 13, for use as a medicament.

15

15. The RNAi oligonucleotide according to any one of claims 1-12, or the pharmaceutical composition according to claim 13, for use in the treatment of hemochromatosis such as hereditary hemochromatosis or beta-thalassemia.

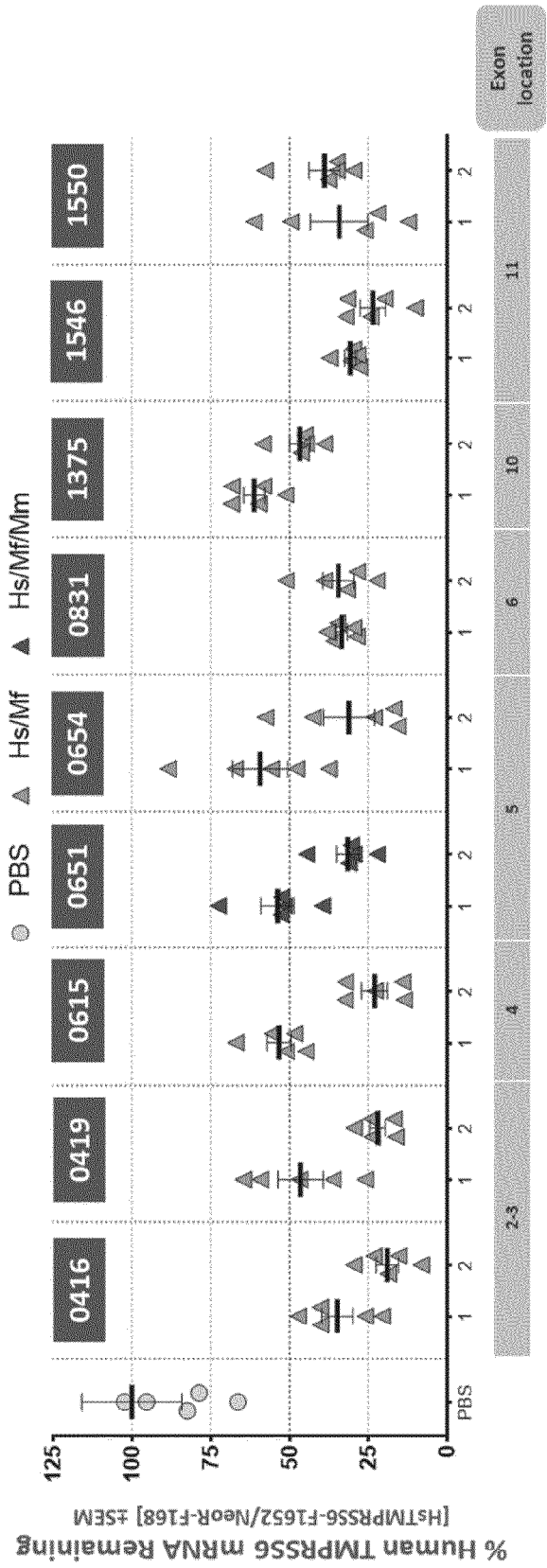


FIG. 1A

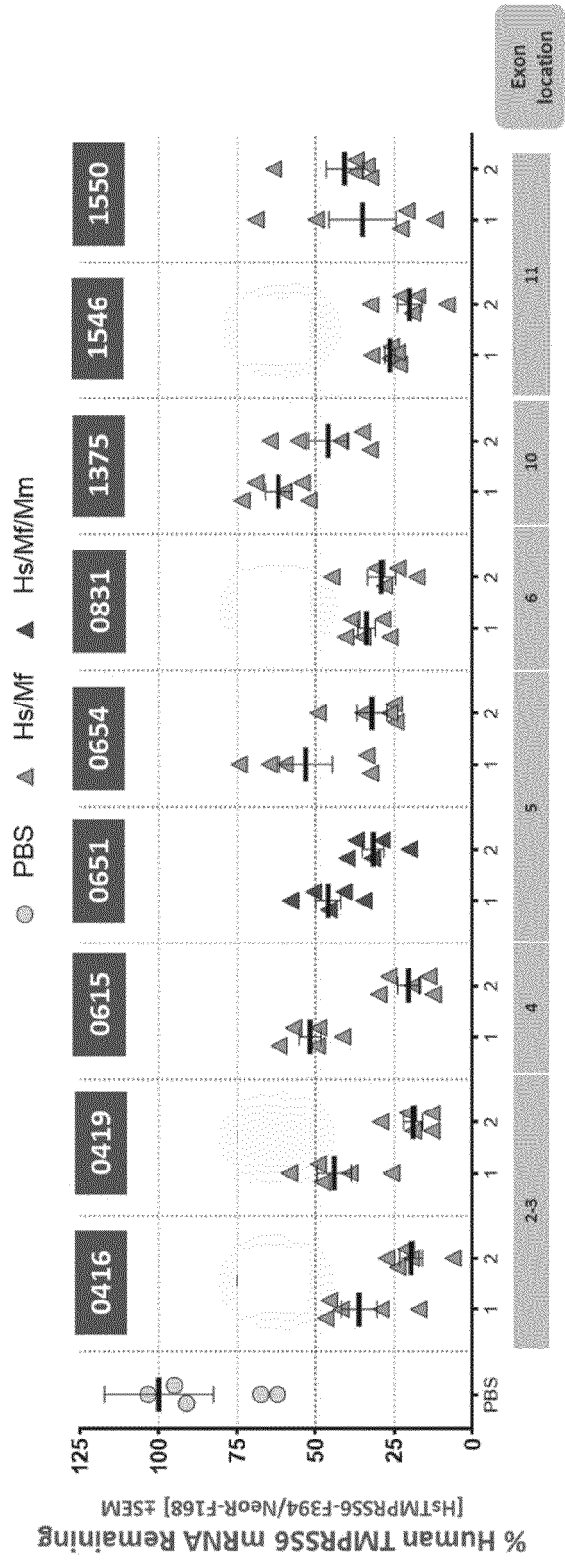


FIG. 1B

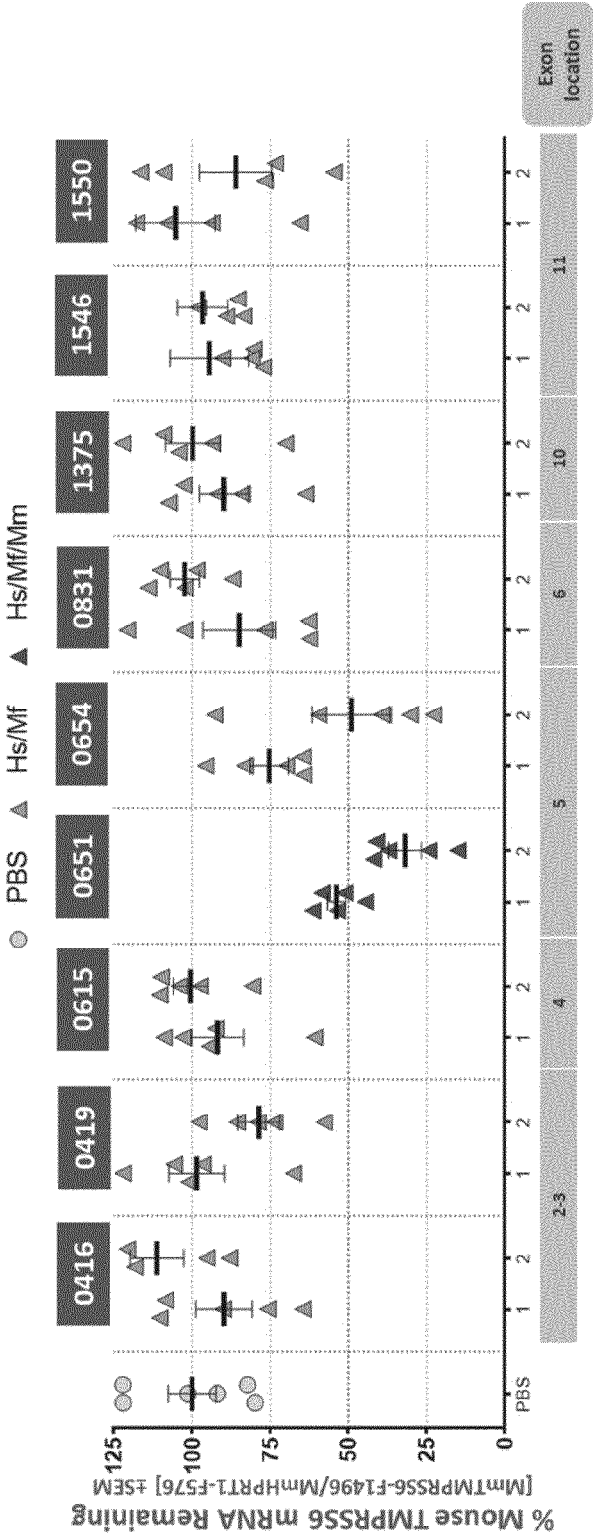


FIG. 2

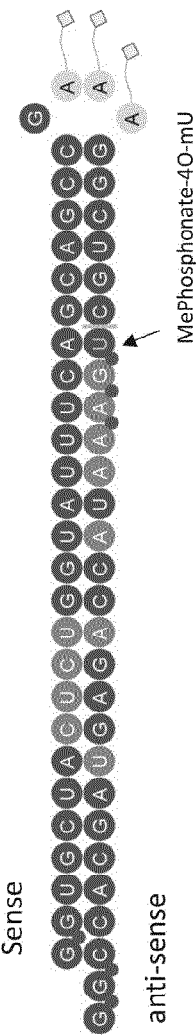


FIG. 3A

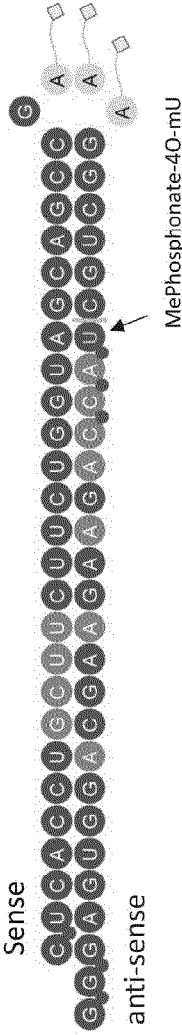


FIG. 3B

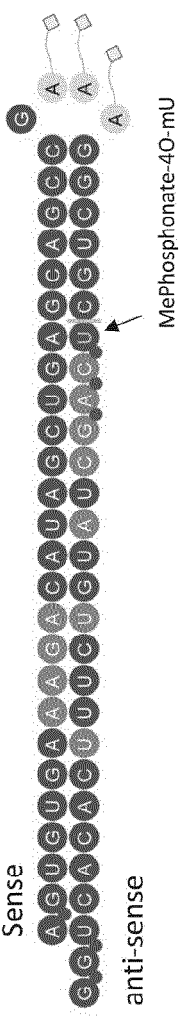


FIG. 3C

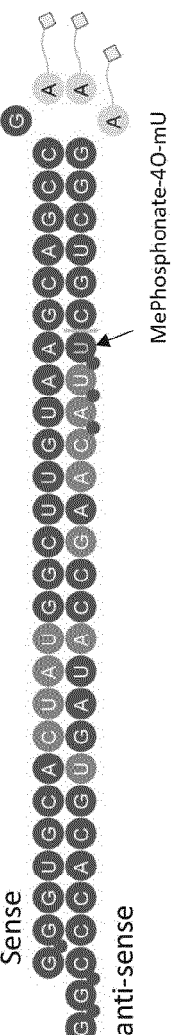
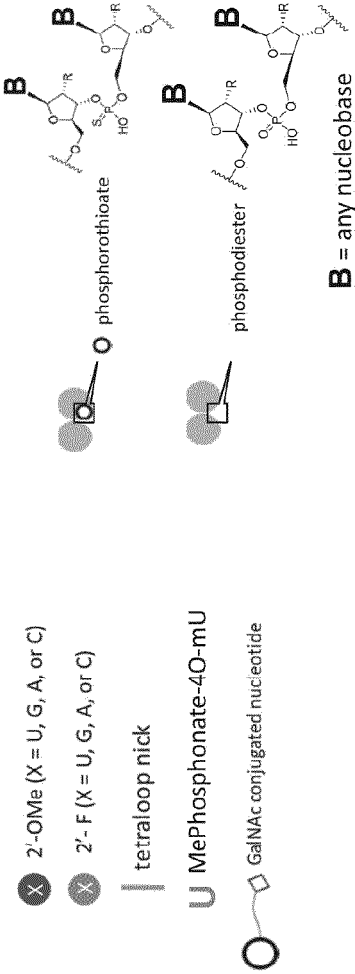


FIG. 3D



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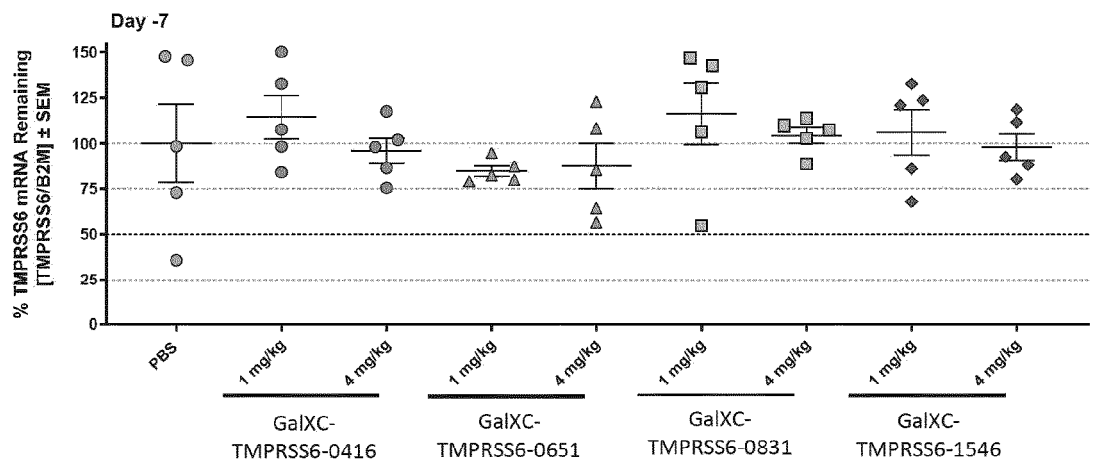


FIG. 4A

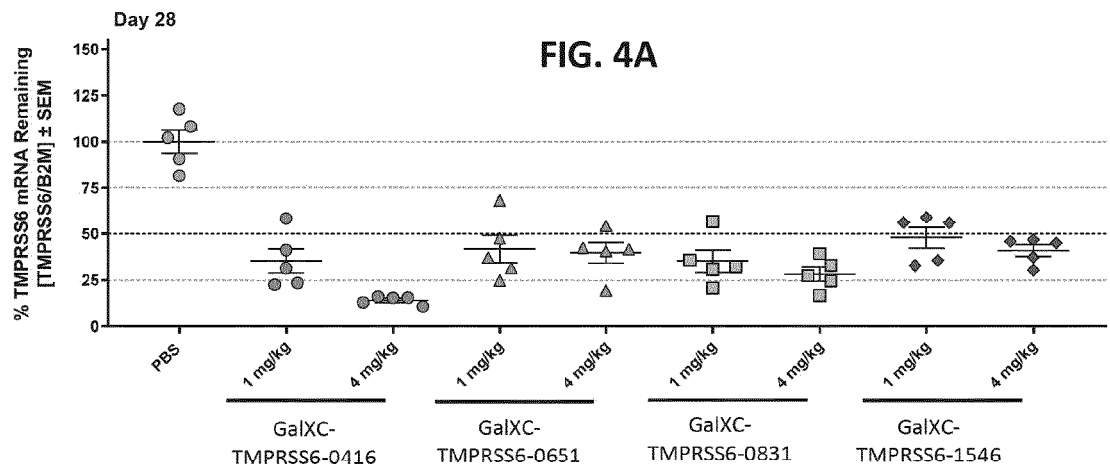


FIG. 4B

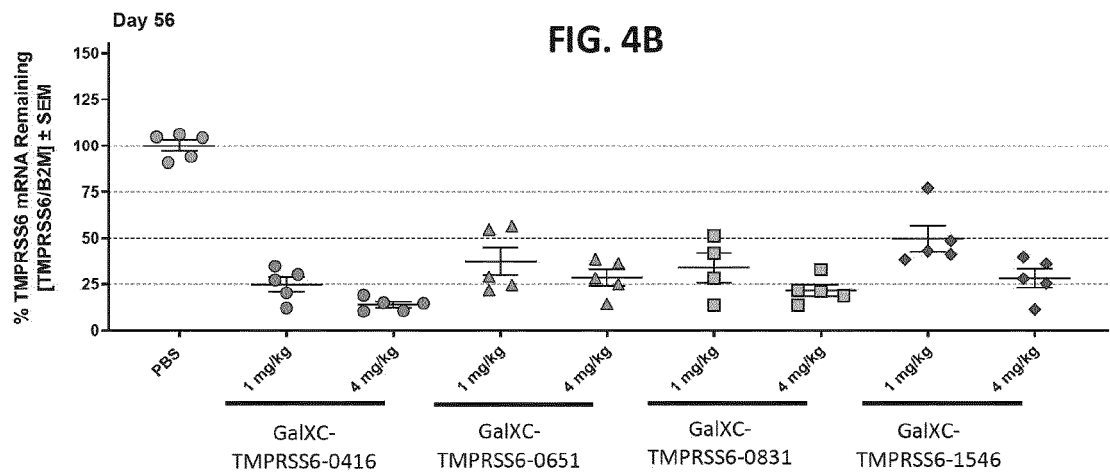


FIG. 4C

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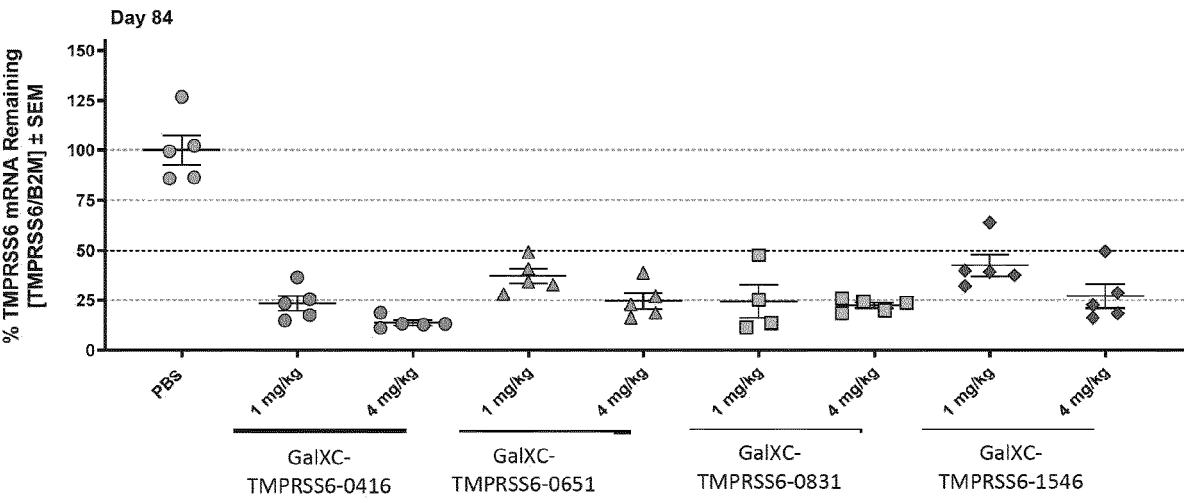


FIG. 4D

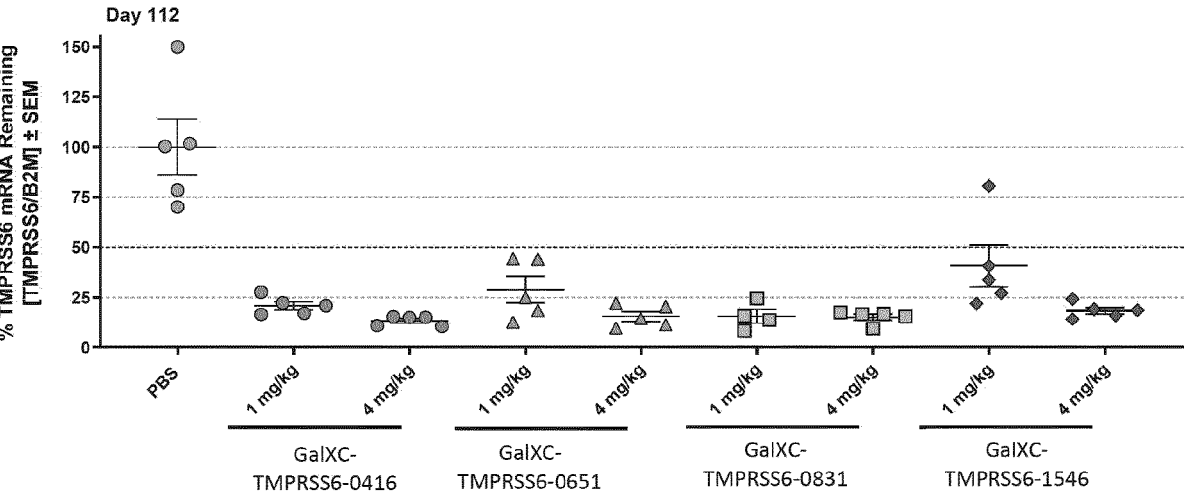


FIG. 4E

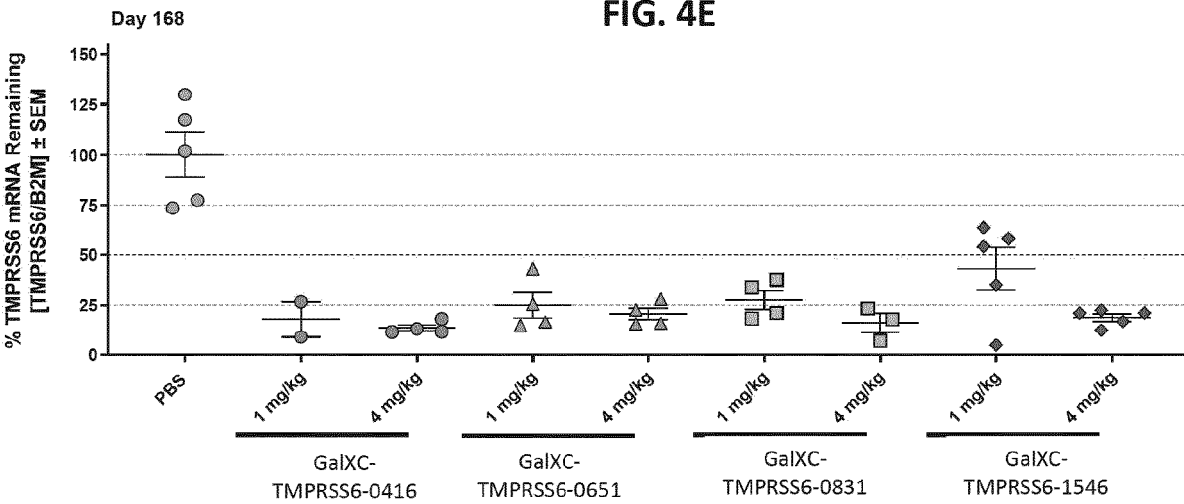


FIG. 4F

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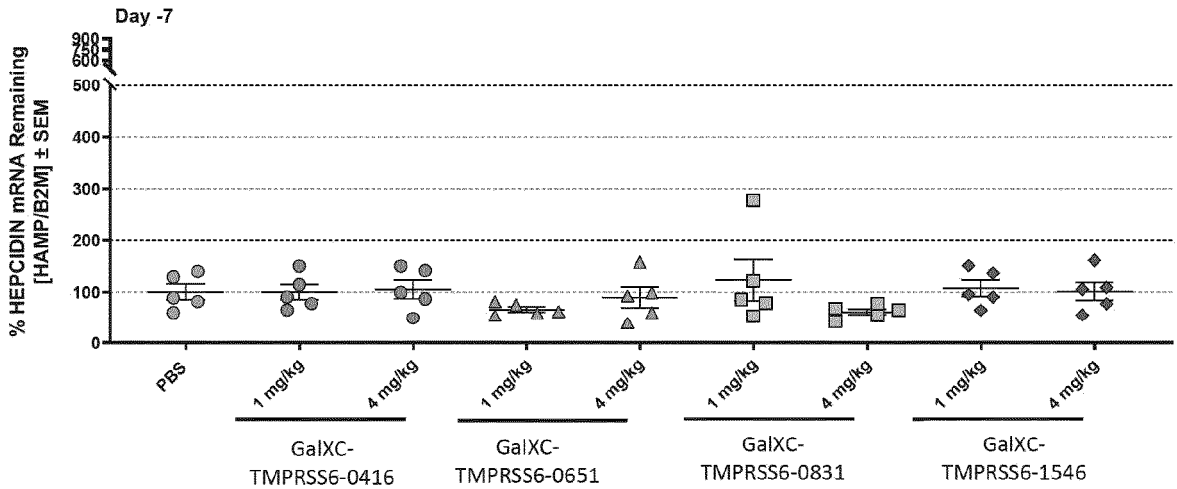


FIG. 5A

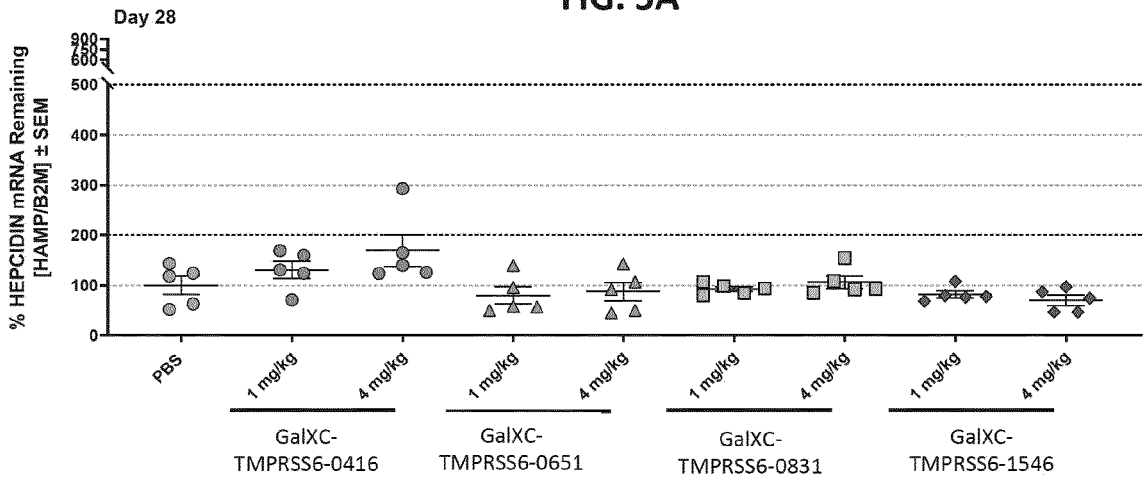


FIG. 5B

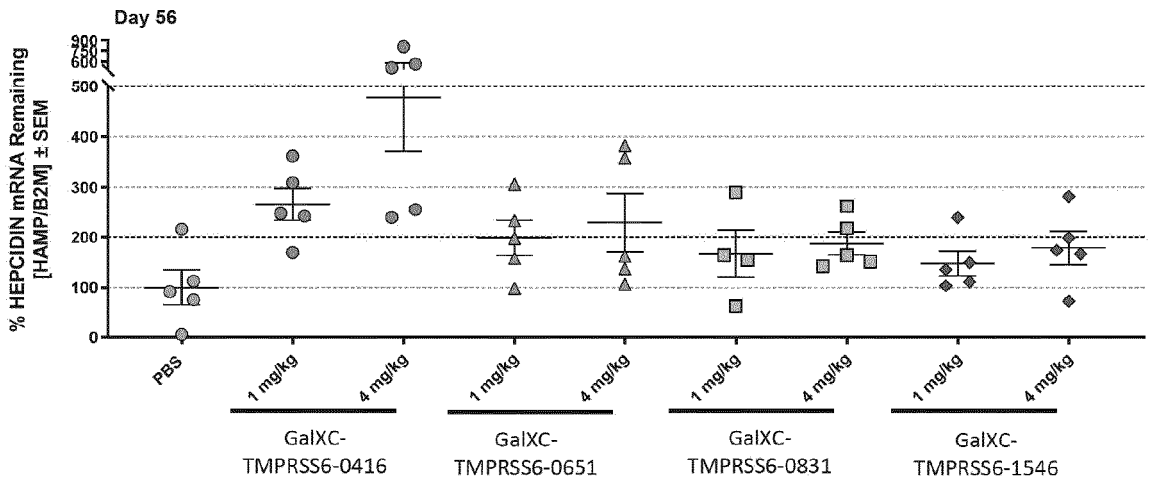


FIG. 5C

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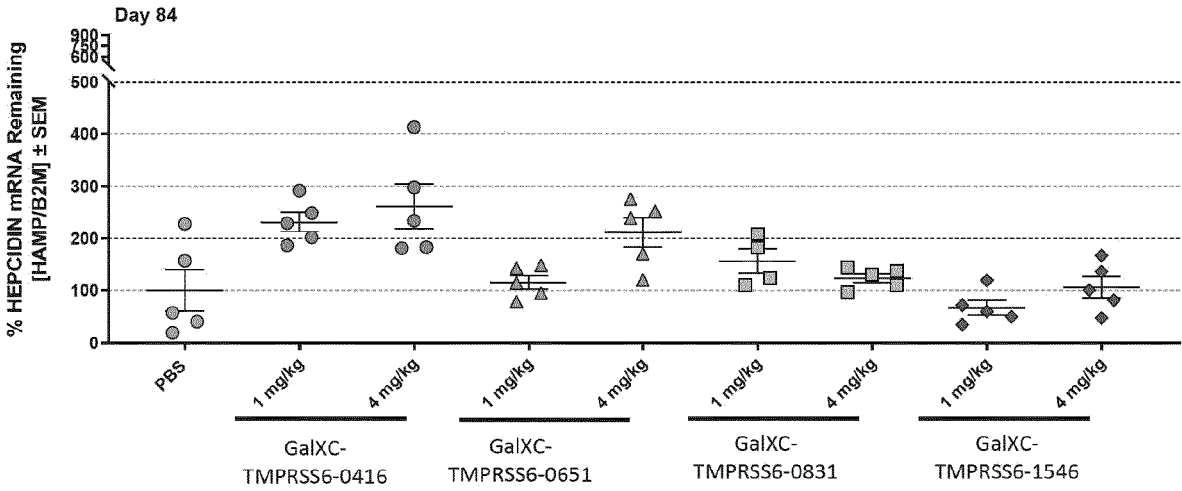


FIG. 5D

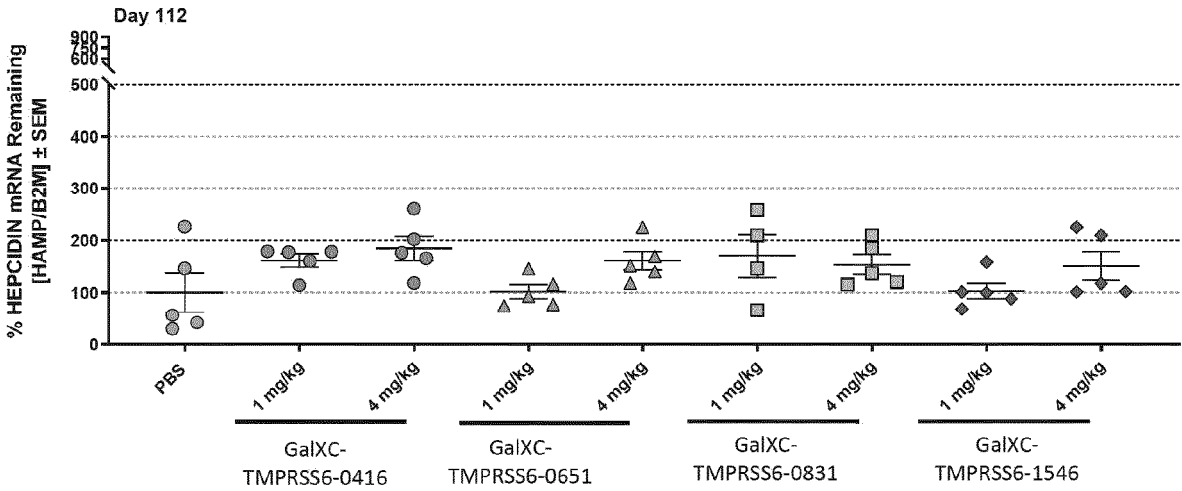


FIG. 5E

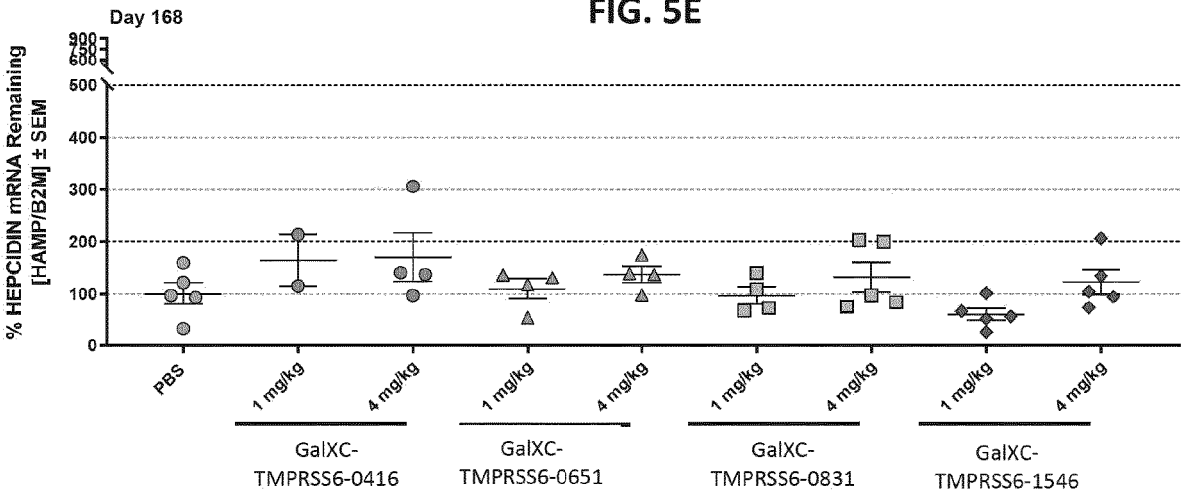


FIG. 5F

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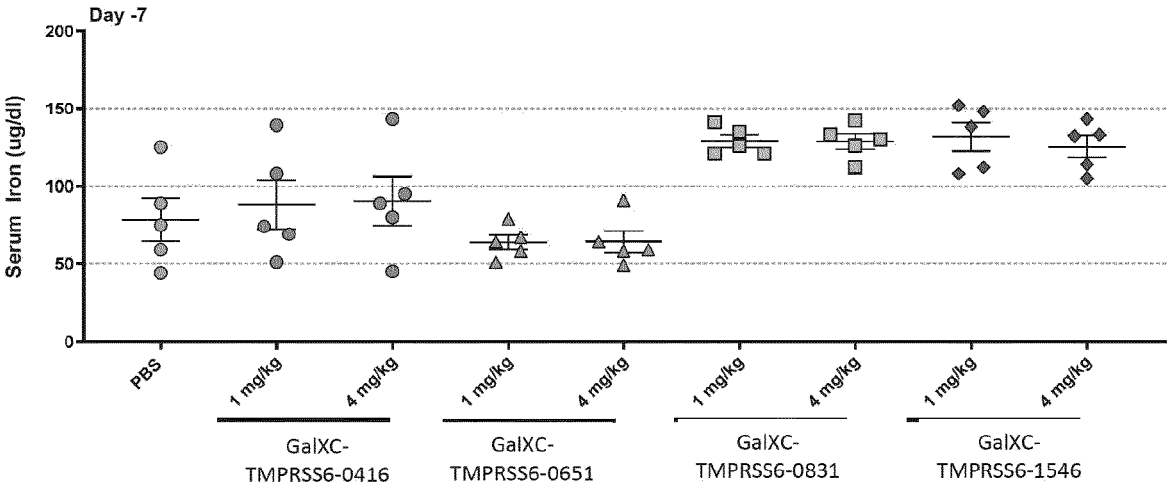


FIG. 6A

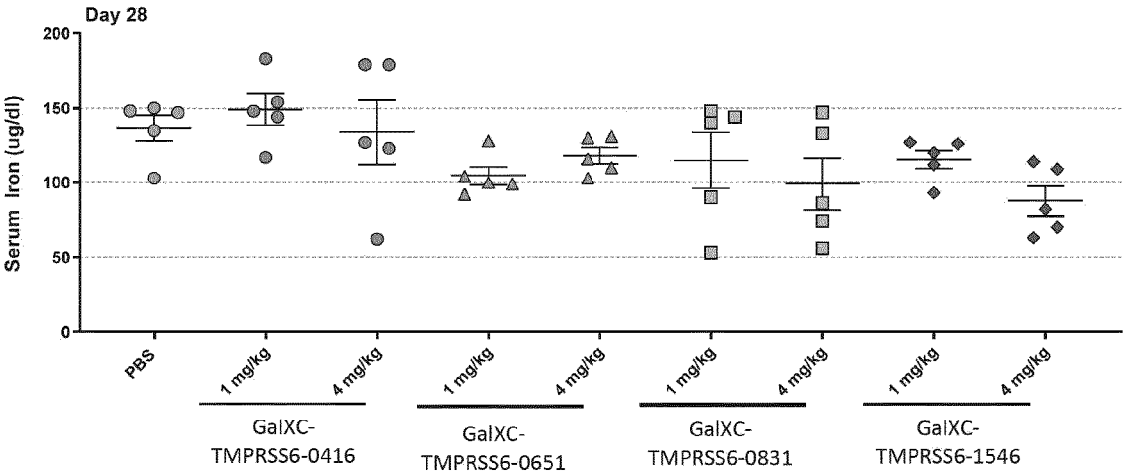


FIG. 6B

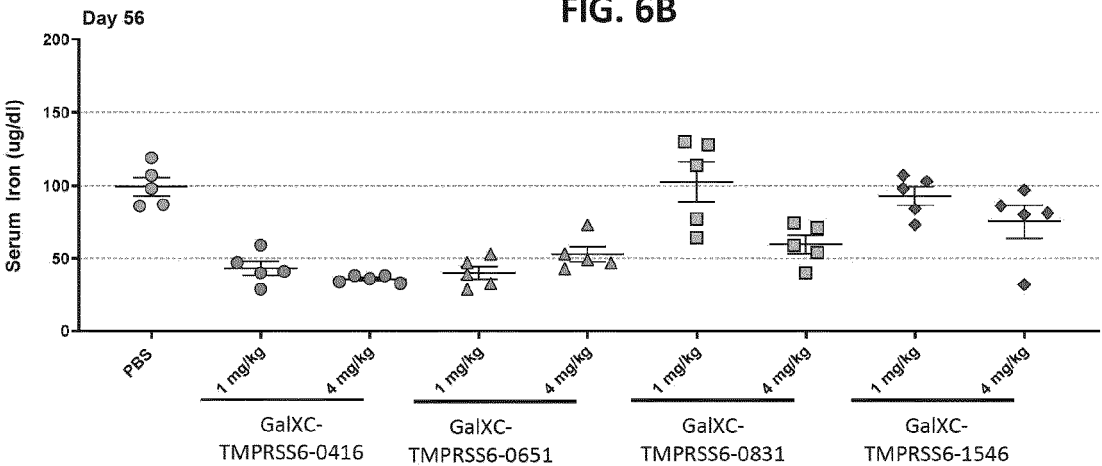


FIG. 6C

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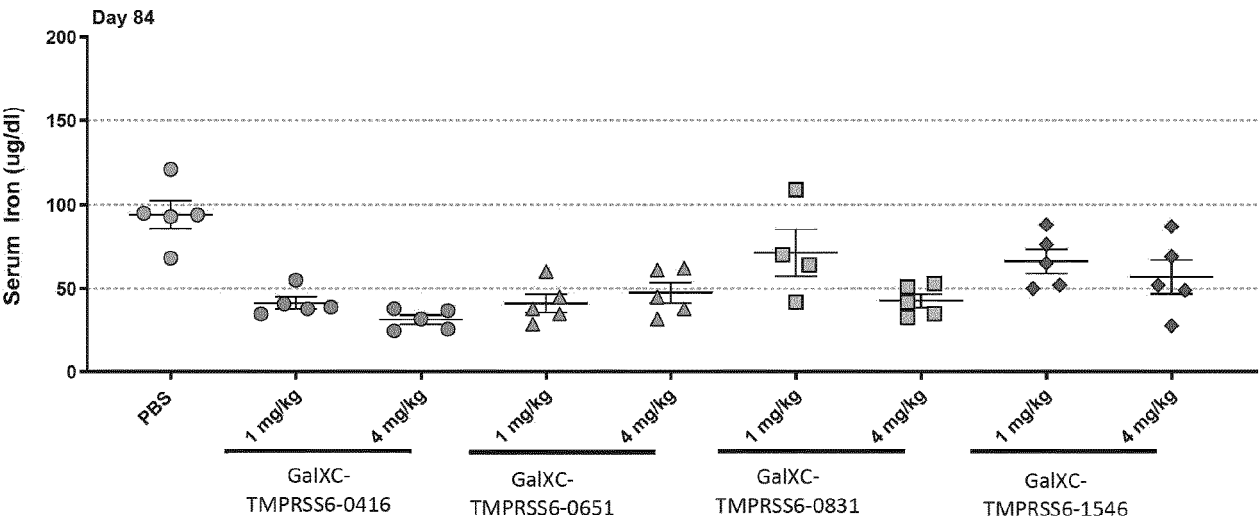


FIG. 6D

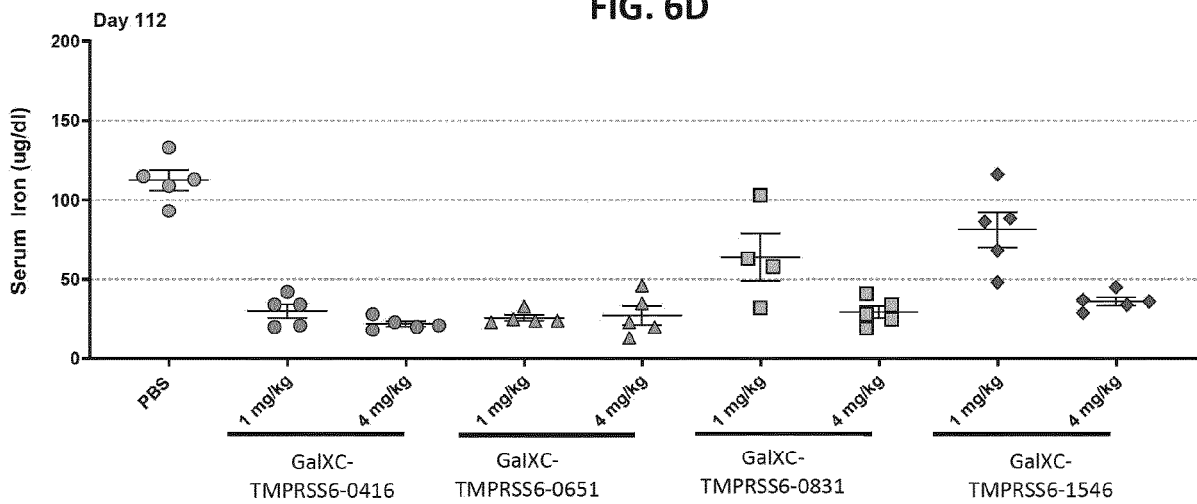


FIG. 6E

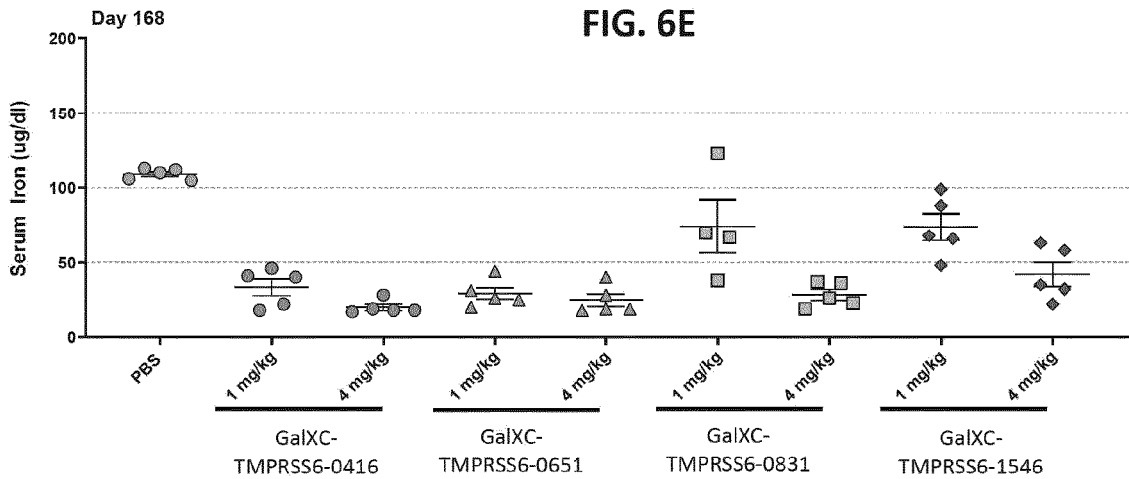


FIG. 6F

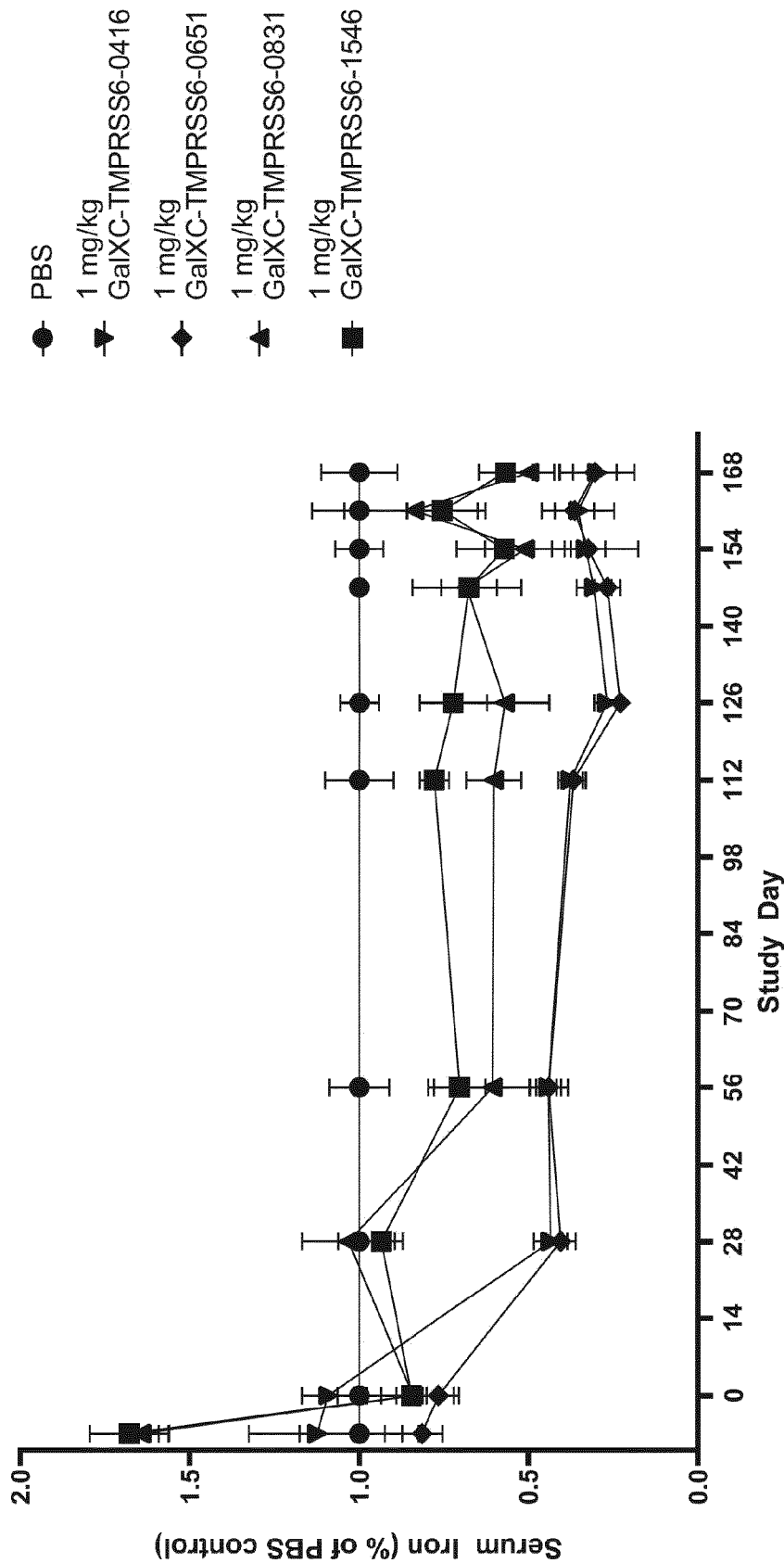


FIG. 7A

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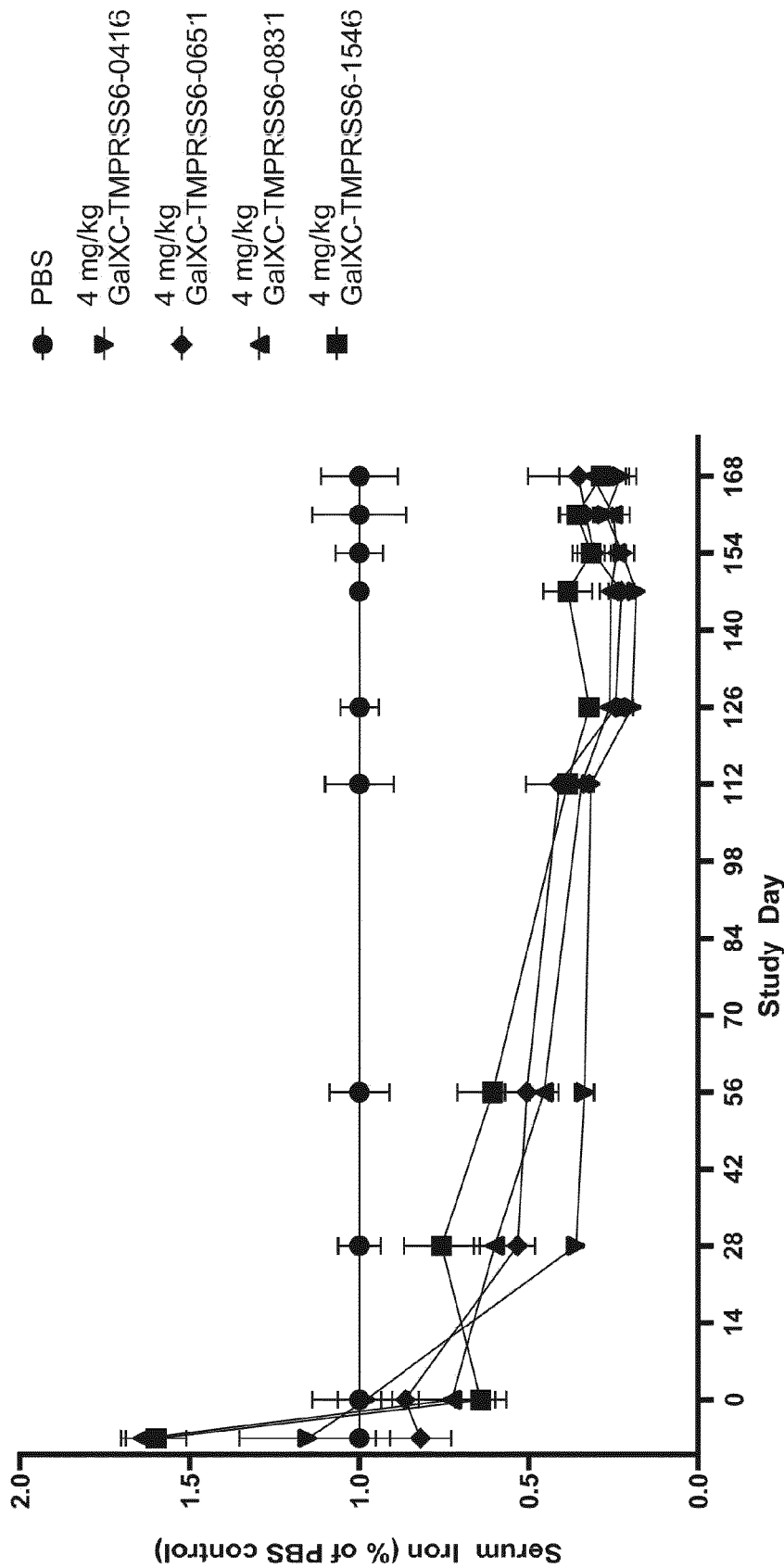


FIG. 7B

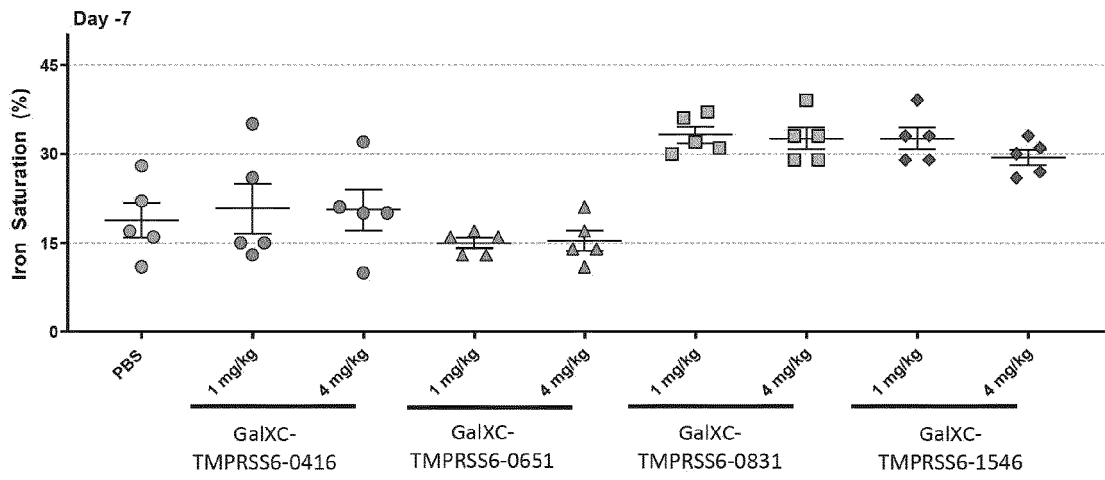


FIG. 8A

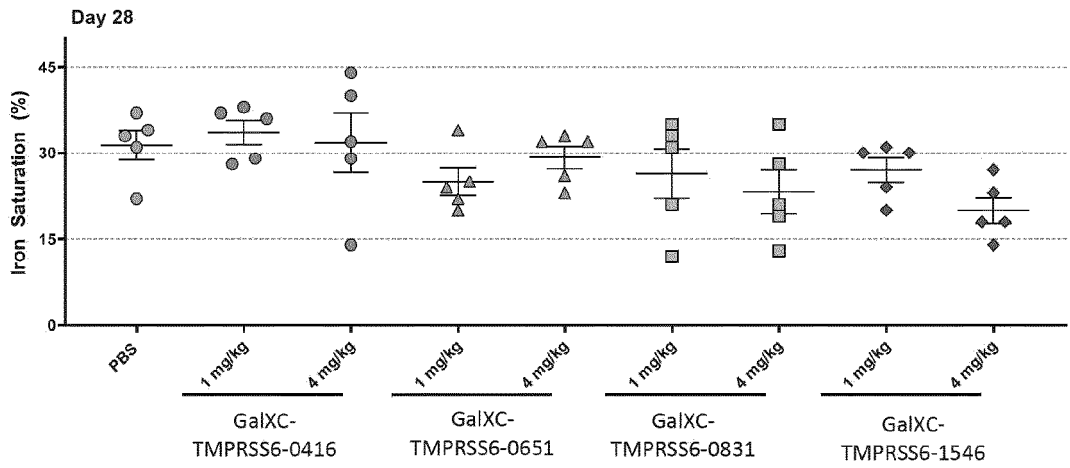


FIG. 8B

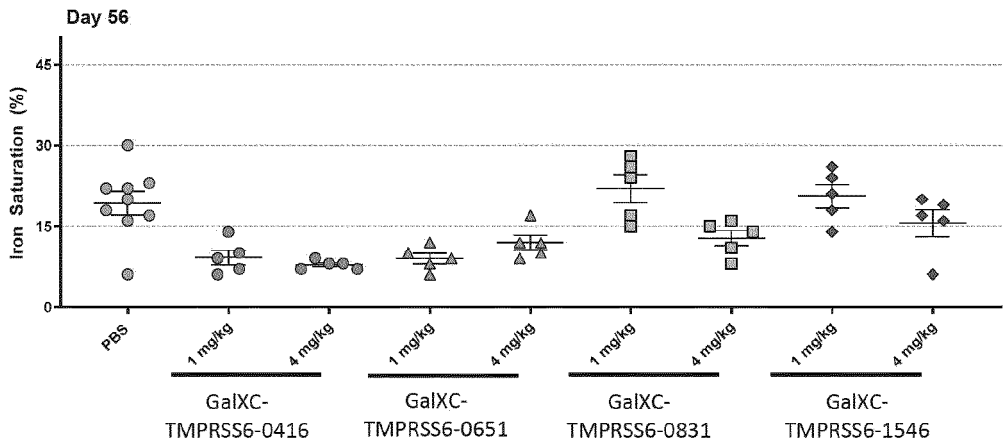


FIG. 8C

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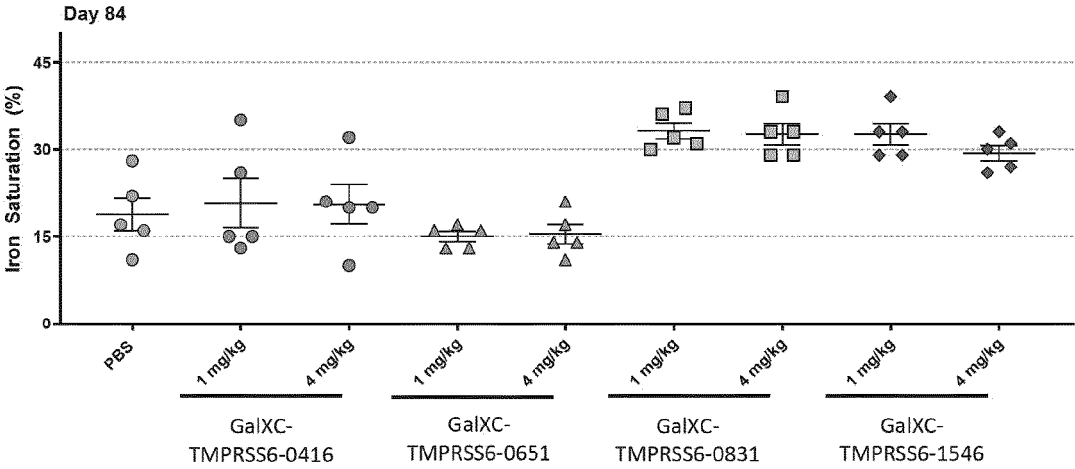


FIG. 8D

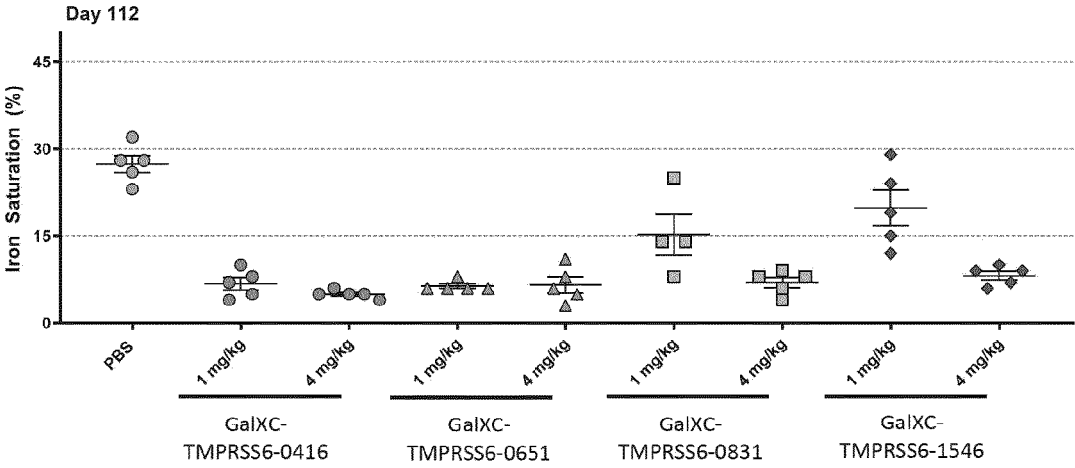


FIG. 8E

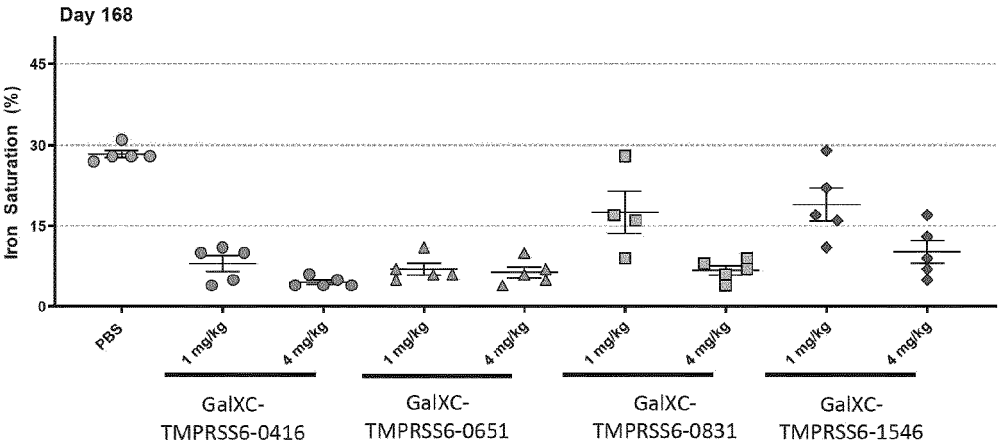


FIG. 8F

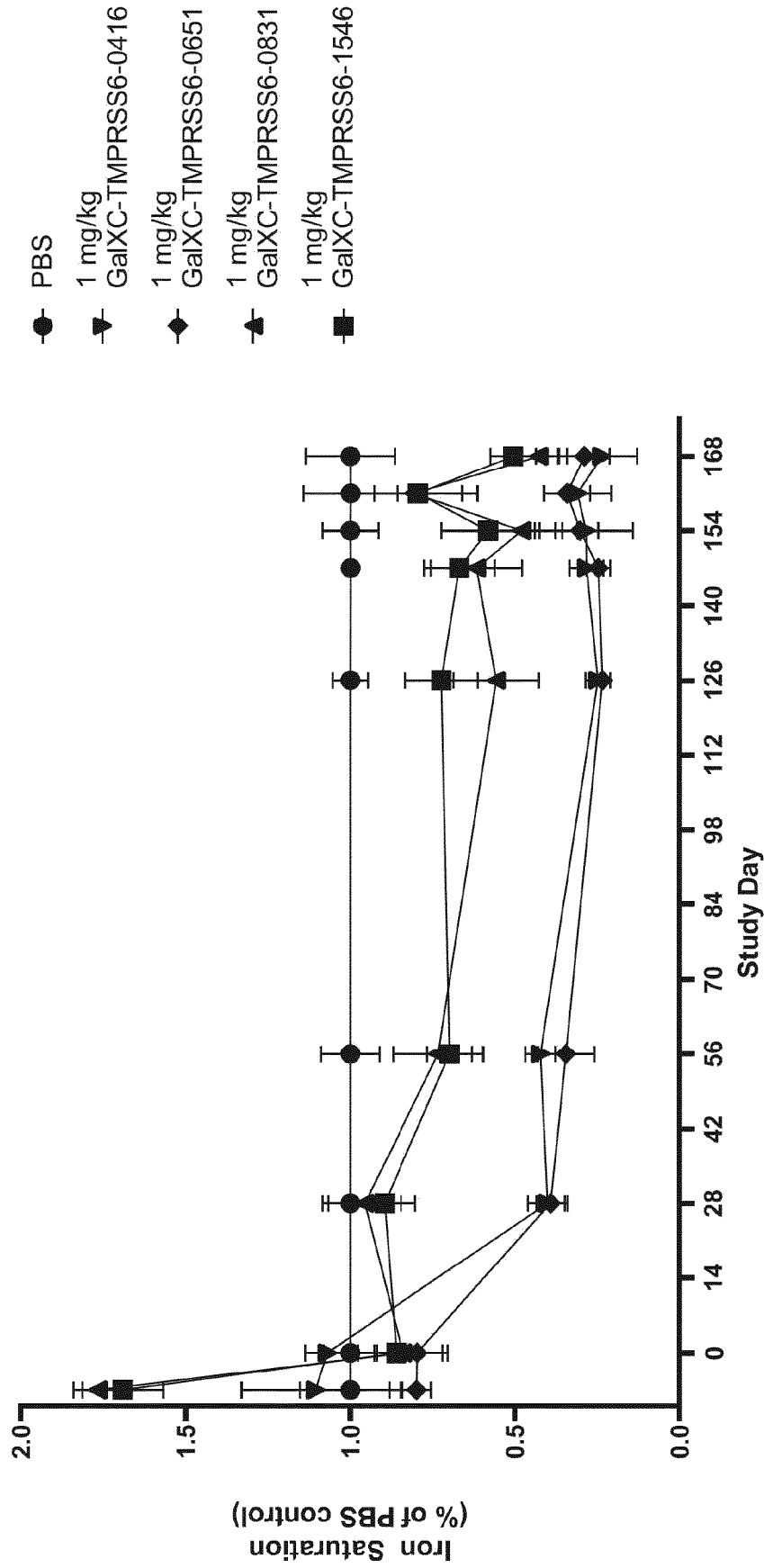


FIG. 9A

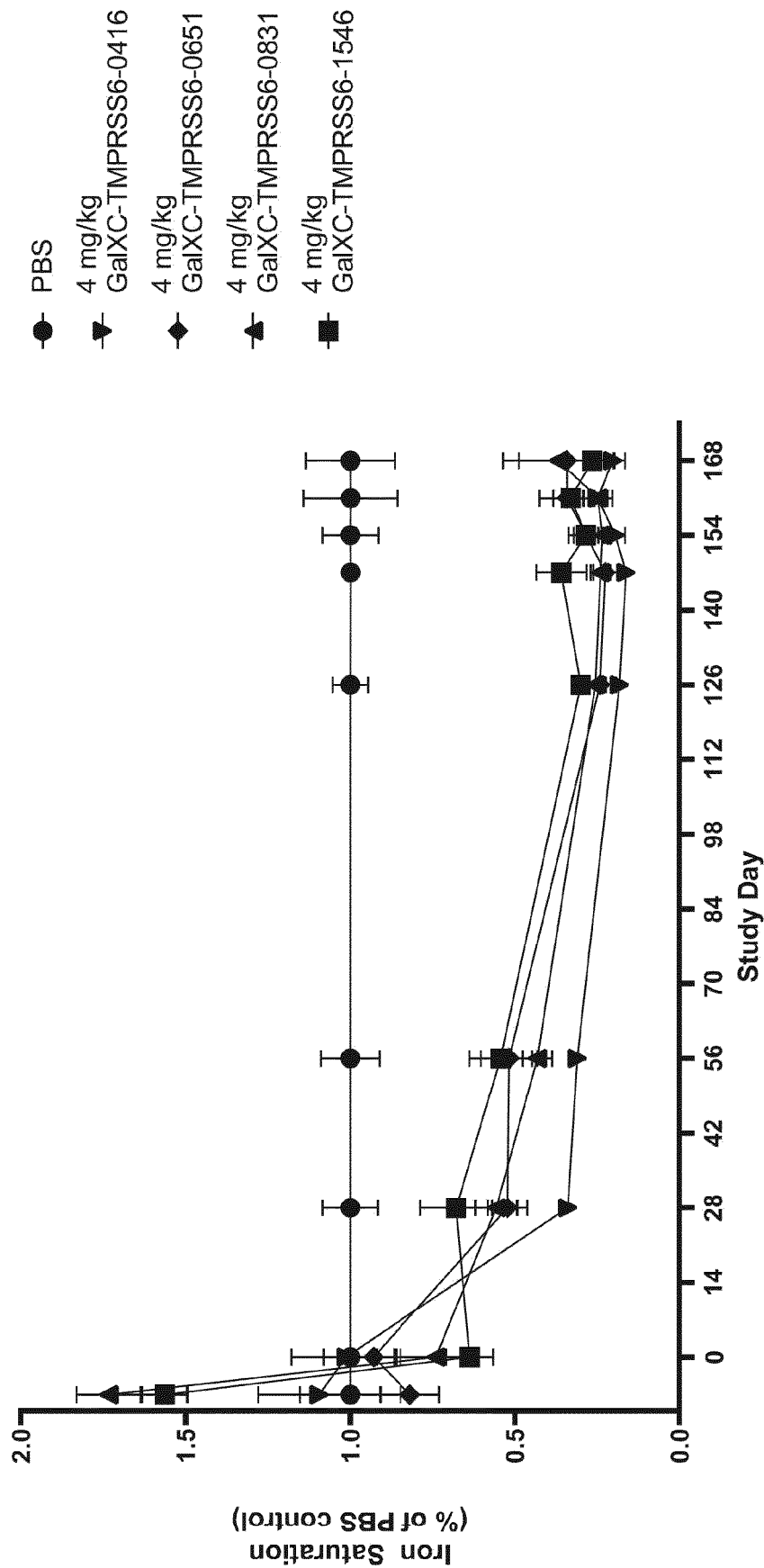


FIG. 9B

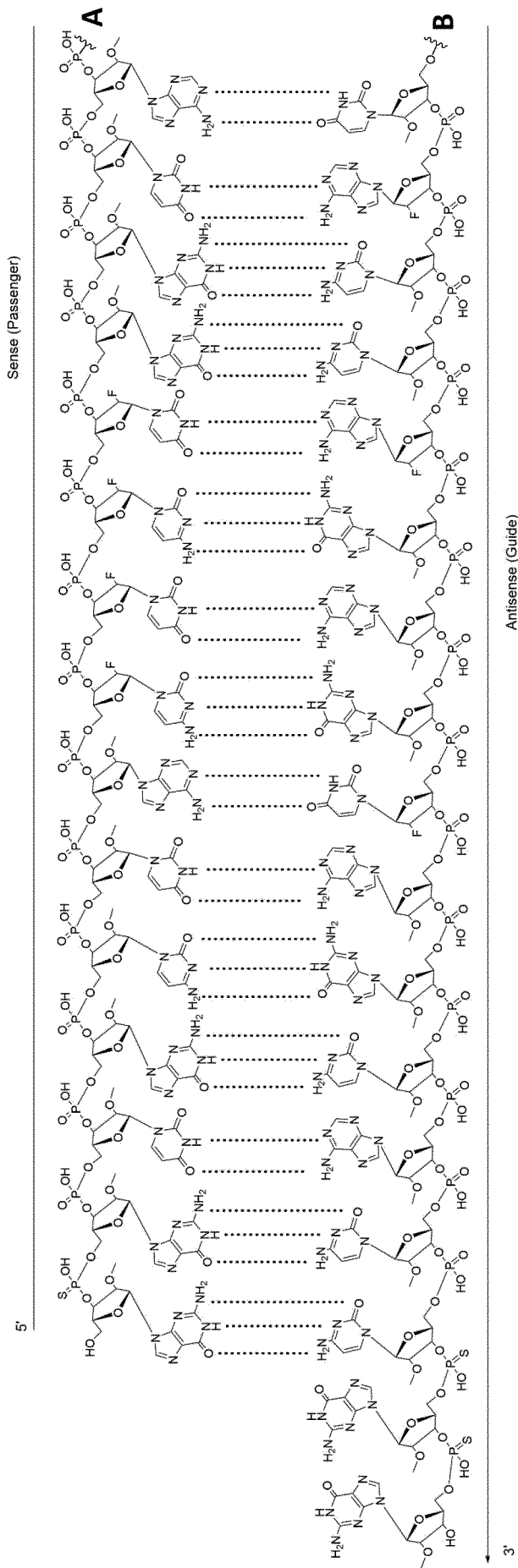


FIG. 10A

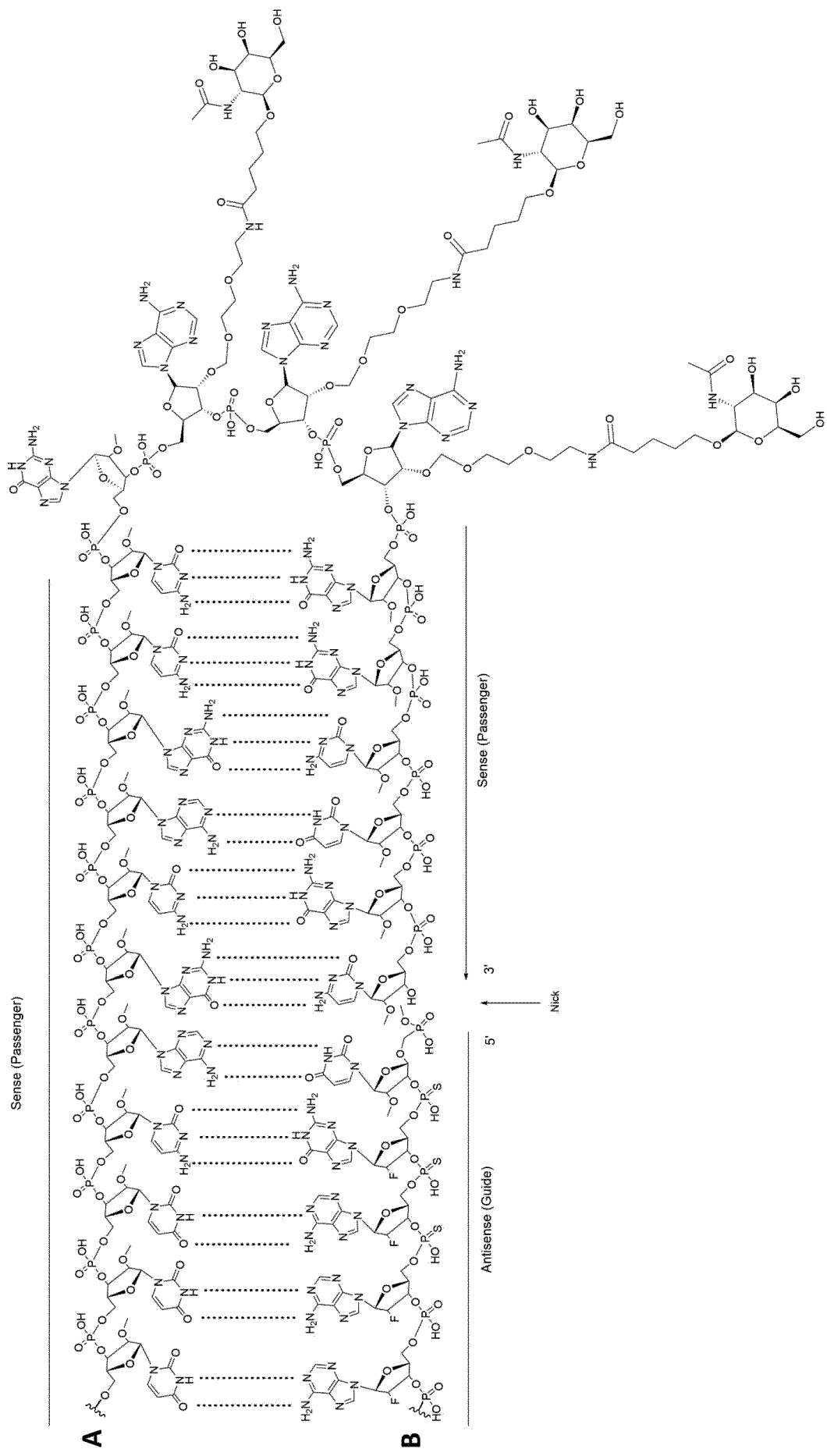


FIG. 10B

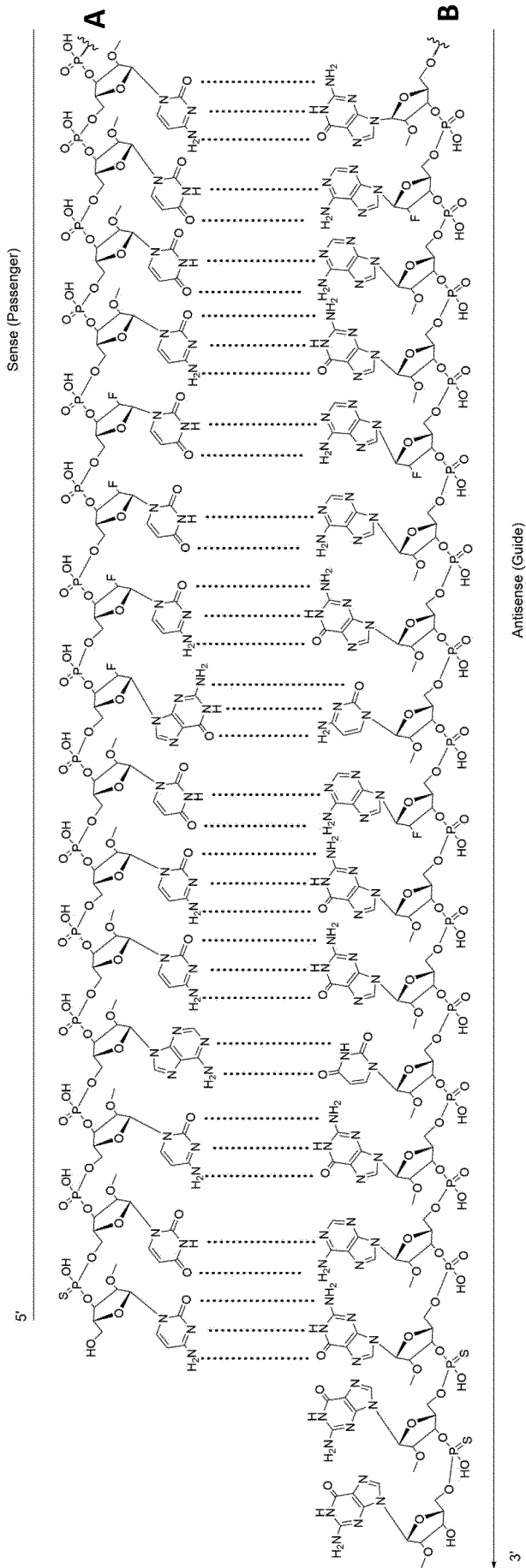


FIG. 11A

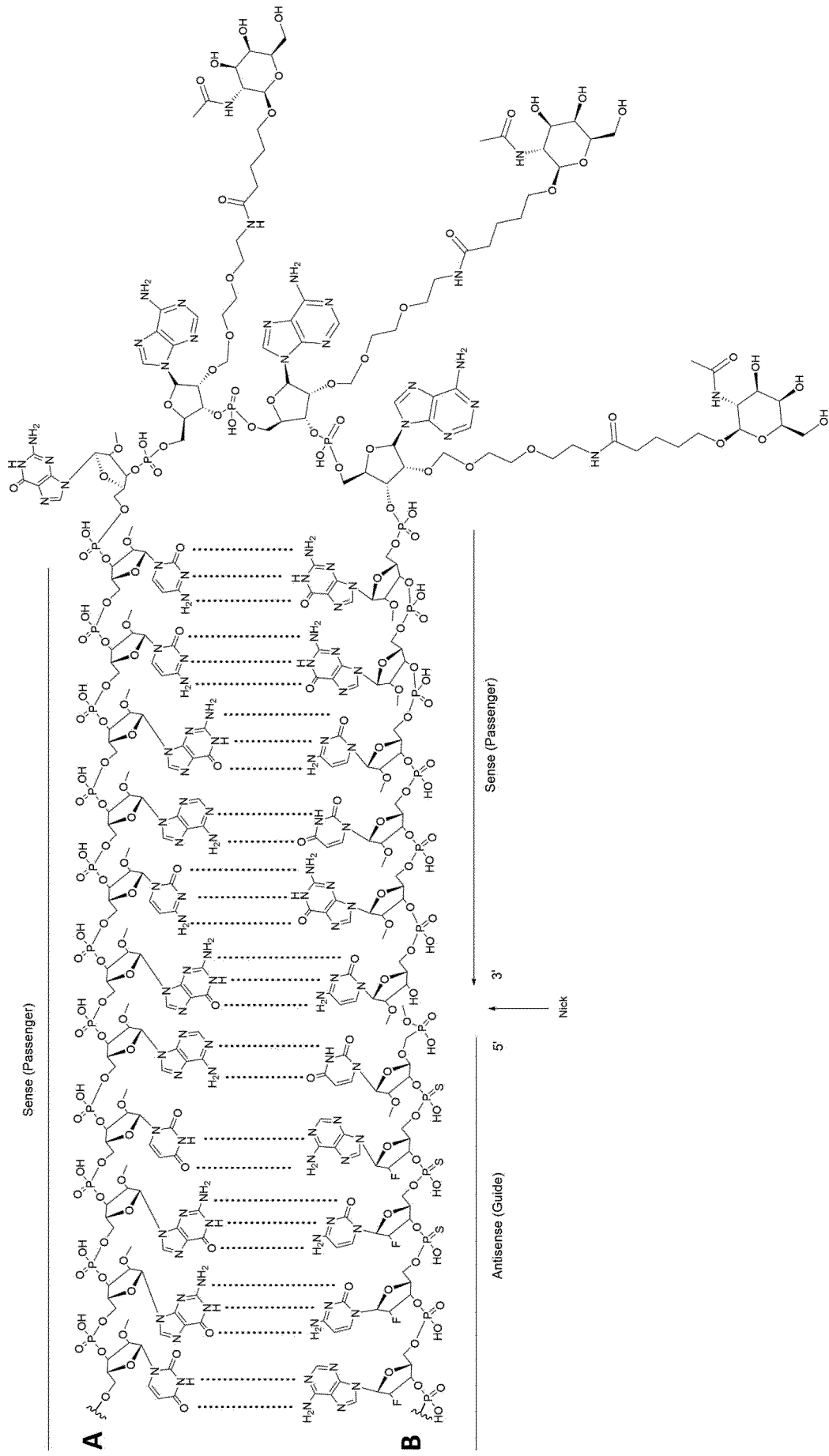


FIG. 11B

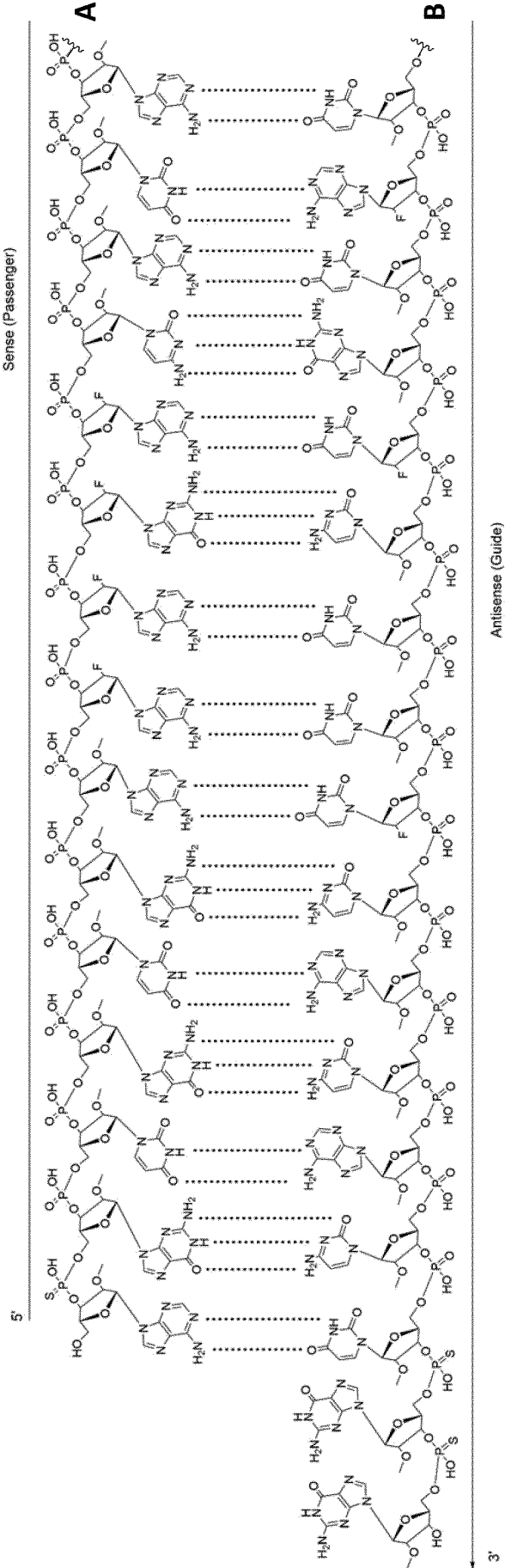


FIG. 12A

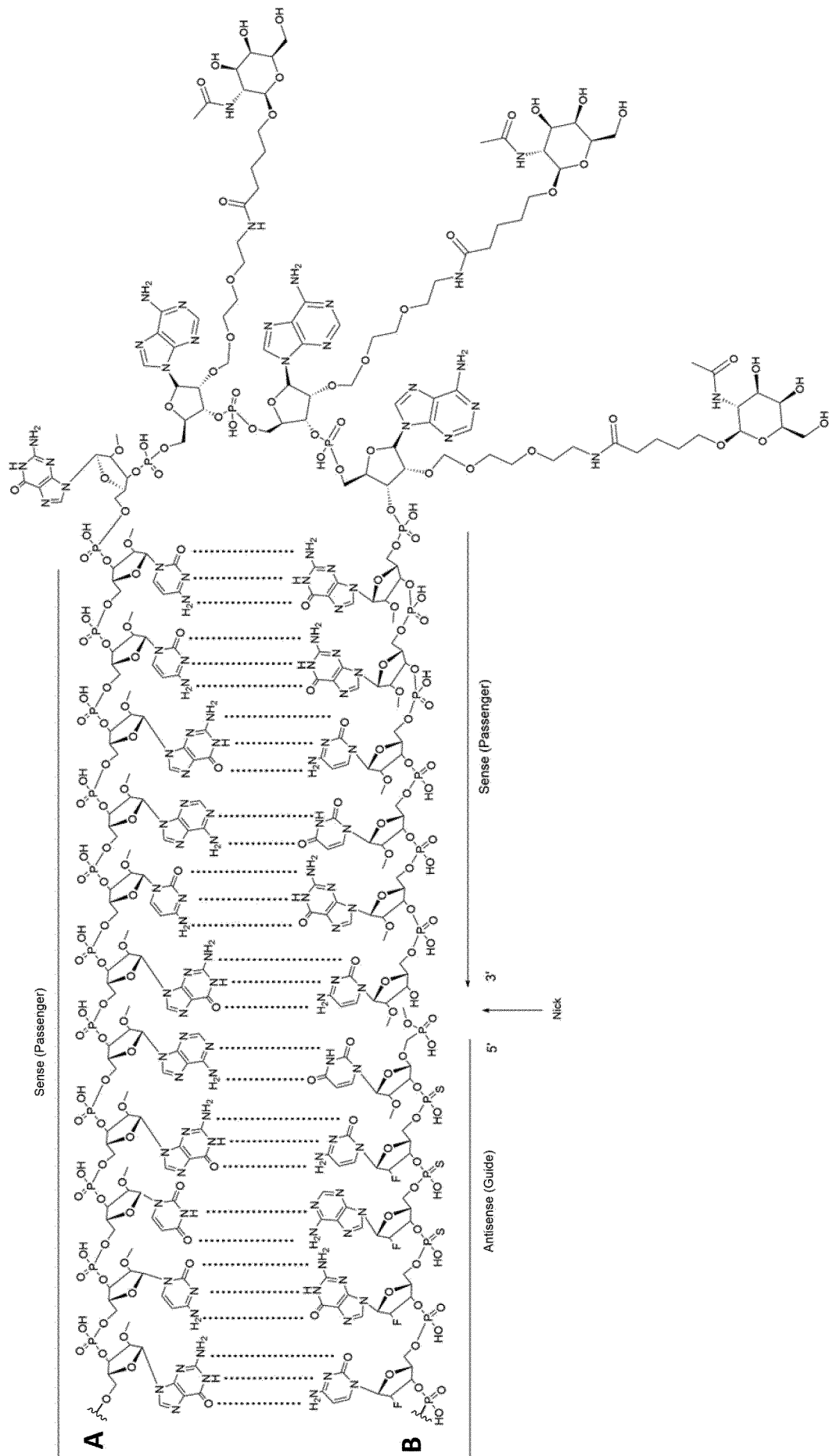


FIG. 12B

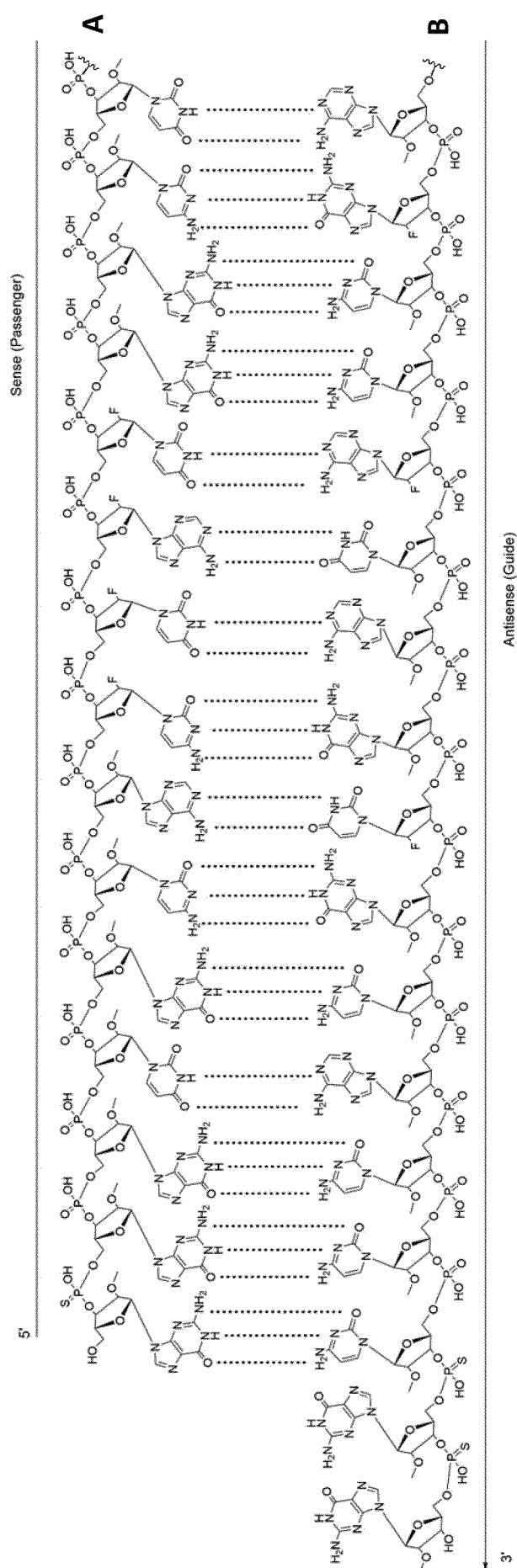


FIG. 13A

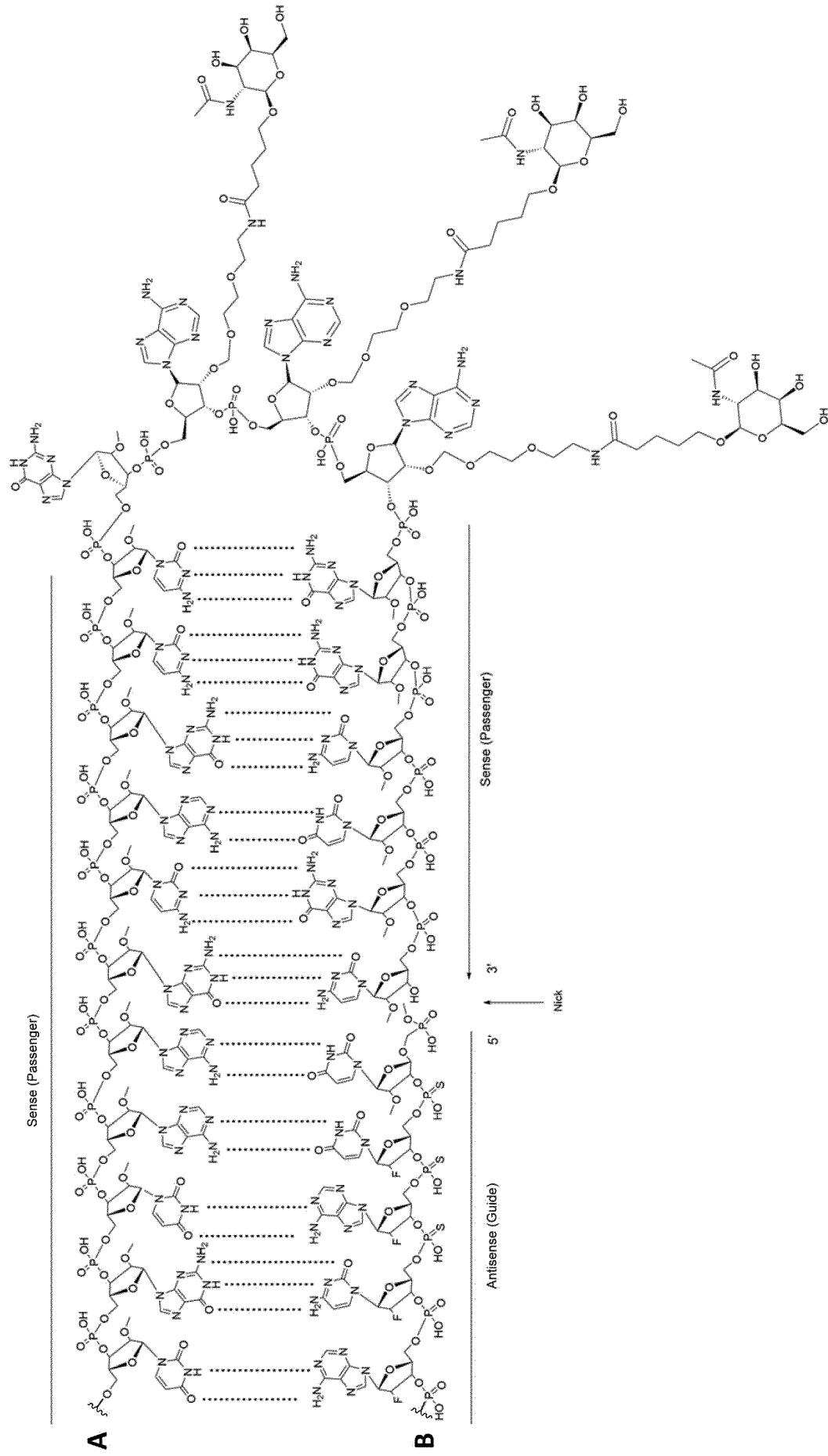


FIG. 13B

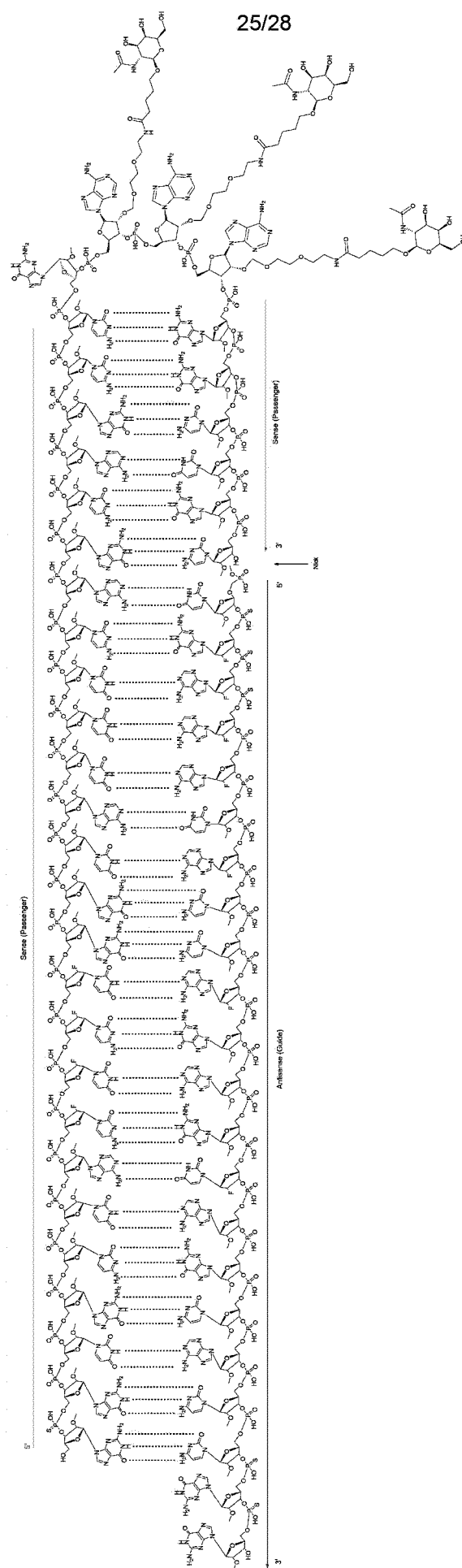


FIG. 14A

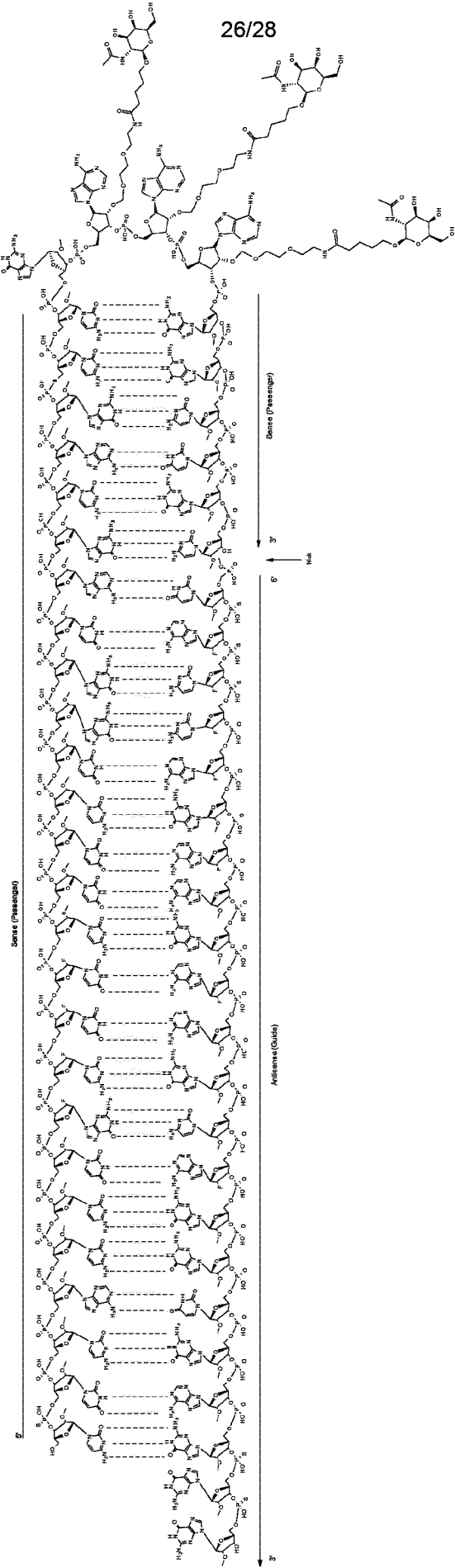


FIG. 14B

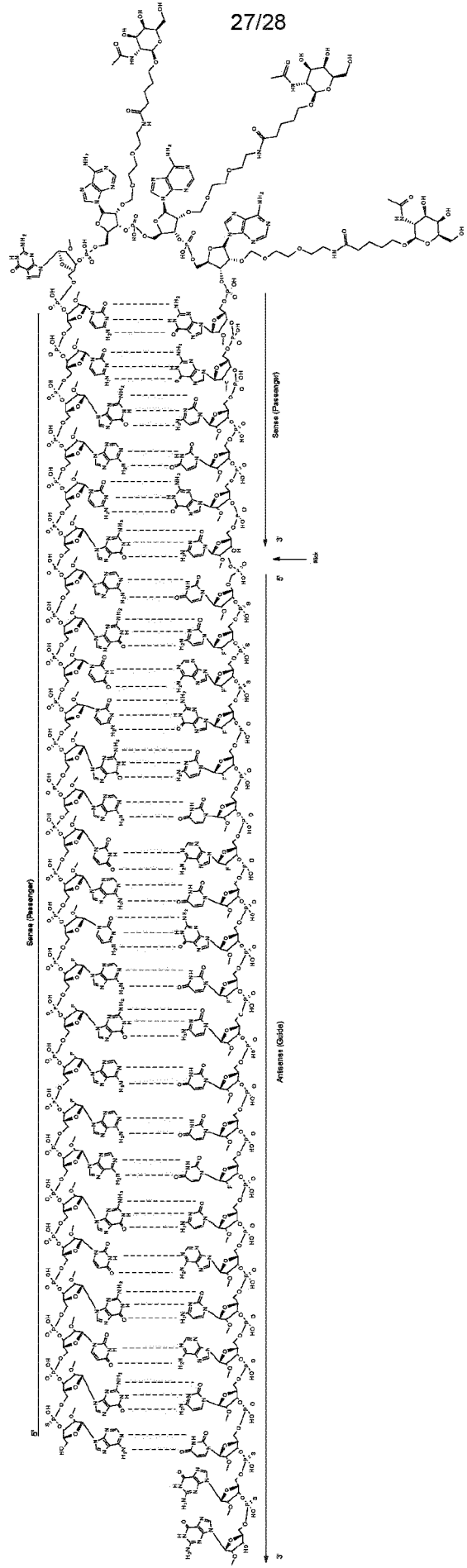


FIG. 14C

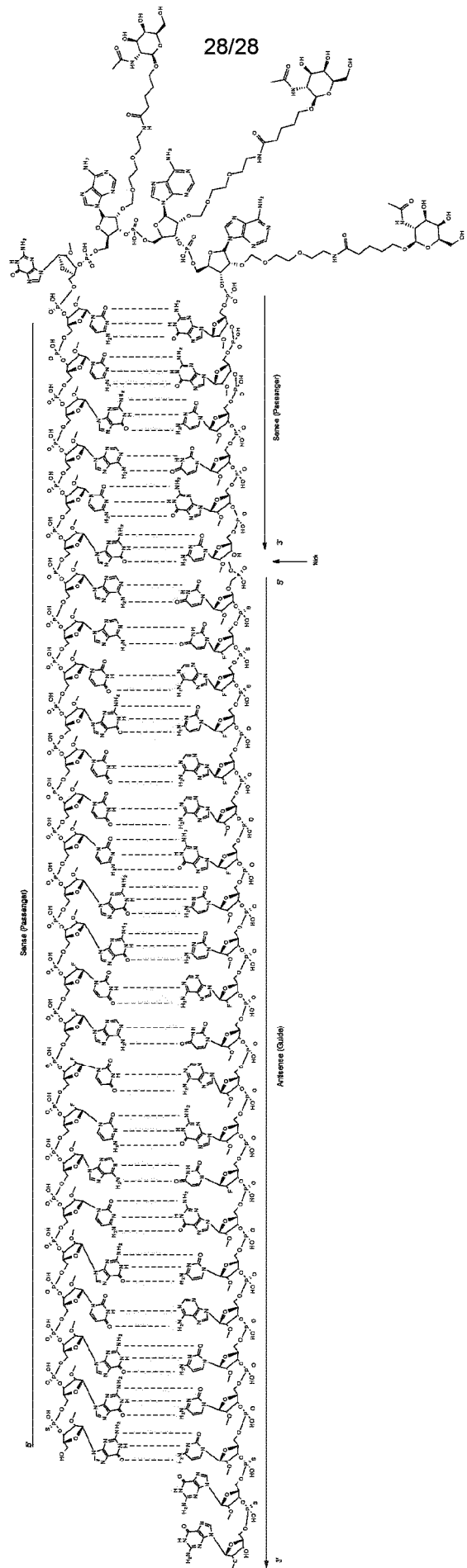


FIG. 14D

Sequence Listing

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1-2	DTD Version	V1_3
1-3	Software Name	WIPO Sequence
1-4	Software Version	2.2.0
1-5	Production Date	2023-05-11
1-6	Original free text language code	en
1-7	Non English free text language code	
2	General Information	
2-1	Current application: IP Office	WO
2-2	Current application: Application number	
2-3	Current application: Filing date	
2-4	Current application: Applicant file reference	210088WO01
2-5	Earliest priority application: IP Office	US
2-6	Earliest priority application: Application number	63/355210
2-7	Earliest priority application: Filing date	2022-06-24
2-8en	Applicant name	Novo Nordisk A/S
2-8	Applicant name: Name Latin	
2-9en	Inventor name	
2-9	Inventor name: Name Latin	
2-10en	Invention title	COMPOSITIONS AND METHODS FOR INHIBITING TRANSMEMBRANE SERINE PROTEASE 6 (TMPRSS6) EXPRESSION
2-11	Sequence Total Quantity	862

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3-6	Sequences		
3-6-1	Sequence Number [ID]	6	
3-6-2	Molecule Type	RNA	
3-6-3	Length	19	
3-6-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-6-5	Residues	gaggccatgc tgtcctcct	19
3-7	Sequences		
3-7-1	Sequence Number [ID]	7	
3-7-2	Molecule Type	RNA	
3-7-3	Length	19	
3-7-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-7-5	Residues	aggccatgct gtcctcctg	19
3-8	Sequences		

3-8-1	Sequence Number [ID]	8	
3-8-2	Molecule Type	RNA	
3-8-3	Length	19	
3-8-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-8-5	Residues	ggccatgctg tcctcctgg	19
3-9	Sequences		
3-9-1	Sequence Number [ID]	9	
3-9-2	Molecule Type	RNA	
3-9-3	Length	19	
3-9-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-9-5	Residues	gccatgctgt cctcctgga	19
3-10	Sequences		
3-10-1	Sequence Number [ID]	10	
3-10-2	Molecule Type	RNA	
3-10-3	Length	19	
3-10-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-10-5	Residues	ccatgctgtc ctcttgga	19
3-11	Sequences		
3-11-1	Sequence Number [ID]	11	
3-11-2	Molecule Type	RNA	
3-11-3	Length	19	
3-11-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-11-5	Residues	catgctgtcc tcctggaag	19
3-12	Sequences		
3-12-1	Sequence Number [ID]	12	
3-12-2	Molecule Type	RNA	
3-12-3	Length	19	
3-12-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-12-5	Residues	atgctgtcct cctggaagc	19
3-13	Sequences		
3-13-1	Sequence Number [ID]	13	
3-13-2	Molecule Type	RNA	
3-13-3	Length	19	
3-13-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-13-5	Residues	tgctgtcctc ctggaagca	19
3-14	Sequences		
3-14-1	Sequence Number [ID]	14	
3-14-2	Molecule Type	RNA	
3-14-3	Length	19	
3-14-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-14-5	Residues	accagcggt cagcgatga	19
3-15	Sequences		
3-15-1	Sequence Number [ID]	15	
3-15-2	Molecule Type	RNA	

3-15-3	Length	19	
3-15-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-15-5	NonEnglishQualifier Value Residues	cccagcggtc agcgatgag	19
3-16	Sequences		
3-16-1	Sequence Number [ID]	16	
3-16-2	Molecule Type	RNA	
3-16-3	Length	19	
3-16-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-16-5	Residues	cctggaggcc acagtcaca	19
3-17	Sequences		
3-17-1	Sequence Number [ID]	17	
3-17-2	Molecule Type	RNA	
3-17-3	Length	19	
3-17-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-17-5	Residues	tggaggccac agtcacagt	19
3-18	Sequences		
3-18-1	Sequence Number [ID]	18	
3-18-2	Molecule Type	RNA	
3-18-3	Length	19	
3-18-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-18-5	Residues	ggaggccaca gtcacagtg	19
3-19	Sequences		
3-19-1	Sequence Number [ID]	19	
3-19-2	Molecule Type	RNA	
3-19-3	Length	19	
3-19-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-19-5	Residues	gtgagggaga tctgggagg	19
3-20	Sequences		
3-20-1	Sequence Number [ID]	20	
3-20-2	Molecule Type	RNA	
3-20-3	Length	19	
3-20-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-20-5	Residues	agggagatct gggaggtga	19
3-21	Sequences		
3-21-1	Sequence Number [ID]	21	
3-21-2	Molecule Type	RNA	
3-21-3	Length	19	
3-21-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-21-5	Residues	gggagatctg ggaggtgaa	19
3-22	Sequences		
3-22-1	Sequence Number [ID]	22	
3-22-2	Molecule Type	RNA	
3-22-3	Length	19	

3-22-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-22-5	NonEnglishQualifier Value Residues	ttgtacccta gaaatacc	19
3-23	Sequences		
3-23-1	Sequence Number [ID]	23	
3-23-2	Molecule Type	RNA	
3-23-3	Length	19	
3-23-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-23-5	Residues	tgtaccctag gaaatacca	19
3-24	Sequences		
3-24-1	Sequence Number [ID]	24	
3-24-2	Molecule Type	RNA	
3-24-3	Length	19	
3-24-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-24-5	Residues	ttcttgcctt tgcggtagc	19
3-25	Sequences		
3-25-1	Sequence Number [ID]	25	
3-25-2	Molecule Type	RNA	
3-25-3	Length	19	
3-25-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-25-5	Residues	tcttgcctt gcggtagcc	19
3-26	Sequences		
3-26-1	Sequence Number [ID]	26	
3-26-2	Molecule Type	RNA	
3-26-3	Length	19	
3-26-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-26-5	Residues	tggaggctgg cctgcatg	19
3-27	Sequences		
3-27-1	Sequence Number [ID]	27	
3-27-2	Molecule Type	RNA	
3-27-3	Length	19	
3-27-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-27-5	Residues	tgccatggcc actcacct	19
3-28	Sequences		
3-28-1	Sequence Number [ID]	28	
3-28-2	Molecule Type	RNA	
3-28-3	Length	19	
3-28-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-28-5	Residues	ccatggccac tcaccctcg	19
3-29	Sequences		
3-29-1	Sequence Number [ID]	29	
3-29-2	Molecule Type	RNA	
3-29-3	Length	19	
3-29-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-29-5	NonEnglishQualifier Value Residues	ccactcaccc tcggaggac	19
3-30	Sequences		
3-30-1	Sequence Number [ID]	30	
3-30-2	Molecule Type	RNA	
3-30-3	Length	19	
3-30-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-30-5	Residues	cactcacct cgaggaca	19
3-31	Sequences		
3-31-1	Sequence Number [ID]	31	
3-31-2	Molecule Type	RNA	
3-31-3	Length	19	
3-31-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-31-5	Residues	actcacctc ggaggacac	19
3-32	Sequences		
3-32-1	Sequence Number [ID]	32	
3-32-2	Molecule Type	RNA	
3-32-3	Length	19	
3-32-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-32-5	Residues	cagtttctct catccaggc	19
3-33	Sequences		
3-33-1	Sequence Number [ID]	33	
3-33-2	Molecule Type	RNA	
3-33-3	Length	19	
3-33-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-33-5	Residues	agtttctctc atccaggcc	19
3-34	Sequences		
3-34-1	Sequence Number [ID]	34	
3-34-2	Molecule Type	RNA	
3-34-3	Length	19	
3-34-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-34-5	Residues	gccaagccgt agtccagag	19
3-35	Sequences		
3-35-1	Sequence Number [ID]	35	
3-35-2	Molecule Type	RNA	
3-35-3	Length	19	
3-35-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-35-5	Residues	ccaagccgta gtccagaga	19
3-36	Sequences		
3-36-1	Sequence Number [ID]	36	
3-36-2	Molecule Type	RNA	
3-36-3	Length	19	
3-36-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-36-5	Residues	aaccagaaga agcaggtga	19
3-37	Sequences		
3-37-1	Sequence Number [ID]	37	
3-37-2	Molecule Type	RNA	
3-37-3	Length	19	
3-37-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-37-5	Residues	accagaagaa gcaggtgag	19
3-38	Sequences		
3-38-1	Sequence Number [ID]	38	
3-38-2	Molecule Type	RNA	
3-38-3	Length	19	
3-38-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-38-5	Residues	gagcatcttc tgggctttg	19
3-39	Sequences		
3-39-1	Sequence Number [ID]	39	
3-39-2	Molecule Type	RNA	
3-39-3	Length	19	
3-39-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-39-5	Residues	agcatcttct gggctttgg	19
3-40	Sequences		
3-40-1	Sequence Number [ID]	40	
3-40-2	Molecule Type	RNA	
3-40-3	Length	19	
3-40-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-40-5	Residues	gcatcttctg ggctttggc	19
3-41	Sequences		
3-41-1	Sequence Number [ID]	41	
3-41-2	Molecule Type	RNA	
3-41-3	Length	19	
3-41-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-41-5	Residues	caggcagctt tattccaaa	19
3-42	Sequences		
3-42-1	Sequence Number [ID]	42	
3-42-2	Molecule Type	RNA	
3-42-3	Length	19	
3-42-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-42-5	Residues	aggcagcttt attccaaag	19
3-43	Sequences		
3-43-1	Sequence Number [ID]	43	
3-43-2	Molecule Type	RNA	
3-43-3	Length	19	
3-43-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-43-5	Residues	gcagctttat tccaaaggg	19

3-44	Sequences		
3-44-1	Sequence Number [ID]	44	
3-44-2	Molecule Type	RNA	
3-44-3	Length	19	
3-44-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-44-5	Residues	cagctttatt ccaaagggc	19
3-45	Sequences		
3-45-1	Sequence Number [ID]	45	
3-45-2	Molecule Type	RNA	
3-45-3	Length	19	
3-45-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-45-5	Residues	agctttattc caaagggca	19
3-46	Sequences		
3-46-1	Sequence Number [ID]	46	
3-46-2	Molecule Type	RNA	
3-46-3	Length	19	
3-46-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-46-5	Residues	tttattccaa agggcagct	19
3-47	Sequences		
3-47-1	Sequence Number [ID]	47	
3-47-2	Molecule Type	RNA	
3-47-3	Length	19	
3-47-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-47-5	Residues	ttattccaaa gggcagctg	19
3-48	Sequences		
3-48-1	Sequence Number [ID]	48	
3-48-2	Molecule Type	RNA	
3-48-3	Length	19	
3-48-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-48-5	Residues	caaagggcag ctgagctca	19
3-49	Sequences		
3-49-1	Sequence Number [ID]	49	
3-49-2	Molecule Type	RNA	
3-49-3	Length	19	
3-49-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-49-5	Residues	aaagggcagc tgagctcac	19
3-50	Sequences		
3-50-1	Sequence Number [ID]	50	
3-50-2	Molecule Type	RNA	
3-50-3	Length	19	
3-50-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-50-5	Residues	accaggggct tccgaagct	19
3-51	Sequences		

3-51-1	Sequence Number [ID]	51	
3-51-2	Molecule Type	RNA	
3-51-3	Length	19	
3-51-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-51-5	Residues	ccagcattct tgctgctga	19
3-52	Sequences		
3-52-1	Sequence Number [ID]	52	
3-52-2	Molecule Type	RNA	
3-52-3	Length	19	
3-52-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-52-5	Residues	cagcattctt gctgctgag	19
3-53	Sequences		
3-53-1	Sequence Number [ID]	53	
3-53-2	Molecule Type	RNA	
3-53-3	Length	19	
3-53-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-53-5	Residues	agcattcttg ctgctgagc	19
3-54	Sequences		
3-54-1	Sequence Number [ID]	54	
3-54-2	Molecule Type	RNA	
3-54-3	Length	19	
3-54-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-54-5	Residues	cattcttgct gctgagcca	19
3-55	Sequences		
3-55-1	Sequence Number [ID]	55	
3-55-2	Molecule Type	RNA	
3-55-3	Length	19	
3-55-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-55-5	Residues	attcttgctg ctgagccac	19
3-56	Sequences		
3-56-1	Sequence Number [ID]	56	
3-56-2	Molecule Type	RNA	
3-56-3	Length	19	
3-56-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-56-5	Residues	catcactgga gcagacatc	19
3-57	Sequences		
3-57-1	Sequence Number [ID]	57	
3-57-2	Molecule Type	RNA	
3-57-3	Length	19	
3-57-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-57-5	Residues	atcactggag cagacatca	19
3-58	Sequences		
3-58-1	Sequence Number [ID]	58	
3-58-2	Molecule Type	RNA	

3-58-3	Length	19	
3-58-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-58-5	Residues	tcactggagc agacatcag	19
3-59	Sequences		
3-59-1	Sequence Number [ID]	59	
3-59-2	Molecule Type	RNA	
3-59-3	Length	19	
3-59-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-59-5	Residues	actggagcag acatcaggg	19
3-60	Sequences		
3-60-1	Sequence Number [ID]	60	
3-60-2	Molecule Type	RNA	
3-60-3	Length	19	
3-60-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-60-5	Residues	gttcctcagg tcaccactt	19
3-61	Sequences		
3-61-1	Sequence Number [ID]	61	
3-61-2	Molecule Type	RNA	
3-61-3	Length	19	
3-61-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-61-5	Residues	ttcctcaggt caccacttg	19
3-62	Sequences		
3-62-1	Sequence Number [ID]	62	
3-62-2	Molecule Type	RNA	
3-62-3	Length	19	
3-62-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-62-5	Residues	tcctcaggtc accacttgc	19
3-63	Sequences		
3-63-1	Sequence Number [ID]	63	
3-63-2	Molecule Type	RNA	
3-63-3	Length	19	
3-63-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-63-5	Residues	cctcaggtca ccacttgct	19
3-64	Sequences		
3-64-1	Sequence Number [ID]	64	
3-64-2	Molecule Type	RNA	
3-64-3	Length	19	
3-64-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-64-5	Residues	ctcaggtcac cacttgctg	19
3-65	Sequences		
3-65-1	Sequence Number [ID]	65	
3-65-2	Molecule Type	RNA	
3-65-3	Length	19	

3-65-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-65-5	NonEnglishQualifier Value Residues	tcaggtcacc acttgctgg	19
3-66	Sequences		
3-66-1	Sequence Number [ID]	66	
3-66-2	Molecule Type	RNA	
3-66-3	Length	19	
3-66-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-66-5	Residues	aggtcaccac ttgctggat	19
3-67	Sequences		
3-67-1	Sequence Number [ID]	67	
3-67-2	Molecule Type	RNA	
3-67-3	Length	19	
3-67-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-67-5	Residues	tcaccacttg ctggatcca	19
3-68	Sequences		
3-68-1	Sequence Number [ID]	68	
3-68-2	Molecule Type	RNA	
3-68-3	Length	19	
3-68-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-68-5	Residues	caccacttgc tggatccag	19
3-69	Sequences		
3-69-1	Sequence Number [ID]	69	
3-69-2	Molecule Type	RNA	
3-69-3	Length	19	
3-69-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-69-5	Residues	atcacacctg tgatgcggg	19
3-70	Sequences		
3-70-1	Sequence Number [ID]	70	
3-70-2	Molecule Type	RNA	
3-70-3	Length	19	
3-70-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-70-5	Residues	tcacacctgt gatgcgggt	19
3-71	Sequences		
3-71-1	Sequence Number [ID]	71	
3-71-2	Molecule Type	RNA	
3-71-3	Length	19	
3-71-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-71-5	Residues	tgtagacgcc gaagtagtt	19
3-72	Sequences		
3-72-1	Sequence Number [ID]	72	
3-72-2	Molecule Type	RNA	
3-72-3	Length	19	
3-72-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-72-5	NonEnglishQualifier Value Residues	acaggtcctg tgggatcaa	19
3-73	Sequences		
3-73-1	Sequence Number [ID]	73	
3-73-2	Molecule Type	RNA	
3-73-3	Length	19	
3-73-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-73-5	Residues	tcctgtggga tcaactgca	19
3-74	Sequences		
3-74-1	Sequence Number [ID]	74	
3-74-2	Molecule Type	RNA	
3-74-3	Length	19	
3-74-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-74-5	Residues	caccttgaag gacacctct	19
3-75	Sequences		
3-75-1	Sequence Number [ID]	75	
3-75-2	Molecule Type	RNA	
3-75-3	Length	19	
3-75-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-75-5	Residues	accttgaagg acacctctc	19
3-76	Sequences		
3-76-1	Sequence Number [ID]	76	
3-76-2	Molecule Type	RNA	
3-76-3	Length	19	
3-76-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-76-5	Residues	ttgaaggaca cctctccag	19
3-77	Sequences		
3-77-1	Sequence Number [ID]	77	
3-77-2	Molecule Type	RNA	
3-77-3	Length	19	
3-77-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-77-5	Residues	atgtgtcgac cccgaacct	19
3-78	Sequences		
3-78-1	Sequence Number [ID]	78	
3-78-2	Molecule Type	RNA	
3-78-3	Length	19	
3-78-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-78-5	Residues	ctcacactgg aaggtgaat	19
3-79	Sequences		
3-79-1	Sequence Number [ID]	79	
3-79-2	Molecule Type	RNA	
3-79-3	Length	19	
3-79-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-79-5	Residues	tcacactgga aggtgaatg	19
3-80	Sequences		
3-80-1	Sequence Number [ID]	80	
3-80-2	Molecule Type	RNA	
3-80-3	Length	19	
3-80-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-80-5	Residues	cacactggaa ggtgaatgt	19
3-81	Sequences		
3-81-1	Sequence Number [ID]	81	
3-81-2	Molecule Type	RNA	
3-81-3	Length	19	
3-81-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-81-5	Residues	acactggaag gtgaatgtc	19
3-82	Sequences		
3-82-1	Sequence Number [ID]	82	
3-82-2	Molecule Type	RNA	
3-82-3	Length	19	
3-82-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-82-5	Residues	cactggaagg tgaatgtcc	19
3-83	Sequences		
3-83-1	Sequence Number [ID]	83	
3-83-2	Molecule Type	RNA	
3-83-3	Length	19	
3-83-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-83-5	Residues	cactggaatg tggctctgc	19
3-84	Sequences		
3-84-1	Sequence Number [ID]	84	
3-84-2	Molecule Type	RNA	
3-84-3	Length	19	
3-84-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-84-5	Residues	actggaatgt ggctctgca	19
3-85	Sequences		
3-85-1	Sequence Number [ID]	85	
3-85-2	Molecule Type	RNA	
3-85-3	Length	19	
3-85-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-85-5	Residues	ctggaatgtg gctctgcaa	19
3-86	Sequences		
3-86-1	Sequence Number [ID]	86	
3-86-2	Molecule Type	RNA	
3-86-3	Length	19	
3-86-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-86-5	Residues	tggaatgtgg ctctgcaaa	19

3-87	Sequences		
3-87-1	Sequence Number [ID]	87	
3-87-2	Molecule Type	RNA	
3-87-3	Length	19	
3-87-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-87-5	Residues	ggctctgcaa acgcagttt	19
3-88	Sequences		
3-88-1	Sequence Number [ID]	88	
3-88-2	Molecule Type	RNA	
3-88-3	Length	19	
3-88-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-88-5	Residues	gctctgcaaa cgagtttc	19
3-89	Sequences		
3-89-1	Sequence Number [ID]	89	
3-89-2	Molecule Type	RNA	
3-89-3	Length	19	
3-89-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-89-5	Residues	ctctgcaaac gcagtttct	19
3-90	Sequences		
3-90-1	Sequence Number [ID]	90	
3-90-2	Molecule Type	RNA	
3-90-3	Length	19	
3-90-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-90-5	Residues	tctgcaaacg cagtttctc	19
3-91	Sequences		
3-91-1	Sequence Number [ID]	91	
3-91-2	Molecule Type	RNA	
3-91-3	Length	19	
3-91-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-91-5	Residues	ctgcaaacgc agtttctct	19
3-92	Sequences		
3-92-1	Sequence Number [ID]	92	
3-92-2	Molecule Type	RNA	
3-92-3	Length	19	
3-92-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-92-5	Residues	tgcaaacgca gtttctctc	19
3-93	Sequences		
3-93-1	Sequence Number [ID]	93	
3-93-2	Molecule Type	RNA	
3-93-3	Length	19	
3-93-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-93-5	Residues	gcaaacgcag tttctctca	19
3-94	Sequences		

3-94-1	Sequence Number [ID]	94	
3-94-2	Molecule Type	RNA	
3-94-3	Length	19	
3-94-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-94-5	Residues	caaacgcagt ttctctcat	19
3-95	Sequences		
3-95-1	Sequence Number [ID]	95	
3-95-2	Molecule Type	RNA	
3-95-3	Length	19	
3-95-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-95-5	Residues	aaacgcagtt tctctcatc	19
3-96	Sequences		
3-96-1	Sequence Number [ID]	96	
3-96-2	Molecule Type	RNA	
3-96-3	Length	19	
3-96-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-96-5	Residues	aacgcagttt ctctcatcc	19
3-97	Sequences		
3-97-1	Sequence Number [ID]	97	
3-97-2	Molecule Type	RNA	
3-97-3	Length	19	
3-97-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-97-5	Residues	acgcagtttc tctcatcca	19
3-98	Sequences		
3-98-1	Sequence Number [ID]	98	
3-98-2	Molecule Type	RNA	
3-98-3	Length	19	
3-98-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-98-5	Residues	cgcagtttct ctcatccag	19
3-99	Sequences		
3-99-1	Sequence Number [ID]	99	
3-99-2	Molecule Type	RNA	
3-99-3	Length	19	
3-99-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-99-5	Residues	gcagtttctc tcatccagg	19
3-100	Sequences		
3-100-1	Sequence Number [ID]	100	
3-100-2	Molecule Type	RNA	
3-100-3	Length	19	
3-100-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-100-5	Residues	tccttgaccc catcacagg	19
3-101	Sequences		
3-101-1	Sequence Number [ID]	101	
3-101-2	Molecule Type	RNA	

3-101-3	Length	19	
3-101-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-101-5	Residues	gggccgactg gttgtacaa	19
3-102	Sequences		
3-102-1	Sequence Number [ID]	102	
3-102-2	Molecule Type	RNA	
3-102-3	Length	19	
3-102-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-102-5	Residues	gtccgactgg ttgtacaag	19
3-103	Sequences		
3-103-1	Sequence Number [ID]	103	
3-103-2	Molecule Type	RNA	
3-103-3	Length	19	
3-103-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-103-5	Residues	tccgactggt tgtacaagc	19
3-104	Sequences		
3-104-1	Sequence Number [ID]	104	
3-104-2	Molecule Type	RNA	
3-104-3	Length	19	
3-104-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-104-5	Residues	cgactggttg tacaagcca	19
3-105	Sequences		
3-105-1	Sequence Number [ID]	105	
3-105-2	Molecule Type	RNA	
3-105-3	Length	19	
3-105-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-105-5	Residues	gactggttgt acaagccat	19
3-106	Sequences		
3-106-1	Sequence Number [ID]	106	
3-106-2	Molecule Type	RNA	
3-106-3	Length	19	
3-106-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-106-5	Residues	actggttgta caagccata	19
3-107	Sequences		
3-107-1	Sequence Number [ID]	107	
3-107-2	Molecule Type	RNA	
3-107-3	Length	19	
3-107-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-107-5	Residues	ctggttgtac aagccatag	19
3-108	Sequences		
3-108-1	Sequence Number [ID]	108	
3-108-2	Molecule Type	RNA	
3-108-3	Length	19	

3-108-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-108-5	NonEnglishQualifier Value Residues	tggttgtaca agccatagt	19
3-109	Sequences		
3-109-1	Sequence Number [ID]	109	
3-109-2	Molecule Type	RNA	
3-109-3	Length	19	
3-109-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-109-5	Residues	ggttgtacaa gccatagtg	19
3-110	Sequences		
3-110-1	Sequence Number [ID]	110	
3-110-2	Molecule Type	RNA	
3-110-3	Length	19	
3-110-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-110-5	Residues	gttgtacaag ccatagtgc	19
3-111	Sequences		
3-111-1	Sequence Number [ID]	111	
3-111-2	Molecule Type	RNA	
3-111-3	Length	19	
3-111-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-111-5	Residues	ttgtacaagc catagtgc	19
3-112	Sequences		
3-112-1	Sequence Number [ID]	112	
3-112-2	Molecule Type	RNA	
3-112-3	Length	19	
3-112-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-112-5	Residues	tgtacaagcc atagtgcac	19
3-113	Sequences		
3-113-1	Sequence Number [ID]	113	
3-113-2	Molecule Type	RNA	
3-113-3	Length	19	
3-113-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-113-5	Residues	gtacaagcca tagtgcacc	19
3-114	Sequences		
3-114-1	Sequence Number [ID]	114	
3-114-2	Molecule Type	RNA	
3-114-3	Length	19	
3-114-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-114-5	Residues	tacaagccat agtgcaccc	19
3-115	Sequences		
3-115-1	Sequence Number [ID]	115	
3-115-2	Molecule Type	RNA	
3-115-3	Length	19	
3-115-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-115-5	NonEnglishQualifier Value Residues	acaagccata gtgcaccg	19
3-116	Sequences		
3-116-1	Sequence Number [ID]	116	
3-116-2	Molecule Type	RNA	
3-116-3	Length	19	
3-116-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-116-5	Residues	aagccatagt gcacccgca	19
3-117	Sequences		
3-117-1	Sequence Number [ID]	117	
3-117-2	Molecule Type	RNA	
3-117-3	Length	19	
3-117-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-117-5	Residues	ccatagtgca cccgcacac	19
3-118	Sequences		
3-118-1	Sequence Number [ID]	118	
3-118-2	Molecule Type	RNA	
3-118-3	Length	19	
3-118-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-118-5	Residues	tcctgttctg gatcgtcca	19
3-119	Sequences		
3-119-1	Sequence Number [ID]	119	
3-119-2	Molecule Type	RNA	
3-119-3	Length	19	
3-119-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-119-5	Residues	tgttctggat cgtccactg	19
3-120	Sequences		
3-120-1	Sequence Number [ID]	120	
3-120-2	Molecule Type	RNA	
3-120-3	Length	19	
3-120-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-120-5	Residues	tgcacggcaa atcactactt	19
3-121	Sequences		
3-121-1	Sequence Number [ID]	121	
3-121-2	Molecule Type	RNA	
3-121-3	Length	19	
3-121-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-121-5	Residues	gcacggcaaa tcactacttc	19
3-122	Sequences		
3-122-1	Sequence Number [ID]	122	
3-122-2	Molecule Type	RNA	
3-122-3	Length	19	
3-122-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-122-5	Residues	cacggcaaat catacttct	19
3-123	Sequences		
3-123-1	Sequence Number [ID]	123	
3-123-2	Molecule Type	RNA	
3-123-3	Length	19	
3-123-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-123-5	Residues	acggcaaatc atacttctg	19
3-124	Sequences		
3-124-1	Sequence Number [ID]	124	
3-124-2	Molecule Type	RNA	
3-124-3	Length	19	
3-124-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-124-5	Residues	ggcaaatcat acttctgcc	19
3-125	Sequences		
3-125-1	Sequence Number [ID]	125	
3-125-2	Molecule Type	RNA	
3-125-3	Length	19	
3-125-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-125-5	Residues	gcaaatcata cttctgcct	19
3-126	Sequences		
3-126-1	Sequence Number [ID]	126	
3-126-2	Molecule Type	RNA	
3-126-3	Length	19	
3-126-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-126-5	Residues	caaatcatatc ttctgcctc	19
3-127	Sequences		
3-127-1	Sequence Number [ID]	127	
3-127-2	Molecule Type	RNA	
3-127-3	Length	19	
3-127-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-127-5	Residues	aatcatact tctgcctcc	19
3-128	Sequences		
3-128-1	Sequence Number [ID]	128	
3-128-2	Molecule Type	RNA	
3-128-3	Length	19	
3-128-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-128-5	Residues	gagtagtagc tggggaagt	19
3-129	Sequences		
3-129-1	Sequence Number [ID]	129	
3-129-2	Molecule Type	RNA	
3-129-3	Length	19	
3-129-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-129-5	Residues	tagtagctgg ggaagtacg	19

3-130	Sequences	
3-130-1	Sequence Number [ID]	130
3-130-2	Molecule Type	RNA
3-130-3	Length	19
3-130-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-130-5	Residues	gggtcgtagt agctgtgca 19
3-131	Sequences	
3-131-1	Sequence Number [ID]	131
3-131-2	Molecule Type	RNA
3-131-3	Length	19
3-131-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-131-5	Residues	tagctgtgca ggccttct 19
3-132	Sequences	
3-132-1	Sequence Number [ID]	132
3-132-2	Molecule Type	RNA
3-132-3	Length	19
3-132-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-132-5	Residues	tcatacatgg ccagtcggt 19
3-133	Sequences	
3-133-1	Sequence Number [ID]	133
3-133-2	Molecule Type	RNA
3-133-3	Length	19
3-133-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-133-5	Residues	tagctgtagc ggtaacaac 19
3-134	Sequences	
3-134-1	Sequence Number [ID]	134
3-134-2	Molecule Type	RNA
3-134-3	Length	19
3-134-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-134-5	Residues	gctgtagcgg taacaaccc 19
3-135	Sequences	
3-135-1	Sequence Number [ID]	135
3-135-2	Molecule Type	RNA
3-135-3	Length	19
3-135-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-135-5	Residues	ctgtagcggg aacaaccga 19
3-136	Sequences	
3-136-1	Sequence Number [ID]	136
3-136-2	Molecule Type	RNA
3-136-3	Length	19
3-136-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-136-5	Residues	tgtagcggta acaaccag 19
3-137	Sequences	

3-137-1	Sequence Number [ID]	137	
3-137-2	Molecule Type	RNA	
3-137-3	Length	19	
3-137-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-137-5	Residues	taacaaccca gcgtggaat	19
3-138	Sequences		
3-138-1	Sequence Number [ID]	138	
3-138-2	Molecule Type	RNA	
3-138-3	Length	19	
3-138-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-138-5	Residues	aacaaccag cgtggaatt	19
3-139	Sequences		
3-139-1	Sequence Number [ID]	139	
3-139-2	Molecule Type	RNA	
3-139-3	Length	19	
3-139-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-139-5	Residues	tgacgctatg tctttcaca	19
3-140	Sequences		
3-140-1	Sequence Number [ID]	140	
3-140-2	Molecule Type	RNA	
3-140-3	Length	19	
3-140-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-140-5	Residues	gcagctatgt ctttcacac	19
3-141	Sequences		
3-141-1	Sequence Number [ID]	141	
3-141-2	Molecule Type	RNA	
3-141-3	Length	19	
3-141-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-141-5	Residues	cagctatgtc tttcacact	19
3-142	Sequences		
3-142-1	Sequence Number [ID]	142	
3-142-2	Molecule Type	RNA	
3-142-3	Length	19	
3-142-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-142-5	Residues	agctatgtct ttcacactg	19
3-143	Sequences		
3-143-1	Sequence Number [ID]	143	
3-143-2	Molecule Type	RNA	
3-143-3	Length	19	
3-143-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-143-5	Residues	gctatgtctt tcacactgg	19
3-144	Sequences		
3-144-1	Sequence Number [ID]	144	
3-144-2	Molecule Type	RNA	

3-144-3	Length	19	
3-144-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-144-5	NonEnglishQualifier Value Residues	ctatgtcttt cacactggc	19
3-145	Sequences		
3-145-1	Sequence Number [ID]	145	
3-145-2	Molecule Type	RNA	
3-145-3	Length	19	
3-145-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-145-5	Residues	tatgtctttc acactggct	19
3-146	Sequences		
3-146-1	Sequence Number [ID]	146	
3-146-2	Molecule Type	RNA	
3-146-3	Length	19	
3-146-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-146-5	Residues	atgtctttca cactggctt	19
3-147	Sequences		
3-147-1	Sequence Number [ID]	147	
3-147-2	Molecule Type	RNA	
3-147-3	Length	19	
3-147-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-147-5	Residues	tgtctttcac actggcttc	19
3-148	Sequences		
3-148-1	Sequence Number [ID]	148	
3-148-2	Molecule Type	RNA	
3-148-3	Length	19	
3-148-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-148-5	Residues	tgttgactgt ggacagcag	19
3-149	Sequences		
3-149-1	Sequence Number [ID]	149	
3-149-2	Molecule Type	RNA	
3-149-3	Length	19	
3-149-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-149-5	Residues	ttgactgtgg acagcagct	19
3-150	Sequences		
3-150-1	Sequence Number [ID]	150	
3-150-2	Molecule Type	RNA	
3-150-3	Length	19	
3-150-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-150-5	Residues	ggggatttgg agaatgaac	19
3-151	Sequences		
3-151-1	Sequence Number [ID]	151	
3-151-2	Molecule Type	RNA	
3-151-3	Length	19	

3-151-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-151-5	NonEnglishQualifier Value Residues	gggatttgga gaatgaacc	19
3-152	Sequences		
3-152-1	Sequence Number [ID]	152	
3-152-2	Molecule Type	RNA	
3-152-3	Length	19	
3-152-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-152-5	Residues	ggatttgga aatgaacca	19
3-153	Sequences		
3-153-1	Sequence Number [ID]	153	
3-153-2	Molecule Type	RNA	
3-153-3	Length	19	
3-153-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-153-5	Residues	gatttgga atgaaccag	19
3-154	Sequences		
3-154-1	Sequence Number [ID]	154	
3-154-2	Molecule Type	RNA	
3-154-3	Length	19	
3-154-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-154-5	Residues	atttgga tgaaccaga	19
3-155	Sequences		
3-155-1	Sequence Number [ID]	155	
3-155-2	Molecule Type	RNA	
3-155-3	Length	19	
3-155-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-155-5	Residues	tttggaat gaaccagaa	19
3-156	Sequences		
3-156-1	Sequence Number [ID]	156	
3-156-2	Molecule Type	RNA	
3-156-3	Length	19	
3-156-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-156-5	Residues	ttggagaatg aaccagaag	19
3-157	Sequences		
3-157-1	Sequence Number [ID]	157	
3-157-2	Molecule Type	RNA	
3-157-3	Length	19	
3-157-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-157-5	Residues	gagaatgaac cagaagaag	19
3-158	Sequences		
3-158-1	Sequence Number [ID]	158	
3-158-2	Molecule Type	RNA	
3-158-3	Length	19	
3-158-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-158-5	NonEnglishQualifier Value Residues	agaatgaacc agaagaagc	19
3-159	Sequences		
3-159-1	Sequence Number [ID]	159	
3-159-2	Molecule Type	RNA	
3-159-3	Length	19	
3-159-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-159-5	Residues	gaatgaacca gaagaagca	19
3-160	Sequences		
3-160-1	Sequence Number [ID]	160	
3-160-2	Molecule Type	RNA	
3-160-3	Length	19	
3-160-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-160-5	Residues	aatgaaccag aagaagcag	19
3-161	Sequences		
3-161-1	Sequence Number [ID]	161	
3-161-2	Molecule Type	RNA	
3-161-3	Length	19	
3-161-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-161-5	Residues	atgaaccaga agaagcagg	19
3-162	Sequences		
3-162-1	Sequence Number [ID]	162	
3-162-2	Molecule Type	RNA	
3-162-3	Length	19	
3-162-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-162-5	Residues	tgaaccagaa gaagcaggt	19
3-163	Sequences		
3-163-1	Sequence Number [ID]	163	
3-163-2	Molecule Type	RNA	
3-163-3	Length	19	
3-163-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-163-5	Residues	gaaccagaag aagcaggtg	19
3-164	Sequences		
3-164-1	Sequence Number [ID]	164	
3-164-2	Molecule Type	RNA	
3-164-3	Length	19	
3-164-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-164-5	Residues	aaaggaatag acggagctg	19
3-165	Sequences		
3-165-1	Sequence Number [ID]	165	
3-165-2	Molecule Type	RNA	
3-165-3	Length	19	
3-165-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-165-5	Residues	gaatagacgg agctggagt	19
3-166	Sequences		
3-166-1	Sequence Number [ID]	166	
3-166-2	Molecule Type	RNA	
3-166-3	Length	19	
3-166-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-166-5	Residues	aatagacgga gctggagt	19
3-167	Sequences		
3-167-1	Sequence Number [ID]	167	
3-167-2	Molecule Type	RNA	
3-167-3	Length	19	
3-167-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-167-5	Residues	atgagctcct tgagcatct	19
3-168	Sequences		
3-168-1	Sequence Number [ID]	168	
3-168-2	Molecule Type	RNA	
3-168-3	Length	19	
3-168-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-168-5	Residues	tgagctcctt gagcatctt	19
3-169	Sequences		
3-169-1	Sequence Number [ID]	169	
3-169-2	Molecule Type	RNA	
3-169-3	Length	19	
3-169-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-169-5	Residues	gagctccttg agcatcttc	19
3-170	Sequences		
3-170-1	Sequence Number [ID]	170	
3-170-2	Molecule Type	RNA	
3-170-3	Length	19	
3-170-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-170-5	Residues	agctccttga gcatcttct	19
3-171	Sequences		
3-171-1	Sequence Number [ID]	171	
3-171-2	Molecule Type	RNA	
3-171-3	Length	19	
3-171-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-171-5	Residues	gctccttgag catcttctg	19
3-172	Sequences		
3-172-1	Sequence Number [ID]	172	
3-172-2	Molecule Type	RNA	
3-172-3	Length	19	
3-172-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-172-5	Residues	ctccttgagc atcttctgg	19

3-173	Sequences	
3-173-1	Sequence Number [ID]	173
3-173-2	Molecule Type	RNA
3-173-3	Length	19
3-173-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-173-5	Residues	tccttgagca tcttctggg 19
3-174	Sequences	
3-174-1	Sequence Number [ID]	174
3-174-2	Molecule Type	RNA
3-174-3	Length	19
3-174-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-174-5	Residues	ttgagcatct tctgggctt 19
3-175	Sequences	
3-175-1	Sequence Number [ID]	175
3-175-2	Molecule Type	RNA
3-175-3	Length	19
3-175-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-175-5	Residues	tgagcatctt ctgggcttt 19
3-176	Sequences	
3-176-1	Sequence Number [ID]	176
3-176-2	Molecule Type	RNA
3-176-3	Length	19
3-176-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-176-5	Residues	ctgagtacac ctggctgac 19
3-177	Sequences	
3-177-1	Sequence Number [ID]	177
3-177-2	Molecule Type	RNA
3-177-3	Length	19
3-177-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-177-5	Residues	tgagtacacc tggctgacc 19
3-178	Sequences	
3-178-1	Sequence Number [ID]	178
3-178-2	Molecule Type	RNA
3-178-3	Length	19
3-178-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-178-5	Residues	ccctaggaaa taccagagt 19
3-179	Sequences	
3-179-1	Sequence Number [ID]	179
3-179-2	Molecule Type	RNA
3-179-3	Length	19
3-179-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-179-5	Residues	cctaggaaat accagagta 19
3-180	Sequences	

3-180-1	Sequence Number [ID]	180	
3-180-2	Molecule Type	RNA	
3-180-3	Length	19	
3-180-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-180-5	Residues	ctaggaaata ccagagtag	19
3-181	Sequences		
3-181-1	Sequence Number [ID]	181	
3-181-2	Molecule Type	RNA	
3-181-3	Length	19	
3-181-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-181-5	Residues	taggaaatac cagagtagc	19
3-182	Sequences		
3-182-1	Sequence Number [ID]	182	
3-182-2	Molecule Type	RNA	
3-182-3	Length	19	
3-182-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-182-5	Residues	aggaaatacc agagtagca	19
3-183	Sequences		
3-183-1	Sequence Number [ID]	183	
3-183-2	Molecule Type	RNA	
3-183-3	Length	19	
3-183-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-183-5	Residues	ggaaatacca gagtagcac	19
3-184	Sequences		
3-184-1	Sequence Number [ID]	184	
3-184-2	Molecule Type	RNA	
3-184-3	Length	19	
3-184-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-184-5	Residues	gaaataccag agtagcacc	19
3-185	Sequences		
3-185-1	Sequence Number [ID]	185	
3-185-2	Molecule Type	RNA	
3-185-3	Length	19	
3-185-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-185-5	Residues	aaataccaga gtagcaccc	19
3-186	Sequences		
3-186-1	Sequence Number [ID]	186	
3-186-2	Molecule Type	RNA	
3-186-3	Length	19	
3-186-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-186-5	Residues	ggcttttctc ttggagtcc	19
3-187	Sequences		
3-187-1	Sequence Number [ID]	187	
3-187-2	Molecule Type	RNA	

3-187-3	Length	19	
3-187-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-187-5	NonEnglishQualifier Value Residues	gcttttctct tggagtcct	19
3-188	Sequences		
3-188-1	Sequence Number [ID]	188	
3-188-2	Molecule Type	RNA	
3-188-3	Length	19	
3-188-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-188-5	Residues	ttttctcttg gagtctca	19
3-189	Sequences		
3-189-1	Sequence Number [ID]	189	
3-189-2	Molecule Type	RNA	
3-189-3	Length	19	
3-189-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-189-5	Residues	tttctcttgg agtcctcac	19
3-190	Sequences		
3-190-1	Sequence Number [ID]	190	
3-190-2	Molecule Type	RNA	
3-190-3	Length	19	
3-190-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-190-5	Residues	ttctcttgga gtcctcaca	19
3-191	Sequences		
3-191-1	Sequence Number [ID]	191	
3-191-2	Molecule Type	RNA	
3-191-3	Length	19	
3-191-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-191-5	Residues	tctcttgag tcctcacag	19
3-192	Sequences		
3-192-1	Sequence Number [ID]	192	
3-192-2	Molecule Type	RNA	
3-192-3	Length	19	
3-192-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-192-5	Residues	ctcttgaggt cctcacagg	19
3-193	Sequences		
3-193-1	Sequence Number [ID]	193	
3-193-2	Molecule Type	DNA	
3-193-3	Length	25	
3-193-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-193-5	Residues	tgtccttcaa ggtgagccgc ctgct	25
3-194	Sequences		

3-194-1	Sequence Number [ID]	194	
3-194-2	Molecule Type	DNA	
3-194-3	Length	25	
3-194-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-194-5	Residues	gtgtccttca aggtgagccg cctgc	25
3-195	Sequences		
3-195-1	Sequence Number [ID]	195	
3-195-2	Molecule Type	DNA	
3-195-3	Length	25	
3-195-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-195-5	Residues	ggtgtccttc aaggtgagcc gcctg	25
3-196	Sequences		
3-196-1	Sequence Number [ID]	196	
3-196-2	Molecule Type	DNA	
3-196-3	Length	25	
3-196-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-196-5	Residues	aggtgtcctt caaggtgagc cgcct	25
3-197	Sequences		
3-197-1	Sequence Number [ID]	197	
3-197-2	Molecule Type	DNA	
3-197-3	Length	25	
3-197-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-197-5	Residues	gaggtgtcct tcaaggtgag ccgcc	25
3-198	Sequences		
3-198-1	Sequence Number [ID]	198	
3-198-2	Molecule Type	DNA	
3-198-3	Length	25	
3-198-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-198-5	Residues	aggaggacag catggcctcc acggt	25
3-199	Sequences		

3-199-1	Sequence Number [ID]	199	
3-199-2	Molecule Type	DNA	
3-199-3	Length	25	
3-199-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-199-5	Residues	caggaggaca gcatggcctc cacgg	25
3-200	Sequences		
3-200-1	Sequence Number [ID]	200	
3-200-2	Molecule Type	DNA	
3-200-3	Length	25	
3-200-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-200-5	Residues	ccaggaggac agcatggcct ccacg	25
3-201	Sequences		
3-201-1	Sequence Number [ID]	201	
3-201-2	Molecule Type	DNA	
3-201-3	Length	25	
3-201-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-201-5	Residues	tccaggagga cagcatggcc tccac	25
3-202	Sequences		
3-202-1	Sequence Number [ID]	202	
3-202-2	Molecule Type	DNA	
3-202-3	Length	25	
3-202-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-202-5	Residues	ttccaggagg acagcatggc ctcca	25
3-203	Sequences		
3-203-1	Sequence Number [ID]	203	
3-203-2	Molecule Type	DNA	
3-203-3	Length	25	
3-203-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-203-5	Residues	cttccaggag gacagcatgg cctcc	25
3-204	Sequences		

3-204-1	Sequence Number [ID]	204	
3-204-2	Molecule Type	DNA	
3-204-3	Length	25	
3-204-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-204-5	NonEnglishQualifier Value Residues	gcttccagga ggacagcatg gcctc	25
3-205	Sequences		
3-205-1	Sequence Number [ID]	205	
3-205-2	Molecule Type	DNA	
3-205-3	Length	25	
3-205-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-205-5	NonEnglishQualifier Value Residues	tgcttccagg aggacagcat ggcct	25
3-206	Sequences		
3-206-1	Sequence Number [ID]	206	
3-206-2	Molecule Type	DNA	
3-206-3	Length	25	
3-206-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-206-5	NonEnglishQualifier Value Residues	tcatcgctga ccgctgggtg ataac	25
3-207	Sequences		
3-207-1	Sequence Number [ID]	207	
3-207-2	Molecule Type	DNA	
3-207-3	Length	25	
3-207-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-207-5	NonEnglishQualifier Value Residues	ctcatcgctg accgctgggt gataa	25
3-208	Sequences		
3-208-1	Sequence Number [ID]	208	
3-208-2	Molecule Type	DNA	
3-208-3	Length	25	
3-208-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-208-5	NonEnglishQualifier Value Residues	tgtgactgtg gcctccaggg ccctc	25
3-209	Sequences		

3-209-1	Sequence Number [ID]	209	
3-209-2	Molecule Type	DNA	
3-209-3	Length	25	
3-209-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-209-5	Residues	actgtgactg tggcctccag ggccc	25
3-210	Sequences		
3-210-1	Sequence Number [ID]	210	
3-210-2	Molecule Type	DNA	
3-210-3	Length	25	
3-210-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-210-5	Residues	cactgtgact gtggcctcca gggcc	25
3-211	Sequences		
3-211-1	Sequence Number [ID]	211	
3-211-2	Molecule Type	DNA	
3-211-3	Length	25	
3-211-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-211-5	Residues	cctcccagat ctccctcacc gggcc	25
3-212	Sequences		
3-212-1	Sequence Number [ID]	212	
3-212-2	Molecule Type	DNA	
3-212-3	Length	25	
3-212-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-212-5	Residues	tcacctcca gatctccctc accgg	25
3-213	Sequences		
3-213-1	Sequence Number [ID]	213	
3-213-2	Molecule Type	DNA	
3-213-3	Length	25	
3-213-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-213-5	Residues	ttcacctccc agatctccct caccg	25
3-214	Sequences		

3-214-1	Sequence Number [ID]	214	
3-214-2	Molecule Type	DNA	
3-214-3	Length	25	
3-214-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-214-5	NonEnglishQualifier Value Residues	ggtatttcct agggtagaag gcgga	25
3-215	Sequences		
3-215-1	Sequence Number [ID]	215	
3-215-2	Molecule Type	DNA	
3-215-3	Length	25	
3-215-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-215-5	NonEnglishQualifier Value Residues	tggtatttcc tagggtagaa ggcgg	25
3-216	Sequences		
3-216-1	Sequence Number [ID]	216	
3-216-2	Molecule Type	DNA	
3-216-3	Length	25	
3-216-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-216-5	NonEnglishQualifier Value Residues	gctaccgcaa gggcaagaag gatgc	25
3-217	Sequences		
3-217-1	Sequence Number [ID]	217	
3-217-2	Molecule Type	DNA	
3-217-3	Length	25	
3-217-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-217-5	NonEnglishQualifier Value Residues	ggctaccgca agggcaagaa ggatg	25
3-218	Sequences		
3-218-1	Sequence Number [ID]	218	
3-218-2	Molecule Type	DNA	
3-218-3	Length	25	
3-218-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-218-5	NonEnglishQualifier Value Residues	catggcaggc cagcctccag gttcg	25
3-219	Sequences		

3-219-1	Sequence Number [ID]	219	
3-219-2	Molecule Type	DNA	
3-219-3	Length	25	
3-219-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-219-5	Residues	agggtgagtg gccatggcag gccag	25
3-220	Sequences		
3-220-1	Sequence Number [ID]	220	
3-220-2	Molecule Type	DNA	
3-220-3	Length	25	
3-220-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-220-5	Residues	cgagggtgag tggccatggc aggcc	25
3-221	Sequences		
3-221-1	Sequence Number [ID]	221	
3-221-2	Molecule Type	DNA	
3-221-3	Length	25	
3-221-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-221-5	Residues	gtcctccgag ggtgagtggc catgg	25
3-222	Sequences		
3-222-1	Sequence Number [ID]	222	
3-222-2	Molecule Type	DNA	
3-222-3	Length	25	
3-222-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-222-5	Residues	tgtcctccga gggtagtgg ccatg	25
3-223	Sequences		
3-223-1	Sequence Number [ID]	223	
3-223-2	Molecule Type	DNA	
3-223-3	Length	25	
3-223-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-223-5	Residues	gtgtcctccg agggtagtg gccat	25
3-224	Sequences		

3-224-1	Sequence Number [ID]	224	
3-224-2	Molecule Type	DNA	
3-224-3	Length	25	
3-224-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-224-5	Residues	gcctggatga gagaaactgc gtttg	25
3-225	Sequences		
3-225-1	Sequence Number [ID]	225	
3-225-2	Molecule Type	DNA	
3-225-3	Length	25	
3-225-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-225-5	Residues	ggcctggatg agagaaactg cgttt	25
3-226	Sequences		
3-226-1	Sequence Number [ID]	226	
3-226-2	Molecule Type	DNA	
3-226-3	Length	25	
3-226-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-226-5	Residues	ctctggacta cggcttg gcc ctctg	25
3-227	Sequences		
3-227-1	Sequence Number [ID]	227	
3-227-2	Molecule Type	DNA	
3-227-3	Length	25	
3-227-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-227-5	Residues	tctctggact acggcttg gcc cctct	25
3-228	Sequences		
3-228-1	Sequence Number [ID]	228	
3-228-2	Molecule Type	DNA	
3-228-3	Length	25	
3-228-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-228-5	Residues	tcacctgctt cttctggttc attct	25
3-229	Sequences		

3-229-1	Sequence Number [ID]	229	
3-229-2	Molecule Type	DNA	
3-229-3	Length	25	
3-229-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-229-5	NonEnglishQualifier Value Residues	ctcacctgct tcttctgggtt cattc	25
3-230	Sequences		
3-230-1	Sequence Number [ID]	230	
3-230-2	Molecule Type	DNA	
3-230-3	Length	25	
3-230-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-230-5	NonEnglishQualifier Value Residues	caaagcccag aagatgctca aggag	25
3-231	Sequences		
3-231-1	Sequence Number [ID]	231	
3-231-2	Molecule Type	DNA	
3-231-3	Length	25	
3-231-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-231-5	NonEnglishQualifier Value Residues	ccaaagccca gaagatgctc aagga	25
3-232	Sequences		
3-232-1	Sequence Number [ID]	232	
3-232-2	Molecule Type	DNA	
3-232-3	Length	25	
3-232-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-232-5	NonEnglishQualifier Value Residues	gccaaagccc agaagatgct caagg	25
3-233	Sequences		
3-233-1	Sequence Number [ID]	233	
3-233-2	Molecule Type	DNA	
3-233-3	Length	25	
3-233-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-233-5	NonEnglishQualifier Value Residues	tttgaataa agctgcctga tccaa	25
3-234	Sequences		

3-234-1	Sequence Number [ID]	234	
3-234-2	Molecule Type	DNA	
3-234-3	Length	25	
3-234-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-234-5	Residues	ctttggaata aagctgcctg atcca	25
3-235	Sequences		
3-235-1	Sequence Number [ID]	235	
3-235-2	Molecule Type	DNA	
3-235-3	Length	25	
3-235-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-235-5	Residues	ccctttgga taaagctgcc tgatc	25
3-236	Sequences		
3-236-1	Sequence Number [ID]	236	
3-236-2	Molecule Type	DNA	
3-236-3	Length	25	
3-236-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-236-5	Residues	gccctttgga ataaagctgc ctgat	25
3-237	Sequences		
3-237-1	Sequence Number [ID]	237	
3-237-2	Molecule Type	DNA	
3-237-3	Length	25	
3-237-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-237-5	Residues	tgccctttgg aataaagctg cctga	25
3-238	Sequences		
3-238-1	Sequence Number [ID]	238	
3-238-2	Molecule Type	DNA	
3-238-3	Length	25	
3-238-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-238-5	Residues	agctgccctt tggaataaag ctgcc	25
3-239	Sequences		

3-239-1	Sequence Number [ID]	239	
3-239-2	Molecule Type	DNA	
3-239-3	Length	25	
3-239-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-239-5	NonEnglishQualifier Value Residues	cagctgccct ttggaataaa gctgc	25
3-240	Sequences		
3-240-1	Sequence Number [ID]	240	
3-240-2	Molecule Type	DNA	
3-240-3	Length	25	
3-240-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-240-5	NonEnglishQualifier Value Residues	tgagctcagc tgccctttgg aataa	25
3-241	Sequences		
3-241-1	Sequence Number [ID]	241	
3-241-2	Molecule Type	DNA	
3-241-3	Length	25	
3-241-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-241-5	NonEnglishQualifier Value Residues	gtgagctcag ctgccctttg gaata	25
3-242	Sequences		
3-242-1	Sequence Number [ID]	242	
3-242-2	Molecule Type	DNA	
3-242-3	Length	25	
3-242-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-242-5	NonEnglishQualifier Value Residues	agcttcggaa gccctggtc taact	25
3-243	Sequences		
3-243-1	Sequence Number [ID]	243	
3-243-2	Molecule Type	DNA	
3-243-3	Length	25	
3-243-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-243-5	NonEnglishQualifier Value Residues	tcagcagcaa gaatgctggt tctac	25
3-244	Sequences		

3-244-1	Sequence Number [ID]	244	
3-244-2	Molecule Type	DNA	
3-244-3	Length	25	
3-244-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-244-5	Residues	ctcagcagca agaatgctgg ttcta	25
3-245	Sequences		
3-245-1	Sequence Number [ID]	245	
3-245-2	Molecule Type	DNA	
3-245-3	Length	25	
3-245-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-245-5	Residues	gctcagcagc aagaatgctg gttct	25
3-246	Sequences		
3-246-1	Sequence Number [ID]	246	
3-246-2	Molecule Type	DNA	
3-246-3	Length	25	
3-246-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-246-5	Residues	tggctcagca gcaagaatgc tgggt	25
3-247	Sequences		
3-247-1	Sequence Number [ID]	247	
3-247-2	Molecule Type	DNA	
3-247-3	Length	25	
3-247-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-247-5	Residues	gtggctcagc agcaagaatg ctggt	25
3-248	Sequences		
3-248-1	Sequence Number [ID]	248	
3-248-2	Molecule Type	DNA	
3-248-3	Length	25	
3-248-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-248-5	Residues	gatgtctgct ccagtgatgg cagga	25
3-249	Sequences		

3-249-1	Sequence Number [ID]	249	
3-249-2	Molecule Type	DNA	
3-249-3	Length	25	
3-249-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-249-5	NonEnglishQualifier Value Residues	tgatgtctgc tccagtgatg gcagg	25
3-250	Sequences		
3-250-1	Sequence Number [ID]	250	
3-250-2	Molecule Type	DNA	
3-250-3	Length	25	
3-250-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-250-5	NonEnglishQualifier Value Residues	ctgatgtctg ctccagtgat ggcag	25
3-251	Sequences		
3-251-1	Sequence Number [ID]	251	
3-251-2	Molecule Type	DNA	
3-251-3	Length	25	
3-251-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-251-5	NonEnglishQualifier Value Residues	ccctgatgtc tgctccagtg atggc	25
3-252	Sequences		
3-252-1	Sequence Number [ID]	252	
3-252-2	Molecule Type	DNA	
3-252-3	Length	25	
3-252-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-252-5	NonEnglishQualifier Value Residues	aagtgggtgac ctgaggaact gcccc	25
3-253	Sequences		
3-253-1	Sequence Number [ID]	253	
3-253-2	Molecule Type	DNA	
3-253-3	Length	25	
3-253-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-253-5	NonEnglishQualifier Value Residues	caagtgggtga cctgaggaac tgccc	25
3-254	Sequences		

3-254-1	Sequence Number [ID]	254	
3-254-2	Molecule Type	DNA	
3-254-3	Length	25	
3-254-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-254-5	Residues	gcaagtgggtg acctgaggaa ctgcc	25
3-255	Sequences		
3-255-1	Sequence Number [ID]	255	
3-255-2	Molecule Type	DNA	
3-255-3	Length	25	
3-255-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-255-5	Residues	agcaagtgggt gacctgagga actgc	25
3-256	Sequences		
3-256-1	Sequence Number [ID]	256	
3-256-2	Molecule Type	DNA	
3-256-3	Length	25	
3-256-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-256-5	Residues	cagcaagtgg tgacctgagg aactg	25
3-257	Sequences		
3-257-1	Sequence Number [ID]	257	
3-257-2	Molecule Type	DNA	
3-257-3	Length	25	
3-257-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-257-5	Residues	ccagcaagtg gtgacctgag gaact	25
3-258	Sequences		
3-258-1	Sequence Number [ID]	258	
3-258-2	Molecule Type	DNA	
3-258-3	Length	25	
3-258-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-258-5	Residues	atccagcaag tgggtgacctg aggaa	25
3-259	Sequences		

3-259-1	Sequence Number [ID]	259	
3-259-2	Molecule Type	DNA	
3-259-3	Length	25	
3-259-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-259-5	Residues	tggatccagc aagtgggtgac ctgag	25
3-260	Sequences		
3-260-1	Sequence Number [ID]	260	
3-260-2	Molecule Type	DNA	
3-260-3	Length	25	
3-260-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-260-5	Residues	ctggatccag caagtgggtga cctga	25
3-261	Sequences		
3-261-1	Sequence Number [ID]	261	
3-261-2	Molecule Type	DNA	
3-261-3	Length	25	
3-261-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-261-5	Residues	cccgcatcac aggtgtgatc agctg	25
3-262	Sequences		
3-262-1	Sequence Number [ID]	262	
3-262-2	Molecule Type	DNA	
3-262-3	Length	25	
3-262-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-262-5	Residues	acccgcatca caggtgtgat cagct	25
3-263	Sequences		
3-263-1	Sequence Number [ID]	263	
3-263-2	Molecule Type	DNA	
3-263-3	Length	25	
3-263-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-263-5	Residues	aactacttcg gcgtctacac ccgca	25
3-264	Sequences		

3-264-1	Sequence Number [ID]	264	
3-264-2	Molecule Type	DNA	
3-264-3	Length	25	
3-264-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-264-5	Residues	ttgatccac aggacctgtg cagcg	25
3-265	Sequences		
3-265-1	Sequence Number [ID]	265	
3-265-2	Molecule Type	DNA	
3-265-3	Length	25	
3-265-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-265-5	Residues	tgcagttgat ccacaggac ctgtg	25
3-266	Sequences		
3-266-1	Sequence Number [ID]	266	
3-266-2	Molecule Type	DNA	
3-266-3	Length	25	
3-266-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-266-5	Residues	agaggtgtcc ttcaaggtga gccgc	25
3-267	Sequences		
3-267-1	Sequence Number [ID]	267	
3-267-2	Molecule Type	DNA	
3-267-3	Length	25	
3-267-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-267-5	Residues	gagaggtgtc cttcaaggtg agccg	25
3-268	Sequences		
3-268-1	Sequence Number [ID]	268	
3-268-2	Molecule Type	DNA	
3-268-3	Length	25	
3-268-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-268-5	Residues	ctggagaggt gtccttcaag gtgag	25
3-269	Sequences		

3-269-1	Sequence Number [ID]	269	
3-269-2	Molecule Type	DNA	
3-269-3	Length	25	
3-269-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-269-5	Residues	aggttcgggg tcgacacatc tgtgg	25
3-270	Sequences		
3-270-1	Sequence Number [ID]	270	
3-270-2	Molecule Type	DNA	
3-270-3	Length	25	
3-270-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-270-5	Residues	attcaccttc cagtgtgagg accgg	25
3-271	Sequences		
3-271-1	Sequence Number [ID]	271	
3-271-2	Molecule Type	DNA	
3-271-3	Length	25	
3-271-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-271-5	Residues	cattcacctt ccagtgtgag gaccg	25
3-272	Sequences		
3-272-1	Sequence Number [ID]	272	
3-272-2	Molecule Type	DNA	
3-272-3	Length	25	
3-272-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-272-5	Residues	acattcacct tccagtgtga ggacc	25
3-273	Sequences		
3-273-1	Sequence Number [ID]	273	
3-273-2	Molecule Type	DNA	
3-273-3	Length	25	
3-273-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-273-5	Residues	gacattcacc ttccagtgtg aggac	25
3-274	Sequences		

3-274-1	Sequence Number [ID]	274	
3-274-2	Molecule Type	DNA	
3-274-3	Length	25	
3-274-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-274-5	Residues	ggacattcac cttccagtgt gagga	25
3-275	Sequences		
3-275-1	Sequence Number [ID]	275	
3-275-2	Molecule Type	DNA	
3-275-3	Length	25	
3-275-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-275-5	Residues	gcagagccac attccagtgc aaaga	25
3-276	Sequences		
3-276-1	Sequence Number [ID]	276	
3-276-2	Molecule Type	DNA	
3-276-3	Length	25	
3-276-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-276-5	Residues	tgcagagcca cattccagtg caaag	25
3-277	Sequences		
3-277-1	Sequence Number [ID]	277	
3-277-2	Molecule Type	DNA	
3-277-3	Length	25	
3-277-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-277-5	Residues	ttgcagagcc acattccagt gcaaa	25
3-278	Sequences		
3-278-1	Sequence Number [ID]	278	
3-278-2	Molecule Type	DNA	
3-278-3	Length	25	
3-278-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-278-5	Residues	tttgcagagc cacattccag tgcaa	25
3-279	Sequences		

3-279-1	Sequence Number [ID]	279	
3-279-2	Molecule Type	DNA	
3-279-3	Length	25	
3-279-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-279-5	Residues	aaactgcgtt tgcagagcca cattc	25
3-280	Sequences		
3-280-1	Sequence Number [ID]	280	
3-280-2	Molecule Type	DNA	
3-280-3	Length	25	
3-280-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-280-5	Residues	gaaactgcgt ttgcagagcc acatt	25
3-281	Sequences		
3-281-1	Sequence Number [ID]	281	
3-281-2	Molecule Type	DNA	
3-281-3	Length	25	
3-281-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-281-5	Residues	agaaactgcg tttgcagagc cacat	25
3-282	Sequences		
3-282-1	Sequence Number [ID]	282	
3-282-2	Molecule Type	DNA	
3-282-3	Length	25	
3-282-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-282-5	Residues	gagaaactgc gtttgcagag ccaca	25
3-283	Sequences		
3-283-1	Sequence Number [ID]	283	
3-283-2	Molecule Type	DNA	
3-283-3	Length	25	
3-283-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-283-5	Residues	agagaaactg cgtttgcaga gccac	25
3-284	Sequences		

3-284-1	Sequence Number [ID]	284	
3-284-2	Molecule Type	DNA	
3-284-3	Length	25	
3-284-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-284-5	Residues	gagagaaact gcgtttgcag agcca	25
3-285	Sequences		
3-285-1	Sequence Number [ID]	285	
3-285-2	Molecule Type	DNA	
3-285-3	Length	25	
3-285-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-285-5	Residues	tgagagaaac tgcgtttgca gagcc	25
3-286	Sequences		
3-286-1	Sequence Number [ID]	286	
3-286-2	Molecule Type	DNA	
3-286-3	Length	25	
3-286-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-286-5	Residues	atgagagaaa ctgcgtttgc agagc	25
3-287	Sequences		
3-287-1	Sequence Number [ID]	287	
3-287-2	Molecule Type	DNA	
3-287-3	Length	25	
3-287-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-287-5	Residues	gatgagagaa actgcgtttg cagag	25
3-288	Sequences		
3-288-1	Sequence Number [ID]	288	
3-288-2	Molecule Type	DNA	
3-288-3	Length	25	
3-288-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-288-5	Residues	ggatgagaga aactgcgttt gcaga	25
3-289	Sequences		

3-289-1	Sequence Number [ID]	289	
3-289-2	Molecule Type	DNA	
3-289-3	Length	25	
3-289-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-289-5	NonEnglishQualifier Value Residues	tg gat gag ag aa act gc gtt tgc ag	25
3-290	Sequences		
3-290-1	Sequence Number [ID]	290	
3-290-2	Molecule Type	DNA	
3-290-3	Length	25	
3-290-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-290-5	NonEnglishQualifier Value Residues	ct gg at ga ga gaa act gc gt tt gc a	25
3-291	Sequences		
3-291-1	Sequence Number [ID]	291	
3-291-2	Molecule Type	DNA	
3-291-3	Length	25	
3-291-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-291-5	NonEnglishQualifier Value Residues	c ct gg at ga g agaa act gc g tt gc	25
3-292	Sequences		
3-292-1	Sequence Number [ID]	292	
3-292-2	Molecule Type	DNA	
3-292-3	Length	25	
3-292-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-292-5	NonEnglishQualifier Value Residues	c ct gt ga tgg ggt ca ag gac tgccc	25
3-293	Sequences		
3-293-1	Sequence Number [ID]	293	
3-293-2	Molecule Type	DNA	
3-293-3	Length	25	
3-293-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-293-5	NonEnglishQualifier Value Residues	tt gtaca acc agt cgg accc ctgcc	25
3-294	Sequences		

3-294-1	Sequence Number [ID]	294	
3-294-2	Molecule Type	DNA	
3-294-3	Length	25	
3-294-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-294-5	Residues	cttgtacaac cagtcggacc cctgc	25
3-295	Sequences		
3-295-1	Sequence Number [ID]	295	
3-295-2	Molecule Type	DNA	
3-295-3	Length	25	
3-295-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-295-5	Residues	gcttgtacaa ccagtcggac ccctg	25
3-296	Sequences		
3-296-1	Sequence Number [ID]	296	
3-296-2	Molecule Type	DNA	
3-296-3	Length	25	
3-296-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-296-5	Residues	tggcttgtac aaccagtcgg acccc	25
3-297	Sequences		
3-297-1	Sequence Number [ID]	297	
3-297-2	Molecule Type	DNA	
3-297-3	Length	25	
3-297-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-297-5	Residues	atggcttgta caaccagtcg gaccc	25
3-298	Sequences		
3-298-1	Sequence Number [ID]	298	
3-298-2	Molecule Type	DNA	
3-298-3	Length	25	
3-298-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-298-5	Residues	tatggcttgt acaaccagtc ggacc	25
3-299	Sequences		

3-299-1	Sequence Number [ID]	299	
3-299-2	Molecule Type	DNA	
3-299-3	Length	25	
3-299-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-299-5	Residues	ctatggcttg tacaaccagt cggac	25
3-300	Sequences		
3-300-1	Sequence Number [ID]	300	
3-300-2	Molecule Type	DNA	
3-300-3	Length	25	
3-300-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-300-5	Residues	actatggctt gtacaaccag tcgga	25
3-301	Sequences		
3-301-1	Sequence Number [ID]	301	
3-301-2	Molecule Type	DNA	
3-301-3	Length	25	
3-301-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-301-5	Residues	cactatggct tgtacaacca gtcgg	25
3-302	Sequences		
3-302-1	Sequence Number [ID]	302	
3-302-2	Molecule Type	DNA	
3-302-3	Length	25	
3-302-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-302-5	Residues	gcactatggc ttgtacaacc agtcg	25
3-303	Sequences		
3-303-1	Sequence Number [ID]	303	
3-303-2	Molecule Type	DNA	
3-303-3	Length	25	
3-303-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-303-5	Residues	tgcactatgg cttgtacaac cagtc	25
3-304	Sequences		

3-304-1	Sequence Number [ID]	304	
3-304-2	Molecule Type	DNA	
3-304-3	Length	25	
3-304-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-304-5	Residues	gtgcactatg gcttgtacaa ccagt	25
3-305	Sequences		
3-305-1	Sequence Number [ID]	305	
3-305-2	Molecule Type	DNA	
3-305-3	Length	25	
3-305-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-305-5	Residues	ggtgcactat ggcttgtaca accag	25
3-306	Sequences		
3-306-1	Sequence Number [ID]	306	
3-306-2	Molecule Type	DNA	
3-306-3	Length	25	
3-306-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-306-5	Residues	gggtgcacta tggcttgtac aacca	25
3-307	Sequences		
3-307-1	Sequence Number [ID]	307	
3-307-2	Molecule Type	DNA	
3-307-3	Length	25	
3-307-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-307-5	Residues	cgggtgcact atggcttgta caacc	25
3-308	Sequences		
3-308-1	Sequence Number [ID]	308	
3-308-2	Molecule Type	DNA	
3-308-3	Length	25	
3-308-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-308-5	Residues	tgcgggtgca ctatggcttg tacaa	25
3-309	Sequences		

3-309-1	Sequence Number [ID]	309	
3-309-2	Molecule Type	DNA	
3-309-3	Length	25	
3-309-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-309-5	NonEnglishQualifier Value Residues	gtgtgcgggt gcactatggc ttgta	25
3-310	Sequences		
3-310-1	Sequence Number [ID]	310	
3-310-2	Molecule Type	DNA	
3-310-3	Length	25	
3-310-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-310-5	NonEnglishQualifier Value Residues	tggacgatcc agaacaggag gctgt	25
3-311	Sequences		
3-311-1	Sequence Number [ID]	311	
3-311-2	Molecule Type	DNA	
3-311-3	Length	25	
3-311-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-311-5	NonEnglishQualifier Value Residues	cagtggacga tccagaacag gaggc	25
3-312	Sequences		
3-312-1	Sequence Number [ID]	312	
3-312-2	Molecule Type	DNA	
3-312-3	Length	25	
3-312-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-312-5	NonEnglishQualifier Value Residues	aagtatgatt tgccgtgcac ccagg	25
3-313	Sequences		
3-313-1	Sequence Number [ID]	313	
3-313-2	Molecule Type	DNA	
3-313-3	Length	25	
3-313-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-313-5	NonEnglishQualifier Value Residues	gaagtatgat ttgccgtgca cccag	25
3-314	Sequences		

3-314-1	Sequence Number [ID]	314	
3-314-2	Molecule Type	DNA	
3-314-3	Length	25	
3-314-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-314-5	NonEnglishQualifier Value Residues	agaagtatga ttgccgtgc accca	25
3-315	Sequences		
3-315-1	Sequence Number [ID]	315	
3-315-2	Molecule Type	DNA	
3-315-3	Length	25	
3-315-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-315-5	NonEnglishQualifier Value Residues	cagaagtatg attgccgtg cacc	25
3-316	Sequences		
3-316-1	Sequence Number [ID]	316	
3-316-2	Molecule Type	DNA	
3-316-3	Length	25	
3-316-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-316-5	NonEnglishQualifier Value Residues	ggcagaagta tgatttgccg tgcac	25
3-317	Sequences		
3-317-1	Sequence Number [ID]	317	
3-317-2	Molecule Type	DNA	
3-317-3	Length	25	
3-317-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-317-5	NonEnglishQualifier Value Residues	aggcagaagt atgatttgcc gtgca	25
3-318	Sequences		
3-318-1	Sequence Number [ID]	318	
3-318-2	Molecule Type	DNA	
3-318-3	Length	25	
3-318-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-318-5	NonEnglishQualifier Value Residues	gaggcagaag tatgatttgc cgtgc	25
3-319	Sequences		

3-319-1	Sequence Number [ID]	319	
3-319-2	Molecule Type	DNA	
3-319-3	Length	25	
3-319-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-319-5	NonEnglishQualifier Value Residues	ggaggcagaa gtatgatttg ccgtg	25
3-320	Sequences		
3-320-1	Sequence Number [ID]	320	
3-320-2	Molecule Type	DNA	
3-320-3	Length	25	
3-320-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-320-5	NonEnglishQualifier Value Residues	acttccccag ctactactcg cccca	25
3-321	Sequences		
3-321-1	Sequence Number [ID]	321	
3-321-2	Molecule Type	DNA	
3-321-3	Length	25	
3-321-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-321-5	NonEnglishQualifier Value Residues	cgtacttccc cagctactac tcgcc	25
3-322	Sequences		
3-322-1	Sequence Number [ID]	322	
3-322-2	Molecule Type	DNA	
3-322-3	Length	25	
3-322-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-322-5	NonEnglishQualifier Value Residues	tgcacagcta ctacgacccc ttcgt	25
3-323	Sequences		
3-323-1	Sequence Number [ID]	323	
3-323-2	Molecule Type	DNA	
3-323-3	Length	25	
3-323-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-323-5	NonEnglishQualifier Value Residues	agaaggcct gcacagctac tacga	25
3-324	Sequences		

3-324-1	Sequence Number [ID]	324	
3-324-2	Molecule Type	DNA	
3-324-3	Length	25	
3-324-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-324-5	Residues	accgactggc catgtatgac gtggc	25
3-325	Sequences		
3-325-1	Sequence Number [ID]	325	
3-325-2	Molecule Type	DNA	
3-325-3	Length	25	
3-325-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-325-5	Residues	gttggtaccg ctacagctac gtggg	25
3-326	Sequences		
3-326-1	Sequence Number [ID]	326	
3-326-2	Molecule Type	DNA	
3-326-3	Length	25	
3-326-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-326-5	Residues	gggttggttac cgctacagct acgtg	25
3-327	Sequences		
3-327-1	Sequence Number [ID]	327	
3-327-2	Molecule Type	DNA	
3-327-3	Length	25	
3-327-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-327-5	Residues	tgggttggtta ccgctacagc tacgt	25
3-328	Sequences		
3-328-1	Sequence Number [ID]	328	
3-328-2	Molecule Type	DNA	
3-328-3	Length	25	
3-328-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-328-5	Residues	ctgggttggtt accgctacag ctacg	25
3-329	Sequences		

3-329-1	Sequence Number [ID]	329	
3-329-2	Molecule Type	DNA	
3-329-3	Length	25	
3-329-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-329-5	Residues	attccacgct gggttgttac cgcta	25
3-330	Sequences		
3-330-1	Sequence Number [ID]	330	
3-330-2	Molecule Type	DNA	
3-330-3	Length	25	
3-330-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-330-5	Residues	aattccacgc tgggttggtta ccgct	25
3-331	Sequences		
3-331-1	Sequence Number [ID]	331	
3-331-2	Molecule Type	DNA	
3-331-3	Length	25	
3-331-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-331-5	Residues	tgtgaaagac atagctgcat tgaat	25
3-332	Sequences		
3-332-1	Sequence Number [ID]	332	
3-332-2	Molecule Type	DNA	
3-332-3	Length	25	
3-332-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-332-5	Residues	gtgtgaaaga catagctgca ttgaa	25
3-333	Sequences		
3-333-1	Sequence Number [ID]	333	
3-333-2	Molecule Type	DNA	
3-333-3	Length	25	
3-333-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-333-5	Residues	agtgtgaaag acatagctgc attga	25
3-334	Sequences		

3-334-1	Sequence Number [ID]	334	
3-334-2	Molecule Type	DNA	
3-334-3	Length	25	
3-334-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-334-5	Residues	cagtgtgaaa gacatagctg cattg	25
3-335	Sequences		
3-335-1	Sequence Number [ID]	335	
3-335-2	Molecule Type	DNA	
3-335-3	Length	25	
3-335-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-335-5	Residues	ccagtgtgaa agacatagct gcatt	25
3-336	Sequences		
3-336-1	Sequence Number [ID]	336	
3-336-2	Molecule Type	DNA	
3-336-3	Length	25	
3-336-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-336-5	Residues	gccagtgtga aagacatagc tgcatt	25
3-337	Sequences		
3-337-1	Sequence Number [ID]	337	
3-337-2	Molecule Type	DNA	
3-337-3	Length	25	
3-337-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-337-5	Residues	agccagtgtg aaagacatag ctgca	25
3-338	Sequences		
3-338-1	Sequence Number [ID]	338	
3-338-2	Molecule Type	DNA	
3-338-3	Length	25	
3-338-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-338-5	Residues	aagccagtgt gaaagacata gctgc	25
3-339	Sequences		

3-339-1	Sequence Number [ID]	339	
3-339-2	Molecule Type	DNA	
3-339-3	Length	25	
3-339-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-339-5	NonEnglishQualifier Value Residues	gaagccagtg tgaaagacat agctg	25
3-340	Sequences		
3-340-1	Sequence Number [ID]	340	
3-340-2	Molecule Type	DNA	
3-340-3	Length	25	
3-340-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-340-5	NonEnglishQualifier Value Residues	ctgctgtcca cagtcaacag ctcgg	25
3-341	Sequences		
3-341-1	Sequence Number [ID]	341	
3-341-2	Molecule Type	DNA	
3-341-3	Length	25	
3-341-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-341-5	NonEnglishQualifier Value Residues	agctgctgtc cacagtcaac agctc	25
3-342	Sequences		
3-342-1	Sequence Number [ID]	342	
3-342-2	Molecule Type	DNA	
3-342-3	Length	25	
3-342-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-342-5	NonEnglishQualifier Value Residues	gttcattctc caaatccccg agcac	25
3-343	Sequences		
3-343-1	Sequence Number [ID]	343	
3-343-2	Molecule Type	DNA	
3-343-3	Length	25	
3-343-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-343-5	NonEnglishQualifier Value Residues	ggttcattct ccaaatcccc gagca	25
3-344	Sequences		

3-344-1	Sequence Number [ID]	344	
3-344-2	Molecule Type	DNA	
3-344-3	Length	25	
3-344-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-344-5	Residues	tggttcattc tccaaatccc cgagc	25
3-345	Sequences		
3-345-1	Sequence Number [ID]	345	
3-345-2	Molecule Type	DNA	
3-345-3	Length	25	
3-345-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-345-5	Residues	ctggttcatt ctccaaatcc ccgag	25
3-346	Sequences		
3-346-1	Sequence Number [ID]	346	
3-346-2	Molecule Type	DNA	
3-346-3	Length	25	
3-346-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-346-5	Residues	tctggttcatt tctccaaatc cccga	25
3-347	Sequences		
3-347-1	Sequence Number [ID]	347	
3-347-2	Molecule Type	DNA	
3-347-3	Length	25	
3-347-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-347-5	Residues	ttctggttca ttctccaaat ccccg	25
3-348	Sequences		
3-348-1	Sequence Number [ID]	348	
3-348-2	Molecule Type	DNA	
3-348-3	Length	25	
3-348-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-348-5	Residues	cttctggttc attctccaaa tcccc	25
3-349	Sequences		

3-349-1	Sequence Number [ID]	349	
3-349-2	Molecule Type	DNA	
3-349-3	Length	25	
3-349-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-349-5	Residues	cttcttctgg ttcattctcc aaatc	25
3-350	Sequences		
3-350-1	Sequence Number [ID]	350	
3-350-2	Molecule Type	DNA	
3-350-3	Length	25	
3-350-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-350-5	Residues	gcttcttctg gttcattctc caaat	25
3-351	Sequences		
3-351-1	Sequence Number [ID]	351	
3-351-2	Molecule Type	DNA	
3-351-3	Length	25	
3-351-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-351-5	Residues	tgcttcttct ggttcattct ccaaa	25
3-352	Sequences		
3-352-1	Sequence Number [ID]	352	
3-352-2	Molecule Type	DNA	
3-352-3	Length	25	
3-352-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-352-5	Residues	ctgcttcttc tggttcattc tccaa	25
3-353	Sequences		
3-353-1	Sequence Number [ID]	353	
3-353-2	Molecule Type	DNA	
3-353-3	Length	25	
3-353-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-353-5	Residues	cctgcttctt ctggttcatt ctcca	25
3-354	Sequences		

3-354-1	Sequence Number [ID]	354	
3-354-2	Molecule Type	DNA	
3-354-3	Length	25	
3-354-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-354-5	NonEnglishQualifier Value Residues	acctgcttct tctggttcac tctcc	25
3-355	Sequences		
3-355-1	Sequence Number [ID]	355	
3-355-2	Molecule Type	DNA	
3-355-3	Length	25	
3-355-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-355-5	NonEnglishQualifier Value Residues	cacctgcttc ttctggttca ttctc	25
3-356	Sequences		
3-356-1	Sequence Number [ID]	356	
3-356-2	Molecule Type	DNA	
3-356-3	Length	25	
3-356-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-356-5	NonEnglishQualifier Value Residues	cagctccgtc tattccttg gggag	25
3-357	Sequences		
3-357-1	Sequence Number [ID]	357	
3-357-2	Molecule Type	DNA	
3-357-3	Length	25	
3-357-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-357-5	NonEnglishQualifier Value Residues	actccagctc cgtctattcc tttag	25
3-358	Sequences		
3-358-1	Sequence Number [ID]	358	
3-358-2	Molecule Type	DNA	
3-358-3	Length	25	
3-358-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-358-5	NonEnglishQualifier Value Residues	aactccagct ccgtctattc ctttg	25
3-359	Sequences		

3-359-1	Sequence Number [ID]	359	
3-359-2	Molecule Type	DNA	
3-359-3	Length	25	
3-359-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-359-5	Residues	agatgctcaa ggagctcatc accag	25
3-360	Sequences		
3-360-1	Sequence Number [ID]	360	
3-360-2	Molecule Type	DNA	
3-360-3	Length	25	
3-360-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-360-5	Residues	aagatgctca aggagctcat cacca	25
3-361	Sequences		
3-361-1	Sequence Number [ID]	361	
3-361-2	Molecule Type	DNA	
3-361-3	Length	25	
3-361-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-361-5	Residues	gaagatgctc aaggagctca tcacc	25
3-362	Sequences		
3-362-1	Sequence Number [ID]	362	
3-362-2	Molecule Type	DNA	
3-362-3	Length	25	
3-362-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-362-5	Residues	agaagatgct caaggagctc atcac	25
3-363	Sequences		
3-363-1	Sequence Number [ID]	363	
3-363-2	Molecule Type	DNA	
3-363-3	Length	25	
3-363-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-363-5	Residues	cagaagatgc tcaaggagct catca	25
3-364	Sequences		

3-364-1	Sequence Number [ID]	364	
3-364-2	Molecule Type	DNA	
3-364-3	Length	25	
3-364-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-364-5	NonEnglishQualifier Value Residues	ccagaagatg ctcaaggagc tcatc	25
3-365	Sequences		
3-365-1	Sequence Number [ID]	365	
3-365-2	Molecule Type	DNA	
3-365-3	Length	25	
3-365-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-365-5	NonEnglishQualifier Value Residues	cccagaagat gctcaaggag ctcac	25
3-366	Sequences		
3-366-1	Sequence Number [ID]	366	
3-366-2	Molecule Type	DNA	
3-366-3	Length	25	
3-366-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-366-5	NonEnglishQualifier Value Residues	aagcccagaa gatgctcaag gagct	25
3-367	Sequences		
3-367-1	Sequence Number [ID]	367	
3-367-2	Molecule Type	DNA	
3-367-3	Length	25	
3-367-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-367-5	NonEnglishQualifier Value Residues	aaagcccaga agatgctcaa ggagc	25
3-368	Sequences		
3-368-1	Sequence Number [ID]	368	
3-368-2	Molecule Type	DNA	
3-368-3	Length	25	
3-368-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-368-5	NonEnglishQualifier Value Residues	gtcagccagg tgtactcagg cagtc	25
3-369	Sequences		

3-369-1	Sequence Number [ID]	369	
3-369-2	Molecule Type	DNA	
3-369-3	Length	25	
3-369-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-369-5	NonEnglishQualifier Value Residues	ggtcagccag gtgtactcag gcagt	25
3-370	Sequences		
3-370-1	Sequence Number [ID]	370	
3-370-2	Molecule Type	DNA	
3-370-3	Length	25	
3-370-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-370-5	NonEnglishQualifier Value Residues	actctggtat ttctagggt acaag	25
3-371	Sequences		
3-371-1	Sequence Number [ID]	371	
3-371-2	Molecule Type	DNA	
3-371-3	Length	25	
3-371-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-371-5	NonEnglishQualifier Value Residues	tactctggtat ttctagggt tacaa	25
3-372	Sequences		
3-372-1	Sequence Number [ID]	372	
3-372-2	Molecule Type	DNA	
3-372-3	Length	25	
3-372-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-372-5	NonEnglishQualifier Value Residues	ctactctggt atttctagg gtaca	25
3-373	Sequences		
3-373-1	Sequence Number [ID]	373	
3-373-2	Molecule Type	DNA	
3-373-3	Length	25	
3-373-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-373-5	NonEnglishQualifier Value Residues	gctactctgg tatttctag ggtac	25
3-374	Sequences		

3-374-1	Sequence Number [ID]	374	
3-374-2	Molecule Type	DNA	
3-374-3	Length	25	
3-374-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-374-5	NonEnglishQualifier Value Residues	tgctactctg gtatttccta gggtg	25
3-375	Sequences		
3-375-1	Sequence Number [ID]	375	
3-375-2	Molecule Type	DNA	
3-375-3	Length	25	
3-375-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-375-5	NonEnglishQualifier Value Residues	gtgctactct ggtatttcct aggggt	25
3-376	Sequences		
3-376-1	Sequence Number [ID]	376	
3-376-2	Molecule Type	DNA	
3-376-3	Length	25	
3-376-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-376-5	NonEnglishQualifier Value Residues	ggtgctactc tggattttcc taggg	25
3-377	Sequences		
3-377-1	Sequence Number [ID]	377	
3-377-2	Molecule Type	DNA	
3-377-3	Length	25	
3-377-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-377-5	NonEnglishQualifier Value Residues	gggtgctact ctggtatttc ctagg	25
3-378	Sequences		
3-378-1	Sequence Number [ID]	378	
3-378-2	Molecule Type	DNA	
3-378-3	Length	25	
3-378-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
3-378-5	NonEnglishQualifier Value Residues	ggactccaag agaaaagccc ggggc	25
3-379	Sequences		

3-379-1	Sequence Number [ID]	379	
3-379-2	Molecule Type	DNA	
3-379-3	Length	25	
3-379-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-379-5	Residues	aggactccaa gagaaaagcc cgggg	25
3-380	Sequences		
3-380-1	Sequence Number [ID]	380	
3-380-2	Molecule Type	DNA	
3-380-3	Length	25	
3-380-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-380-5	Residues	tgaggactcc aagagaaaag cccgg	25
3-381	Sequences		
3-381-1	Sequence Number [ID]	381	
3-381-2	Molecule Type	DNA	
3-381-3	Length	25	
3-381-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-381-5	Residues	gtgaggactc caagagaaaa gcccg	25
3-382	Sequences		
3-382-1	Sequence Number [ID]	382	
3-382-2	Molecule Type	DNA	
3-382-3	Length	25	
3-382-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-382-5	Residues	tgtgaggact ccaagagaaa agccc	25
3-383	Sequences		
3-383-1	Sequence Number [ID]	383	
3-383-2	Molecule Type	DNA	
3-383-3	Length	25	
3-383-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-383-5	Residues	ctgtgaggac tccaagagaa aagcc	25
3-384	Sequences		

3-384-1	Sequence Number [ID]	384	
3-384-2	Molecule Type	DNA	
3-384-3	Length	25	
3-384-4	Features Location/ Qualifiers	misc_feature 1..23 note=RNA misc_feature 24..25 note=DNA source 1..25 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-384-5	Residues	cctgtgagga ctccaagaga aaagc	25
3-385	Sequences		
3-385-1	Sequence Number [ID]	385	
3-385-2	Molecule Type	RNA	
3-385-3	Length	27	
3-385-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-385-5	Residues	agcaggcggc tcaccttgaa ggacacc	27
3-386	Sequences		
3-386-1	Sequence Number [ID]	386	
3-386-2	Molecule Type	RNA	
3-386-3	Length	27	
3-386-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-386-5	Residues	gcaggcggct caccttgaag gacacct	27
3-387	Sequences		
3-387-1	Sequence Number [ID]	387	
3-387-2	Molecule Type	RNA	
3-387-3	Length	27	
3-387-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-387-5	Residues	caggcggctc accttgaagg acacctc	27
3-388	Sequences		
3-388-1	Sequence Number [ID]	388	
3-388-2	Molecule Type	RNA	
3-388-3	Length	27	
3-388-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-388-5	Residues	aggcggctca ccttgaagga cacctct	27
3-389	Sequences		
3-389-1	Sequence Number [ID]	389	
3-389-2	Molecule Type	RNA	
3-389-3	Length	27	
3-389-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-389-5	Residues	ggcggctcac cttgaaggac acctctc	27
3-390	Sequences		
3-390-1	Sequence Number [ID]	390	
3-390-2	Molecule Type	RNA	
3-390-3	Length	27	
3-390-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-390-5	Residues	accgtggagg ccatgctgtc ctcttg	27
3-391	Sequences		
3-391-1	Sequence Number [ID]	391	
3-391-2	Molecule Type	RNA	
3-391-3	Length	27	
3-391-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-391-5	Residues	ccgtggaggc catgctgtcc tcttgga	27
3-392	Sequences		
3-392-1	Sequence Number [ID]	392	
3-392-2	Molecule Type	RNA	
3-392-3	Length	27	
3-392-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-392-5	Residues	cgtggaggcc atgctgtcct cctggaa	27
3-393	Sequences		
3-393-1	Sequence Number [ID]	393	
3-393-2	Molecule Type	RNA	
3-393-3	Length	27	
3-393-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-393-5	Residues	gtggaggcca tgctgtcctc ctggaag	27
3-394	Sequences		
3-394-1	Sequence Number [ID]	394	
3-394-2	Molecule Type	RNA	
3-394-3	Length	27	
3-394-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-394-5	Residues	tggaggccat gctgtcctcc tggaagc	27
3-395	Sequences		
3-395-1	Sequence Number [ID]	395	
3-395-2	Molecule Type	RNA	
3-395-3	Length	27	
3-395-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-395-5	Residues	ggaggccatg ctgtcctcct ggaagca	27
3-396	Sequences		
3-396-1	Sequence Number [ID]	396	
3-396-2	Molecule Type	RNA	
3-396-3	Length	27	
3-396-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-396-5	Residues	gaggccatgc tgcctcctg gaagcag	27
3-397	Sequences		
3-397-1	Sequence Number [ID]	397	
3-397-2	Molecule Type	RNA	
3-397-3	Length	27	
3-397-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-397-5	Residues	aggccatgct gtcctcctgg aagcagt	27

3-398	Sequences		
3-398-1	Sequence Number [ID]	398	
3-398-2	Molecule Type	RNA	
3-398-3	Length	27	
3-398-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-398-5	Residues	gttatcaccc agcggtcagc gatgagg	27
3-399	Sequences		
3-399-1	Sequence Number [ID]	399	
3-399-2	Molecule Type	RNA	
3-399-3	Length	27	
3-399-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-399-5	Residues	ttatcaccca gcggtcagcg atgaggg	27
3-400	Sequences		
3-400-1	Sequence Number [ID]	400	
3-400-2	Molecule Type	RNA	
3-400-3	Length	27	
3-400-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-400-5	Residues	aggggccctg gaggccacag tcacagt	27
3-401	Sequences		
3-401-1	Sequence Number [ID]	401	
3-401-2	Molecule Type	RNA	
3-401-3	Length	27	
3-401-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-401-5	Residues	gggccctgga ggccacagtc acagtgc	27
3-402	Sequences		
3-402-1	Sequence Number [ID]	402	
3-402-2	Molecule Type	RNA	
3-402-3	Length	27	
3-402-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-402-5	Residues	ggccctggag gccacagtca cagtgtc	27
3-403	Sequences		
3-403-1	Sequence Number [ID]	403	
3-403-2	Molecule Type	RNA	
3-403-3	Length	27	
3-403-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-403-5	Residues	ggcccgtga gggagatctg ggaggtg	27
3-404	Sequences		
3-404-1	Sequence Number [ID]	404	
3-404-2	Molecule Type	RNA	
3-404-3	Length	27	
3-404-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-404-5	Residues	ccggtgaggg agatctggga ggtgaag	27
3-405	Sequences		

3-405-1	Sequence Number [ID]	405	
3-405-2	Molecule Type	RNA	
3-405-3	Length	27	
3-405-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-405-5	Residues	cggtgaggga gatctgggag gtgaagt	27
3-406	Sequences		
3-406-1	Sequence Number [ID]	406	
3-406-2	Molecule Type	RNA	
3-406-3	Length	27	
3-406-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-406-5	Residues	tccgccttgt accctaggaa ataccag	27
3-407	Sequences		
3-407-1	Sequence Number [ID]	407	
3-407-2	Molecule Type	RNA	
3-407-3	Length	27	
3-407-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-407-5	Residues	ccgccttgta ccctaggaaa taccaga	27
3-408	Sequences		
3-408-1	Sequence Number [ID]	408	
3-408-2	Molecule Type	RNA	
3-408-3	Length	27	
3-408-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-408-5	Residues	gcatccttct tgccttgcg gtagccg	27
3-409	Sequences		
3-409-1	Sequence Number [ID]	409	
3-409-2	Molecule Type	RNA	
3-409-3	Length	27	
3-409-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-409-5	Residues	catccttctt gcccttgcg tagccg	27
3-410	Sequences		
3-410-1	Sequence Number [ID]	410	
3-410-2	Molecule Type	RNA	
3-410-3	Length	27	
3-410-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-410-5	Residues	cgaacctgga ggctggcctg ccatggc	27
3-411	Sequences		
3-411-1	Sequence Number [ID]	411	
3-411-2	Molecule Type	RNA	
3-411-3	Length	27	
3-411-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-411-5	Residues	ctggcctgcc atggccactc accctcg	27
3-412	Sequences		
3-412-1	Sequence Number [ID]	412	
3-412-2	Molecule Type	RNA	

3-412-3	Length	27	
3-412-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-412-5	Residues	ggcctgccat ggccactcac cctcgga	27
3-413	Sequences		
3-413-1	Sequence Number [ID]	413	
3-413-2	Molecule Type	RNA	
3-413-3	Length	27	
3-413-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-413-5	Residues	ccatggccac tcaccctcgg aggacac	27
3-414	Sequences		
3-414-1	Sequence Number [ID]	414	
3-414-2	Molecule Type	RNA	
3-414-3	Length	27	
3-414-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-414-5	Residues	catggccact caccctcggg ggacaca	27
3-415	Sequences		
3-415-1	Sequence Number [ID]	415	
3-415-2	Molecule Type	RNA	
3-415-3	Length	27	
3-415-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-415-5	Residues	atggccactc accctcggag gacacag	27
3-416	Sequences		
3-416-1	Sequence Number [ID]	416	
3-416-2	Molecule Type	RNA	
3-416-3	Length	27	
3-416-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-416-5	Residues	caaacgcagt ttctctcatc caggccg	27
3-417	Sequences		
3-417-1	Sequence Number [ID]	417	
3-417-2	Molecule Type	RNA	
3-417-3	Length	27	
3-417-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-417-5	Residues	aaacgcagtt tctctcatcc aggccgt	27
3-418	Sequences		
3-418-1	Sequence Number [ID]	418	
3-418-2	Molecule Type	RNA	
3-418-3	Length	27	
3-418-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-418-5	Residues	cagagggcca agccgtagtc cagagag	27
3-419	Sequences		
3-419-1	Sequence Number [ID]	419	
3-419-2	Molecule Type	RNA	
3-419-3	Length	27	

3-419-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-419-5	NonEnglishQualifier Value Residues	agagggccaa gccgtagtcc agagagg	27
3-420	Sequences		
3-420-1	Sequence Number [ID]	420	
3-420-2	Molecule Type	RNA	
3-420-3	Length	27	
3-420-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-420-5	Residues	agaatgaacc agaagaagca ggtgagg	27
3-421	Sequences		
3-421-1	Sequence Number [ID]	421	
3-421-2	Molecule Type	RNA	
3-421-3	Length	27	
3-421-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-421-5	Residues	gaatgaacca gaagaagcag gtgaggg	27
3-422	Sequences		
3-422-1	Sequence Number [ID]	422	
3-422-2	Molecule Type	RNA	
3-422-3	Length	27	
3-422-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-422-5	Residues	ctccttgagc atcttctggg ctttggc	27
3-423	Sequences		
3-423-1	Sequence Number [ID]	423	
3-423-2	Molecule Type	RNA	
3-423-3	Length	27	
3-423-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-423-5	Residues	tccttgagca tcttctgggc tttggcg	27
3-424	Sequences		
3-424-1	Sequence Number [ID]	424	
3-424-2	Molecule Type	RNA	
3-424-3	Length	27	
3-424-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-424-5	Residues	ccttgagcat cttctgggct ttggcgg	27
3-425	Sequences		
3-425-1	Sequence Number [ID]	425	
3-425-2	Molecule Type	RNA	
3-425-3	Length	27	
3-425-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-425-5	Residues	ttggatcagg cagctttatt ccaaagg	27
3-426	Sequences		
3-426-1	Sequence Number [ID]	426	
3-426-2	Molecule Type	RNA	
3-426-3	Length	27	
3-426-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA	

		organism=synthetic construct	
3-426-5	NonEnglishQualifier Value Residues	tggatcaggc agctttattc caaaggg	27
3-427	Sequences		
3-427-1	Sequence Number [ID]	427	
3-427-2	Molecule Type	RNA	
3-427-3	Length	27	
3-427-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-427-5	Residues	gatcaggcag ctttattcca aagggca	27
3-428	Sequences		
3-428-1	Sequence Number [ID]	428	
3-428-2	Molecule Type	RNA	
3-428-3	Length	27	
3-428-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-428-5	Residues	atcaggcagc tttattccaa agggcag	27
3-429	Sequences		
3-429-1	Sequence Number [ID]	429	
3-429-2	Molecule Type	RNA	
3-429-3	Length	27	
3-429-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-429-5	Residues	tcaggcagct ttattccaaa gggcagc	27
3-430	Sequences		
3-430-1	Sequence Number [ID]	430	
3-430-2	Molecule Type	RNA	
3-430-3	Length	27	
3-430-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-430-5	Residues	ggcagcttta ttccaaaggg cagctga	27
3-431	Sequences		
3-431-1	Sequence Number [ID]	431	
3-431-2	Molecule Type	RNA	
3-431-3	Length	27	
3-431-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-431-5	Residues	gcagctttat tccaaagggc agctgag	27
3-432	Sequences		
3-432-1	Sequence Number [ID]	432	
3-432-2	Molecule Type	RNA	
3-432-3	Length	27	
3-432-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-432-5	Residues	ttattccaaa gggcagctga gctcacc	27
3-433	Sequences		
3-433-1	Sequence Number [ID]	433	
3-433-2	Molecule Type	RNA	
3-433-3	Length	27	
3-433-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-433-5	Residues	tattccaaag ggcagctgag ctcacct	27
3-434	Sequences		
3-434-1	Sequence Number [ID]	434	
3-434-2	Molecule Type	RNA	
3-434-3	Length	27	
3-434-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-434-5	Residues	agttagacca ggggcttccg aagctgg	27
3-435	Sequences		
3-435-1	Sequence Number [ID]	435	
3-435-2	Molecule Type	RNA	
3-435-3	Length	27	
3-435-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-435-5	Residues	gtagaaccag cattcttgct gctgagc	27
3-436	Sequences		
3-436-1	Sequence Number [ID]	436	
3-436-2	Molecule Type	RNA	
3-436-3	Length	27	
3-436-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-436-5	Residues	tagaaccagc attcttgctg ctgagcc	27
3-437	Sequences		
3-437-1	Sequence Number [ID]	437	
3-437-2	Molecule Type	RNA	
3-437-3	Length	27	
3-437-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-437-5	Residues	agaaccagca ttcttgctgc tgagcca	27
3-438	Sequences		
3-438-1	Sequence Number [ID]	438	
3-438-2	Molecule Type	RNA	
3-438-3	Length	27	
3-438-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-438-5	Residues	aaccagcatt ctgctgctg agccact	27
3-439	Sequences		
3-439-1	Sequence Number [ID]	439	
3-439-2	Molecule Type	RNA	
3-439-3	Length	27	
3-439-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-439-5	Residues	accagcattc ttgctgctga gccactg	27
3-440	Sequences		
3-440-1	Sequence Number [ID]	440	
3-440-2	Molecule Type	RNA	
3-440-3	Length	27	
3-440-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-440-5	Residues	tcctgccatc actggagcag acatcag	27

3-441	Sequences		
3-441-1	Sequence Number [ID]	441	
3-441-2	Molecule Type	RNA	
3-441-3	Length	27	
3-441-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-441-5	Residues	cctgccatca ctggagcaga catcagg	27
3-442	Sequences		
3-442-1	Sequence Number [ID]	442	
3-442-2	Molecule Type	RNA	
3-442-3	Length	27	
3-442-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-442-5	Residues	ctgccatcac tggagcagac atcaggg	27
3-443	Sequences		
3-443-1	Sequence Number [ID]	443	
3-443-2	Molecule Type	RNA	
3-443-3	Length	27	
3-443-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-443-5	Residues	gccatcactg gagcagacat cagggac	27
3-444	Sequences		
3-444-1	Sequence Number [ID]	444	
3-444-2	Molecule Type	RNA	
3-444-3	Length	27	
3-444-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-444-5	Residues	ggggcagttc ctcaggtcac cacttgc	27
3-445	Sequences		
3-445-1	Sequence Number [ID]	445	
3-445-2	Molecule Type	RNA	
3-445-3	Length	27	
3-445-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-445-5	Residues	gggcagttcc tcaggtcacc acttgct	27
3-446	Sequences		
3-446-1	Sequence Number [ID]	446	
3-446-2	Molecule Type	RNA	
3-446-3	Length	27	
3-446-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-446-5	Residues	ggcagttcct caggtcacca ctgctg	27
3-447	Sequences		
3-447-1	Sequence Number [ID]	447	
3-447-2	Molecule Type	RNA	
3-447-3	Length	27	
3-447-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-447-5	Residues	gcagttcctc aggtcaccac ttgctgg	27
3-448	Sequences		

3-448-1	Sequence Number [ID]	448	
3-448-2	Molecule Type	RNA	
3-448-3	Length	27	
3-448-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-448-5	Residues	cagttcctca ggtcaccact tgctgga	27
3-449	Sequences		
3-449-1	Sequence Number [ID]	449	
3-449-2	Molecule Type	RNA	
3-449-3	Length	27	
3-449-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-449-5	Residues	agttcctcag gtcaccactt gctggat	27
3-450	Sequences		
3-450-1	Sequence Number [ID]	450	
3-450-2	Molecule Type	RNA	
3-450-3	Length	27	
3-450-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-450-5	Residues	ttcctcaggt caccacttgc tggatcc	27
3-451	Sequences		
3-451-1	Sequence Number [ID]	451	
3-451-2	Molecule Type	RNA	
3-451-3	Length	27	
3-451-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-451-5	Residues	ctcaggtcac cacttgctgg atccagc	27
3-452	Sequences		
3-452-1	Sequence Number [ID]	452	
3-452-2	Molecule Type	RNA	
3-452-3	Length	27	
3-452-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-452-5	Residues	tcaggtcacc acttgctgga tccagct	27
3-453	Sequences		
3-453-1	Sequence Number [ID]	453	
3-453-2	Molecule Type	RNA	
3-453-3	Length	27	
3-453-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-453-5	Residues	cagctgatca cacctgtgat gcgggtg	27
3-454	Sequences		
3-454-1	Sequence Number [ID]	454	
3-454-2	Molecule Type	RNA	
3-454-3	Length	27	
3-454-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-454-5	Residues	agctgatcac acctgtgatg cggggtg	27
3-455	Sequences		
3-455-1	Sequence Number [ID]	455	
3-455-2	Molecule Type	RNA	

3-455-3	Length	27	
3-455-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-455-5	NonEnglishQualifier Value Residues	tgcggggtgta gacgccgaag tagttag	27
3-456	Sequences		
3-456-1	Sequence Number [ID]	456	
3-456-2	Molecule Type	RNA	
3-456-3	Length	27	
3-456-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-456-5	Residues	cgctgcacag gtcctgtggg atcaact	27
3-457	Sequences		
3-457-1	Sequence Number [ID]	457	
3-457-2	Molecule Type	RNA	
3-457-3	Length	27	
3-457-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-457-5	Residues	cacaggtcct gtgggatcaa ctgcaca	27
3-458	Sequences		
3-458-1	Sequence Number [ID]	458	
3-458-2	Molecule Type	RNA	
3-458-3	Length	27	
3-458-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-458-5	Residues	gcggctcacc ttgaaggaca cctctcc	27
3-459	Sequences		
3-459-1	Sequence Number [ID]	459	
3-459-2	Molecule Type	RNA	
3-459-3	Length	27	
3-459-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-459-5	Residues	cggctcacct tgaaggacac ctctcca	27
3-460	Sequences		
3-460-1	Sequence Number [ID]	460	
3-460-2	Molecule Type	RNA	
3-460-3	Length	27	
3-460-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-460-5	Residues	ctcaccttga aggacacctc tccaggc	27
3-461	Sequences		
3-461-1	Sequence Number [ID]	461	
3-461-2	Molecule Type	RNA	
3-461-3	Length	27	
3-461-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-461-5	Residues	ccacagatgt gtcgaccccg aacctgg	27
3-462	Sequences		
3-462-1	Sequence Number [ID]	462	
3-462-2	Molecule Type	RNA	
3-462-3	Length	27	

3-462-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-462-5	NonEnglishQualifier Value Residues		ccggtcctca cactggaagg tgaatgt 27
3-463	Sequences		
3-463-1	Sequence Number [ID]	463	
3-463-2	Molecule Type	RNA	
3-463-3	Length	27	
3-463-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-463-5	Residues	cggtcctcac actggaaggt gaatgtc	27
3-464	Sequences		
3-464-1	Sequence Number [ID]	464	
3-464-2	Molecule Type	RNA	
3-464-3	Length	27	
3-464-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-464-5	Residues	ggtcctcaca ctggaaggtg aatgtcc	27
3-465	Sequences		
3-465-1	Sequence Number [ID]	465	
3-465-2	Molecule Type	RNA	
3-465-3	Length	27	
3-465-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-465-5	Residues	gtcctcacac tgggaaggtga atgtccc	27
3-466	Sequences		
3-466-1	Sequence Number [ID]	466	
3-466-2	Molecule Type	RNA	
3-466-3	Length	27	
3-466-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-466-5	Residues	tcctcacact ggaaggtgaa tgtccca	27
3-467	Sequences		
3-467-1	Sequence Number [ID]	467	
3-467-2	Molecule Type	RNA	
3-467-3	Length	27	
3-467-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-467-5	Residues	tctttgcact ggaatgtggc tctgcaa	27
3-468	Sequences		
3-468-1	Sequence Number [ID]	468	
3-468-2	Molecule Type	RNA	
3-468-3	Length	27	
3-468-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-468-5	Residues	ctttgcactg gaatgtggct ctgcaaa	27
3-469	Sequences		
3-469-1	Sequence Number [ID]	469	
3-469-2	Molecule Type	RNA	
3-469-3	Length	27	
3-469-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA	

		organism=synthetic construct	
3-469-5	NonEnglishQualifier Value Residues	tttgactgg aatgtggctc tgcaaac	27
3-470	Sequences		
3-470-1	Sequence Number [ID]	470	
3-470-2	Molecule Type	RNA	
3-470-3	Length	27	
3-470-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-470-5	Residues	ttgcactgga atgtggctct gcaaacg	27
3-471	Sequences		
3-471-1	Sequence Number [ID]	471	
3-471-2	Molecule Type	RNA	
3-471-3	Length	27	
3-471-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-471-5	Residues	gaatgtggct ctgcaaacgc agtttct	27
3-472	Sequences		
3-472-1	Sequence Number [ID]	472	
3-472-2	Molecule Type	RNA	
3-472-3	Length	27	
3-472-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-472-5	Residues	aatgtggctc tgcaaacgca gtttctc	27
3-473	Sequences		
3-473-1	Sequence Number [ID]	473	
3-473-2	Molecule Type	RNA	
3-473-3	Length	27	
3-473-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-473-5	Residues	atgtggctct gcaaacgcag tttctct	27
3-474	Sequences		
3-474-1	Sequence Number [ID]	474	
3-474-2	Molecule Type	RNA	
3-474-3	Length	27	
3-474-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-474-5	Residues	tgtggctctg caaacgcagt ttctctc	27
3-475	Sequences		
3-475-1	Sequence Number [ID]	475	
3-475-2	Molecule Type	RNA	
3-475-3	Length	27	
3-475-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-475-5	Residues	gtggctctgc aaacgcagtt tctctca	27
3-476	Sequences		
3-476-1	Sequence Number [ID]	476	
3-476-2	Molecule Type	RNA	
3-476-3	Length	27	
3-476-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-476-5	Residues	tggtctgtgca aacgcagttt ctctcat	27
3-477	Sequences		
3-477-1	Sequence Number [ID]	477	
3-477-2	Molecule Type	RNA	
3-477-3	Length	27	
3-477-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-477-5	Residues	ggctctgcaa acgcagtttc tctcatc	27
3-478	Sequences		
3-478-1	Sequence Number [ID]	478	
3-478-2	Molecule Type	RNA	
3-478-3	Length	27	
3-478-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-478-5	Residues	gctctgcaaa cgcagtttct ctcatcc	27
3-479	Sequences		
3-479-1	Sequence Number [ID]	479	
3-479-2	Molecule Type	RNA	
3-479-3	Length	27	
3-479-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-479-5	Residues	ctctgcaaac gcagtttctc tcattcca	27
3-480	Sequences		
3-480-1	Sequence Number [ID]	480	
3-480-2	Molecule Type	RNA	
3-480-3	Length	27	
3-480-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-480-5	Residues	tctgcaaacg cagtttctct catccag	27
3-481	Sequences		
3-481-1	Sequence Number [ID]	481	
3-481-2	Molecule Type	RNA	
3-481-3	Length	27	
3-481-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-481-5	Residues	ctgcaaacgc agtttctctc atccagg	27
3-482	Sequences		
3-482-1	Sequence Number [ID]	482	
3-482-2	Molecule Type	RNA	
3-482-3	Length	27	
3-482-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-482-5	Residues	tgcaaacgca gtttctctca tccaggc	27
3-483	Sequences		
3-483-1	Sequence Number [ID]	483	
3-483-2	Molecule Type	RNA	
3-483-3	Length	27	
3-483-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-483-5	Residues	gcaaacgcag tttctctcat ccaggcc	27

3-484	Sequences	
3-484-1	Sequence Number [ID]	484
3-484-2	Molecule Type	RNA
3-484-3	Length	27
3-484-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-484-5	Residues	gggcagtcct tgaccccatc acaggca 27
3-485	Sequences	
3-485-1	Sequence Number [ID]	485
3-485-2	Molecule Type	RNA
3-485-3	Length	27
3-485-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-485-5	Residues	ggcaggggtc cgactggttg tacaagc 27
3-486	Sequences	
3-486-1	Sequence Number [ID]	486
3-486-2	Molecule Type	RNA
3-486-3	Length	27
3-486-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-486-5	Residues	gcaggggtcc gactggttgt acaagcc 27
3-487	Sequences	
3-487-1	Sequence Number [ID]	487
3-487-2	Molecule Type	RNA
3-487-3	Length	27
3-487-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-487-5	Residues	caggggtccg actggttgta caagcca 27
3-488	Sequences	
3-488-1	Sequence Number [ID]	488
3-488-2	Molecule Type	RNA
3-488-3	Length	27
3-488-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-488-5	Residues	ggggtccgac tggtgtaca agccata 27
3-489	Sequences	
3-489-1	Sequence Number [ID]	489
3-489-2	Molecule Type	RNA
3-489-3	Length	27
3-489-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-489-5	Residues	gggtccgact ggtgtacaa gccatag 27
3-490	Sequences	
3-490-1	Sequence Number [ID]	490
3-490-2	Molecule Type	RNA
3-490-3	Length	27
3-490-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-490-5	Residues	ggtccgactg gttgtacaag ccatagt 27
3-491	Sequences	

3-491-1	Sequence Number [ID]	491	
3-491-2	Molecule Type	RNA	
3-491-3	Length	27	
3-491-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-491-5	Residues	gtccgactgg ttgtacaagc catagtg	27
3-492	Sequences		
3-492-1	Sequence Number [ID]	492	
3-492-2	Molecule Type	RNA	
3-492-3	Length	27	
3-492-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-492-5	Residues	tccgactggt tgtacaagcc atagtgc	27
3-493	Sequences		
3-493-1	Sequence Number [ID]	493	
3-493-2	Molecule Type	RNA	
3-493-3	Length	27	
3-493-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-493-5	Residues	ccgactgggt gtacaagcca tagtgca	27
3-494	Sequences		
3-494-1	Sequence Number [ID]	494	
3-494-2	Molecule Type	RNA	
3-494-3	Length	27	
3-494-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-494-5	Residues	cgactggttg tacaagccat agtgcac	27
3-495	Sequences		
3-495-1	Sequence Number [ID]	495	
3-495-2	Molecule Type	RNA	
3-495-3	Length	27	
3-495-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-495-5	Residues	gactggttgt acaagccata gtgcacc	27
3-496	Sequences		
3-496-1	Sequence Number [ID]	496	
3-496-2	Molecule Type	RNA	
3-496-3	Length	27	
3-496-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-496-5	Residues	actggttgta caagccatag tgcaccc	27
3-497	Sequences		
3-497-1	Sequence Number [ID]	497	
3-497-2	Molecule Type	RNA	
3-497-3	Length	27	
3-497-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-497-5	Residues	ctggttgtag aagccatagt gcacccg	27
3-498	Sequences		
3-498-1	Sequence Number [ID]	498	
3-498-2	Molecule Type	RNA	

3-498-3	Length	27	
3-498-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-498-5	NonEnglishQualifier Value Residues	tggtgtgaca agccatagtg caccgcg	27
3-499	Sequences		
3-499-1	Sequence Number [ID]	499	
3-499-2	Molecule Type	RNA	
3-499-3	Length	27	
3-499-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-499-5	Residues	ggttgtacaa gccatagtc acccgca	27
3-500	Sequences		
3-500-1	Sequence Number [ID]	500	
3-500-2	Molecule Type	RNA	
3-500-3	Length	27	
3-500-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-500-5	Residues	ttgtacaagc catagtgac ccgcaca	27
3-501	Sequences		
3-501-1	Sequence Number [ID]	501	
3-501-2	Molecule Type	RNA	
3-501-3	Length	27	
3-501-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-501-5	Residues	tacaagccat agtgcacccg cacaccg	27
3-502	Sequences		
3-502-1	Sequence Number [ID]	502	
3-502-2	Molecule Type	RNA	
3-502-3	Length	27	
3-502-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-502-5	Residues	acagcctcct gttctggatc gtccact	27
3-503	Sequences		
3-503-1	Sequence Number [ID]	503	
3-503-2	Molecule Type	RNA	
3-503-3	Length	27	
3-503-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-503-5	Residues	gcctcctgtt ctggatcgtc cactggc	27
3-504	Sequences		
3-504-1	Sequence Number [ID]	504	
3-504-2	Molecule Type	RNA	
3-504-3	Length	27	
3-504-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-504-5	Residues	cctgggtgca cggcaaata tacttct	27
3-505	Sequences		
3-505-1	Sequence Number [ID]	505	
3-505-2	Molecule Type	RNA	
3-505-3	Length	27	

3-505-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-505-5	NonEnglishQualifier Value Residues		ctgggtgcac ggcaaatcat acttctg 27
3-506	Sequences		
3-506-1	Sequence Number [ID]	506	
3-506-2	Molecule Type	RNA	
3-506-3	Length	27	
3-506-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-506-5	Residues	tgggtgcacg gcaaatcata cttctgc	27
3-507	Sequences		
3-507-1	Sequence Number [ID]	507	
3-507-2	Molecule Type	RNA	
3-507-3	Length	27	
3-507-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-507-5	Residues	gggtgcacgg caaatcatatc ttctgcc	27
3-508	Sequences		
3-508-1	Sequence Number [ID]	508	
3-508-2	Molecule Type	RNA	
3-508-3	Length	27	
3-508-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-508-5	Residues	gtgcacggca aatcatactt ctgcctc	27
3-509	Sequences		
3-509-1	Sequence Number [ID]	509	
3-509-2	Molecule Type	RNA	
3-509-3	Length	27	
3-509-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-509-5	Residues	tgcacggcaa atcatacttc tgcctcc	27
3-510	Sequences		
3-510-1	Sequence Number [ID]	510	
3-510-2	Molecule Type	RNA	
3-510-3	Length	27	
3-510-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-510-5	Residues	gcacggcaaa tcatacttct gcctcct	27
3-511	Sequences		
3-511-1	Sequence Number [ID]	511	
3-511-2	Molecule Type	RNA	
3-511-3	Length	27	
3-511-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-511-5	Residues	cacggcaaat catacttctg cctcctc	27
3-512	Sequences		
3-512-1	Sequence Number [ID]	512	
3-512-2	Molecule Type	RNA	
3-512-3	Length	27	
3-512-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA	

		organism=synthetic construct	
3-512-5	NonEnglishQualifier Value Residues	tggggcgagt agtagctggg gaagtac	27
3-513	Sequences		
3-513-1	Sequence Number [ID]	513	
3-513-2	Molecule Type	RNA	
3-513-3	Length	27	
3-513-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-513-5	Residues	ggcgagtagt agctggggaa gtacggg	27
3-514	Sequences		
3-514-1	Sequence Number [ID]	514	
3-514-2	Molecule Type	RNA	
3-514-3	Length	27	
3-514-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-514-5	Residues	acgaaggggt cgtagtagct gtgcagg	27
3-515	Sequences		
3-515-1	Sequence Number [ID]	515	
3-515-2	Molecule Type	RNA	
3-515-3	Length	27	
3-515-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-515-5	Residues	tcgtagtagc tgtgcaggcc cttcttc	27
3-516	Sequences		
3-516-1	Sequence Number [ID]	516	
3-516-2	Molecule Type	RNA	
3-516-3	Length	27	
3-516-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-516-5	Residues	gccacgtcat acatggccag tcggtcc	27
3-517	Sequences		
3-517-1	Sequence Number [ID]	517	
3-517-2	Molecule Type	RNA	
3-517-3	Length	27	
3-517-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-517-5	Residues	cccacgtagc tgtagcggta acaaccc	27
3-518	Sequences		
3-518-1	Sequence Number [ID]	518	
3-518-2	Molecule Type	RNA	
3-518-3	Length	27	
3-518-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-518-5	Residues	cacgtagctg tagcggtaac aacccag	27
3-519	Sequences		
3-519-1	Sequence Number [ID]	519	
3-519-2	Molecule Type	RNA	
3-519-3	Length	27	
3-519-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-519-5	Residues	acgtagctgt agcggtaaca acccagc	27
3-520	Sequences		
3-520-1	Sequence Number [ID]	520	
3-520-2	Molecule Type	RNA	
3-520-3	Length	27	
3-520-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-520-5	Residues	cgtagctgta gcggtaacaa cccagcg	27
3-521	Sequences		
3-521-1	Sequence Number [ID]	521	
3-521-2	Molecule Type	RNA	
3-521-3	Length	27	
3-521-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-521-5	Residues	tagcggtaac aaccagcgt ggaattc	27
3-522	Sequences		
3-522-1	Sequence Number [ID]	522	
3-522-2	Molecule Type	RNA	
3-522-3	Length	27	
3-522-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-522-5	Residues	agcggtaaca acccagcgtg gaattca	27
3-523	Sequences		
3-523-1	Sequence Number [ID]	523	
3-523-2	Molecule Type	RNA	
3-523-3	Length	27	
3-523-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-523-5	Residues	attcaatgca gctatgtctt tcacact	27
3-524	Sequences		
3-524-1	Sequence Number [ID]	524	
3-524-2	Molecule Type	RNA	
3-524-3	Length	27	
3-524-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-524-5	Residues	ttcaatgcag ctatgtcttt cacactg	27
3-525	Sequences		
3-525-1	Sequence Number [ID]	525	
3-525-2	Molecule Type	RNA	
3-525-3	Length	27	
3-525-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-525-5	Residues	tcaatgcagc tatgtctttc aactgg	27
3-526	Sequences		
3-526-1	Sequence Number [ID]	526	
3-526-2	Molecule Type	RNA	
3-526-3	Length	27	
3-526-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-526-5	Residues	caatgcagct atgtctttca cactggc	27

3-527	Sequences	
3-527-1	Sequence Number [ID]	527
3-527-2	Molecule Type	RNA
3-527-3	Length	27
3-527-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-527-5	Residues	aatgcagcta tgtctttcac actggct 27
3-528	Sequences	
3-528-1	Sequence Number [ID]	528
3-528-2	Molecule Type	RNA
3-528-3	Length	27
3-528-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-528-5	Residues	atgcagctat gtctttcaca ctggctt 27
3-529	Sequences	
3-529-1	Sequence Number [ID]	529
3-529-2	Molecule Type	RNA
3-529-3	Length	27
3-529-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-529-5	Residues	tgcagctatg tctttcacac tggcttc 27
3-530	Sequences	
3-530-1	Sequence Number [ID]	530
3-530-2	Molecule Type	RNA
3-530-3	Length	27
3-530-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-530-5	Residues	gcagctatgt ctttcacact ggcttcc 27
3-531	Sequences	
3-531-1	Sequence Number [ID]	531
3-531-2	Molecule Type	RNA
3-531-3	Length	27
3-531-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-531-5	Residues	cagctatgtc tttcacactg gcttcca 27
3-532	Sequences	
3-532-1	Sequence Number [ID]	532
3-532-2	Molecule Type	RNA
3-532-3	Length	27
3-532-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-532-5	Residues	ccgagctgtt gactgtggac agcagct 27
3-533	Sequences	
3-533-1	Sequence Number [ID]	533
3-533-2	Molecule Type	RNA
3-533-3	Length	27
3-533-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-533-5	Residues	gagctgttga ctgtggacag cagctcc 27
3-534	Sequences	

3-534-1	Sequence Number [ID]	534	
3-534-2	Molecule Type	RNA	
3-534-3	Length	27	
3-534-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-534-5	Residues	gtgctcgggg atttgagaa tgaacca	27
3-535	Sequences		
3-535-1	Sequence Number [ID]	535	
3-535-2	Molecule Type	RNA	
3-535-3	Length	27	
3-535-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-535-5	Residues	tgctcgggga tttggagaat gaaccag	27
3-536	Sequences		
3-536-1	Sequence Number [ID]	536	
3-536-2	Molecule Type	RNA	
3-536-3	Length	27	
3-536-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-536-5	Residues	gctcggggat ttggagaatg aaccaga	27
3-537	Sequences		
3-537-1	Sequence Number [ID]	537	
3-537-2	Molecule Type	RNA	
3-537-3	Length	27	
3-537-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-537-5	Residues	ctcggggatt tggagaatga accagaa	27
3-538	Sequences		
3-538-1	Sequence Number [ID]	538	
3-538-2	Molecule Type	RNA	
3-538-3	Length	27	
3-538-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-538-5	Residues	tcggggattt ggagaatgaa ccagaag	27
3-539	Sequences		
3-539-1	Sequence Number [ID]	539	
3-539-2	Molecule Type	RNA	
3-539-3	Length	27	
3-539-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-539-5	Residues	cggggatttg gagaatgaac cagaaga	27
3-540	Sequences		
3-540-1	Sequence Number [ID]	540	
3-540-2	Molecule Type	RNA	
3-540-3	Length	27	
3-540-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-540-5	Residues	ggggatttgg agaataaacc agaagaa	27
3-541	Sequences		
3-541-1	Sequence Number [ID]	541	
3-541-2	Molecule Type	RNA	

3-541-3	Length	27	
3-541-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-541-5	NonEnglishQualifier Value Residues	gatttgaga atgaaccaga agaagca	27
3-542	Sequences		
3-542-1	Sequence Number [ID]	542	
3-542-2	Molecule Type	RNA	
3-542-3	Length	27	
3-542-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-542-5	Residues	atttgagaa tgaaccagaa gaagcag	27
3-543	Sequences		
3-543-1	Sequence Number [ID]	543	
3-543-2	Molecule Type	RNA	
3-543-3	Length	27	
3-543-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-543-5	Residues	tttgagaat gaaccagaag aagcagg	27
3-544	Sequences		
3-544-1	Sequence Number [ID]	544	
3-544-2	Molecule Type	RNA	
3-544-3	Length	27	
3-544-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-544-5	Residues	ttggagaatg aaccagaaga agcaggt	27
3-545	Sequences		
3-545-1	Sequence Number [ID]	545	
3-545-2	Molecule Type	RNA	
3-545-3	Length	27	
3-545-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-545-5	Residues	tggagaatga accagaagaa gcaggtg	27
3-546	Sequences		
3-546-1	Sequence Number [ID]	546	
3-546-2	Molecule Type	RNA	
3-546-3	Length	27	
3-546-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-546-5	Residues	ggagaatgaa ccagaagaag caggtga	27
3-547	Sequences		
3-547-1	Sequence Number [ID]	547	
3-547-2	Molecule Type	RNA	
3-547-3	Length	27	
3-547-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-547-5	Residues	gagaatgaac cagaagaagc aggtgag	27
3-548	Sequences		
3-548-1	Sequence Number [ID]	548	
3-548-2	Molecule Type	RNA	
3-548-3	Length	27	

3-548-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
3-548-5	NonEnglishQualifier Value Residues		ctccccaag gaatagacgg agctgga 27
3-549	Sequences		
3-549-1	Sequence Number [ID]	549	
3-549-2	Molecule Type	RNA	
3-549-3	Length	27	
3-549-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-549-5	Residues	caaaggaat agacggagct ggagtgtg	27
3-550	Sequences		
3-550-1	Sequence Number [ID]	550	
3-550-2	Molecule Type	RNA	
3-550-3	Length	27	
3-550-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-550-5	Residues	caaaggaata gacggagctg gagttgt	27
3-551	Sequences		
3-551-1	Sequence Number [ID]	551	
3-551-2	Molecule Type	RNA	
3-551-3	Length	27	
3-551-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-551-5	Residues	ctggtgatga gctccttgag catcttc	27
3-552	Sequences		
3-552-1	Sequence Number [ID]	552	
3-552-2	Molecule Type	RNA	
3-552-3	Length	27	
3-552-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-552-5	Residues	tggatgatgag ctccttgagc atcttct	27
3-553	Sequences		
3-553-1	Sequence Number [ID]	553	
3-553-2	Molecule Type	RNA	
3-553-3	Length	27	
3-553-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-553-5	Residues	ggtgatgagc tccttgagca tcttctg	27
3-554	Sequences		
3-554-1	Sequence Number [ID]	554	
3-554-2	Molecule Type	RNA	
3-554-3	Length	27	
3-554-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-554-5	Residues	gtgatgagct ccttgagcat cttctgg	27
3-555	Sequences		
3-555-1	Sequence Number [ID]	555	
3-555-2	Molecule Type	RNA	
3-555-3	Length	27	
3-555-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA	

		organism=synthetic construct	
3-555-5	NonEnglishQualifier Value Residues	tgatgagctc cttgagcatc ttctggg	27
3-556	Sequences		
3-556-1	Sequence Number [ID]	556	
3-556-2	Molecule Type	RNA	
3-556-3	Length	27	
3-556-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-556-5	Residues	gatgagctcc ttgagcatct tctgggc	27
3-557	Sequences		
3-557-1	Sequence Number [ID]	557	
3-557-2	Molecule Type	RNA	
3-557-3	Length	27	
3-557-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-557-5	Residues	atgagctcct tgagcatctt ctgggct	27
3-558	Sequences		
3-558-1	Sequence Number [ID]	558	
3-558-2	Molecule Type	RNA	
3-558-3	Length	27	
3-558-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-558-5	Residues	agctccttga gcatcttctg ggctttg	27
3-559	Sequences		
3-559-1	Sequence Number [ID]	559	
3-559-2	Molecule Type	RNA	
3-559-3	Length	27	
3-559-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-559-5	Residues	gctccttgag catcttctgg gcttttg	27
3-560	Sequences		
3-560-1	Sequence Number [ID]	560	
3-560-2	Molecule Type	RNA	
3-560-3	Length	27	
3-560-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-560-5	Residues	gactgcctga gtacacctgg ctgacca	27
3-561	Sequences		
3-561-1	Sequence Number [ID]	561	
3-561-2	Molecule Type	RNA	
3-561-3	Length	27	
3-561-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-561-5	Residues	actgcctgag tacacctggc tgaccat	27
3-562	Sequences		
3-562-1	Sequence Number [ID]	562	
3-562-2	Molecule Type	RNA	
3-562-3	Length	27	
3-562-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-562-5	Residues	cttgtaccct aggaaatacc agagtag	27
3-563	Sequences		
3-563-1	Sequence Number [ID]	563	
3-563-2	Molecule Type	RNA	
3-563-3	Length	27	
3-563-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-563-5	Residues	ttgtacccta ggaaatacca gagtagc	27
3-564	Sequences		
3-564-1	Sequence Number [ID]	564	
3-564-2	Molecule Type	RNA	
3-564-3	Length	27	
3-564-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-564-5	Residues	tgtaccctag gaaataccag agtagca	27
3-565	Sequences		
3-565-1	Sequence Number [ID]	565	
3-565-2	Molecule Type	RNA	
3-565-3	Length	27	
3-565-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-565-5	Residues	gtaccctagg aaataccaga gtagcac	27
3-566	Sequences		
3-566-1	Sequence Number [ID]	566	
3-566-2	Molecule Type	RNA	
3-566-3	Length	27	
3-566-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-566-5	Residues	taccctagga aataccagag tagcacc	27
3-567	Sequences		
3-567-1	Sequence Number [ID]	567	
3-567-2	Molecule Type	RNA	
3-567-3	Length	27	
3-567-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-567-5	Residues	accctaggaa ataccagagt agcaccc	27
3-568	Sequences		
3-568-1	Sequence Number [ID]	568	
3-568-2	Molecule Type	RNA	
3-568-3	Length	27	
3-568-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-568-5	Residues	ccctaggaaa taccagagta gcacccc	27
3-569	Sequences		
3-569-1	Sequence Number [ID]	569	
3-569-2	Molecule Type	RNA	
3-569-3	Length	27	
3-569-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-569-5	Residues	cctaggaaat accagagtag caccccc	27

3-570	Sequences	
3-570-1	Sequence Number [ID]	570
3-570-2	Molecule Type	RNA
3-570-3	Length	27
3-570-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-570-5	Residues	gccccgggct tttctcttgg agtcctc 27
3-571	Sequences	
3-571-1	Sequence Number [ID]	571
3-571-2	Molecule Type	RNA
3-571-3	Length	27
3-571-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-571-5	Residues	ccccgggctt ttctcttggg gtccctca 27
3-572	Sequences	
3-572-1	Sequence Number [ID]	572
3-572-2	Molecule Type	RNA
3-572-3	Length	27
3-572-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-572-5	Residues	ccgggctttt ctcttgagtc cctcaca 27
3-573	Sequences	
3-573-1	Sequence Number [ID]	573
3-573-2	Molecule Type	RNA
3-573-3	Length	27
3-573-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-573-5	Residues	cgggcttttc tcttgagtc ctcacag 27
3-574	Sequences	
3-574-1	Sequence Number [ID]	574
3-574-2	Molecule Type	RNA
3-574-3	Length	27
3-574-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-574-5	Residues	gggcttttct cttggagtc tcacagg 27
3-575	Sequences	
3-575-1	Sequence Number [ID]	575
3-575-2	Molecule Type	RNA
3-575-3	Length	27
3-575-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-575-5	Residues	ggcttttctc ttggagtcct cacaggc 27
3-576	Sequences	
3-576-1	Sequence Number [ID]	576
3-576-2	Molecule Type	RNA
3-576-3	Length	27
3-576-4	Features Location/ Qualifiers	source 1..27 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-576-5	Residues	gcttttctct tggagtcctc acaggcc 27
3-577	Sequences	

3-577-1	Sequence Number [ID]	577	
3-577-2	Molecule Type	RNA	
3-577-3	Length	36	
3-577-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-577-5	Residues	gtgaggactc caagagaaaa gcagccgaaa ggctgc	36
3-578	Sequences		
3-578-1	Sequence Number [ID]	578	
3-578-2	Molecule Type	RNA	
3-578-3	Length	36	
3-578-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-578-5	Residues	gggtgctact ctggtattta gcagccgaaa ggctgc	36
3-579	Sequences		
3-579-1	Sequence Number [ID]	579	
3-579-2	Molecule Type	RNA	
3-579-3	Length	36	
3-579-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-579-5	Residues	ggtgctactc tgggtattca gcagccgaaa ggctgc	36
3-580	Sequences		
3-580-1	Sequence Number [ID]	580	
3-580-2	Molecule Type	RNA	
3-580-3	Length	36	
3-580-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-580-5	Residues	gctactctgg tatttcctaa gcagccgaaa ggctgc	36
3-581	Sequences		
3-581-1	Sequence Number [ID]	581	
3-581-2	Molecule Type	RNA	
3-581-3	Length	36	
3-581-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-581-5	Residues	ggtatttcct agggtacaaa gcagccgaaa ggctgc	36
3-582	Sequences		
3-582-1	Sequence Number [ID]	582	
3-582-2	Molecule Type	RNA	
3-582-3	Length	36	
3-582-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-582-5	Residues	cacctgcttc ttctggttca gcagccgaaa ggctgc	36
3-583	Sequences		
3-583-1	Sequence Number [ID]	583	
3-583-2	Molecule Type	RNA	
3-583-3	Length	36	
3-583-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-583-5	Residues	gaagccagtg tgaaagacaa gcagccgaaa ggctgc	36
3-584	Sequences		
3-584-1	Sequence Number [ID]	584	
3-584-2	Molecule Type	RNA	

3-584-3	Length	36	
3-584-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
3-584-5	NonEnglishQualifier Value Residues	cgtacttccc cagctactaa gcagccgaaa ggctgc	36
3-585	Sequences		
3-585-1	Sequence Number [ID]	585	
3-585-2	Molecule Type	RNA	
3-585-3	Length	36	
3-585-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-585-5	Residues	ggaggcagaa gtatgattta gcagccgaaa ggctgc	36
3-586	Sequences		
3-586-1	Sequence Number [ID]	586	
3-586-2	Molecule Type	RNA	
3-586-3	Length	36	
3-586-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-586-5	Residues	gggtgcacta tggcttgtaa gcagccgaaa ggctgc	36
3-587	Sequences		
3-587-1	Sequence Number [ID]	587	
3-587-2	Molecule Type	RNA	
3-587-3	Length	36	
3-587-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-587-5	Residues	gcactatggc ttgtacaaca gcagccgaaa ggctgc	36
3-588	Sequences		
3-588-1	Sequence Number [ID]	588	
3-588-2	Molecule Type	RNA	
3-588-3	Length	36	
3-588-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-588-5	Residues	gatgagagaa actgcgttta gcagccgaaa ggctgc	36
3-589	Sequences		
3-589-1	Sequence Number [ID]	589	
3-589-2	Molecule Type	RNA	
3-589-3	Length	36	
3-589-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-589-5	Residues	gaggtgtcct tcaaggtgaa gcagccgaaa ggctgc	36
3-590	Sequences		
3-590-1	Sequence Number [ID]	590	
3-590-2	Molecule Type	RNA	
3-590-3	Length	36	
3-590-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-590-5	Residues	ctcacctgct tcttctggta gcagccgaaa ggctgc	36
3-591	Sequences		
3-591-1	Sequence Number [ID]	591	
3-591-2	Molecule Type	RNA	
3-591-3	Length	36	

3-591-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
3-591-5	NonEnglishQualifier Value Residues	tcacctgctt cttctggtta gcagccgaaa ggctgc	36
3-592	Sequences		
3-592-1	Sequence Number [ID]	592	
3-592-2	Molecule Type	RNA	
3-592-3	Length	36	
3-592-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-592-5	Residues	tctggttcat tctccaaata gcagccgaaa ggctgc	36
3-593	Sequences		
3-593-1	Sequence Number [ID]	593	
3-593-2	Molecule Type	RNA	
3-593-3	Length	36	
3-593-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-593-5	Residues	gttcattctc caaatcccca gcagccgaaa ggctgc	36
3-594	Sequences		
3-594-1	Sequence Number [ID]	594	
3-594-2	Molecule Type	RNA	
3-594-3	Length	36	
3-594-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-594-5	Residues	aaagtggatg tgcagttgaa gcagccgaaa ggctgc	36
3-595	Sequences		
3-595-1	Sequence Number [ID]	595	
3-595-2	Molecule Type	RNA	
3-595-3	Length	36	
3-595-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-595-5	Residues	aactccagct ccgtctatta gcagccgaaa ggctgc	36
3-596	Sequences		
3-596-1	Sequence Number [ID]	596	
3-596-2	Molecule Type	RNA	
3-596-3	Length	36	
3-596-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-596-5	Residues	acctgcttct tctggttcaa gcagccgaaa ggctgc	36
3-597	Sequences		
3-597-1	Sequence Number [ID]	597	
3-597-2	Molecule Type	RNA	
3-597-3	Length	36	
3-597-4	Features Location/ Qualifiers	source 1..36 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-597-5	Residues	agtggtgaaag acatagctga gcagccgaaa ggctgc	36
3-598	Sequences		
3-598-1	Sequence Number [ID]	598	
3-598-2	Molecule Type	RNA	
3-598-3	Length	22	
3-598-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA	

		organism=synthetic construct	
3-598-5	NonEnglishQualifier Value Residues	ttttctcttg gagtcctcac gg	22
3-599	Sequences		
3-599-1	Sequence Number [ID]	599	
3-599-2	Molecule Type	RNA	
3-599-3	Length	22	
3-599-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-599-5	Residues	taaataccag agtagcacc gg	22
3-600	Sequences		
3-600-1	Sequence Number [ID]	600	
3-600-2	Molecule Type	RNA	
3-600-3	Length	22	
3-600-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-600-5	Residues	tgaaatacca gagtagcacc gg	22
3-601	Sequences		
3-601-1	Sequence Number [ID]	601	
3-601-2	Molecule Type	RNA	
3-601-3	Length	22	
3-601-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-601-5	Residues	ttaggaaata ccagagtagc gg	22
3-602	Sequences		
3-602-1	Sequence Number [ID]	602	
3-602-2	Molecule Type	RNA	
3-602-3	Length	22	
3-602-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-602-5	Residues	tttgtaccct aggaaatacc gg	22
3-603	Sequences		
3-603-1	Sequence Number [ID]	603	
3-603-2	Molecule Type	RNA	
3-603-3	Length	22	
3-603-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-603-5	Residues	tgaaccagaa gaagcaggtg gg	22
3-604	Sequences		
3-604-1	Sequence Number [ID]	604	
3-604-2	Molecule Type	RNA	
3-604-3	Length	22	
3-604-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-604-5	Residues	ttgtctttca cactggcttc gg	22
3-605	Sequences		
3-605-1	Sequence Number [ID]	605	
3-605-2	Molecule Type	RNA	
3-605-3	Length	22	
3-605-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-605-5	Residues	ttagtagctg gggaagtacg gg	22
3-606	Sequences		
3-606-1	Sequence Number [ID]	606	
3-606-2	Molecule Type	RNA	
3-606-3	Length	22	
3-606-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-606-5	Residues	taaatacatc ttctgcctcc gg	22
3-607	Sequences		
3-607-1	Sequence Number [ID]	607	
3-607-2	Molecule Type	RNA	
3-607-3	Length	22	
3-607-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-607-5	Residues	ttacaagcca tagtgcaccc gg	22
3-608	Sequences		
3-608-1	Sequence Number [ID]	608	
3-608-2	Molecule Type	RNA	
3-608-3	Length	22	
3-608-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-608-5	Residues	tgttgtacaa gccatagtgc gg	22
3-609	Sequences		
3-609-1	Sequence Number [ID]	609	
3-609-2	Molecule Type	RNA	
3-609-3	Length	22	
3-609-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-609-5	Residues	taaacgcagt ttctctcatc gg	22
3-610	Sequences		
3-610-1	Sequence Number [ID]	610	
3-610-2	Molecule Type	RNA	
3-610-3	Length	22	
3-610-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-610-5	Residues	ttcaccttga aggacacctc gg	22
3-611	Sequences		
3-611-1	Sequence Number [ID]	611	
3-611-2	Molecule Type	RNA	
3-611-3	Length	22	
3-611-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-611-5	Residues	taccagaaga agcaggtgag gg	22
3-612	Sequences		
3-612-1	Sequence Number [ID]	612	
3-612-2	Molecule Type	RNA	
3-612-3	Length	22	
3-612-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-612-5	Residues	taaccagaag aagcaggtga gg	22

3-613	Sequences	
3-613-1	Sequence Number [ID]	613
3-613-2	Molecule Type	RNA
3-613-3	Length	22
3-613-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-613-5	Residues	tatttgaga atgaaccaga gg 22
3-614	Sequences	
3-614-1	Sequence Number [ID]	614
3-614-2	Molecule Type	RNA
3-614-3	Length	22
3-614-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-614-5	Residues	tggggatttg gagaatgaac gg 22
3-615	Sequences	
3-615-1	Sequence Number [ID]	615
3-615-2	Molecule Type	RNA
3-615-3	Length	22
3-615-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-615-5	Residues	ttcaactgca catccacttt gg 22
3-616	Sequences	
3-616-1	Sequence Number [ID]	616
3-616-2	Molecule Type	RNA
3-616-3	Length	22
3-616-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-616-5	Residues	taatagacgg agctggagtt gg 22
3-617	Sequences	
3-617-1	Sequence Number [ID]	617
3-617-2	Molecule Type	RNA
3-617-3	Length	22
3-617-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-617-5	Residues	ttgaaccaga agaagcaggt gg 22
3-618	Sequences	
3-618-1	Sequence Number [ID]	618
3-618-2	Molecule Type	RNA
3-618-3	Length	22
3-618-4	Features Location/ Qualifiers	source 1..22 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-618-5	Residues	tcagctatgt ctttcacact gg 22
3-619	Sequences	
3-619-1	Sequence Number [ID]	619
3-619-2	Molecule Type	RNA
3-619-3	Length	36
3-619-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine

	modified_base 2 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 3 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 4 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 5 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 8 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 9 mod_base=OTHER note=2'-fluoro uridine
	modified_base 10 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 11 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 14 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 23 mod_base=OTHER

		note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl mcytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-619-5	NonEnglishQualifier Value Residues	gtgaggactc caagagaaaa gcagccgaaa ggctgc	36
3-620	Sequences		
3-620-1	Sequence Number [ID]	620	
3-620-2	Molecule Type	RNA	
3-620-3	Length	36	
3-620-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl guanosine modified_base 4 mod_base=OTHER note=2'-O-methyl uridine	

	modified_base 5 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 7 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 8 mod_base=OTHER note=2'-fluoro adenosine
	modified_base 9 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 10 mod_base=OTHER note=2'-fluoro uridine
	modified_base 11 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 12 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 14 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 15 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 17 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 18 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 19 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 26 mod_base=OTHER

		note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-620-5	NonEnglishQualifier Value Residues	gggtgctact ctggtattta gcagccgaaa ggctgc	36
3-621	Sequences		
3-621-1	Sequence Number [ID]	621	
3-621-2	Molecule Type	RNA	
3-621-3	Length	36	
3-621-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine	

	modified_base 8 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 9 mod_base=OTHER note=2'-fluoro uridine
	modified_base 10 mod_base=OTHER note=2'-fluoro cytidine
	modified_base 11 mod_base=OTHER note=2'-fluoro uridine
	modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 14 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 16 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 17 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 18 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 29 mod_base=OTHER

		note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-621-5	NonEnglishQualifier Value Residues	ggtgctactc tggtatttca gcagccgaaa ggctgc	36
3-622	Sequences		
3-622-1	Sequence Number [ID]	622	
3-622-2	Molecule Type	RNA	
3-622-3	Length	36	
3-622-4	Features Location/Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl cytidine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl adenosine modified_base 5 mod_base=OTHER note=2'-O-methyl cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-O-methyl cytidine modified_base 8 mod_base=OTHER note=2'-fluoro uridine modified_base 9 mod_base=OTHER note=2'-fluoro guanosine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine	

	modified_base 11 mod_base=OTHER note=2'-fluoro uridine
	modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 13 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 14 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 15 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 18 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 32 mod_base=OTHER

		note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-622-5	NonEnglishQualifier Value Residues	gctactctgg tatttcctaa gcagccgaaa ggctgc	36
3-623	Sequences		
3-623-1	Sequence Number [ID]	623	
3-623-2	Molecule Type	RNA	
3-623-3	Length	36	
3-623-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl adenosine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-O-methyl uridine modified_base 8 mod_base=OTHER note=2'-fluoro cytidine modified_base 9 mod_base=OTHER note=2'-fluoro cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-fluoro adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine	

	modified_base 14 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 15 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine
	modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc
	modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine
	modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine
	modified_base 34 mod_base=OTHER note=2'-O-methyl uridine
	modified_base 35 mod_base=OTHER

		note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-623-5	NonEnglishQualifier Value Residues	ggattttcct aggtacaaa gcagccgaaa ggctgc	36
3-624	Sequences		
3-624-1	Sequence Number [ID]	624	
3-624-2	Molecule Type	RNA	
3-624-3	Length	36	
3-624-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl cytidine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl cytidine modified_base 4 mod_base=OTHER note=2'-O-methyl cytidine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-O-methyl cytidine modified_base 8 mod_base=OTHER note=2'-fluoro uridine modified_base 9 mod_base=OTHER note=2'-fluoro uridine modified_base 10 mod_base=OTHER note=2'-fluoro cytidine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-O-methyl uridine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine	

3-624-5	NonEnglishQualifier Value Residues	modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct cacctgcttc ttctggttca gcagccgaaa ggctgc
		36

3-625	Sequences	
3-625-1	Sequence Number [ID]	625
3-625-2	Molecule Type	RNA
3-625-3	Length	36
3-625-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl adenosine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro uridine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-O-methyl adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine modified_base 18 mod_base=OTHER note=2'-O-methyl cytidine modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine

		modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-625-5	NonEnglishQualifier Value Residues	gaagccagtg tgaagacaa gcagccgaaa ggctgc	36
3-626	Sequences		
3-626-1	Sequence Number [ID]	626	
3-626-2	Molecule Type	RNA	
3-626-3	Length	36	
3-626-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1	

mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 2
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 3
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 4
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 5
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 6
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 7
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 8
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 9
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 10
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 11
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 12
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 13
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 14
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 15
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 16
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 17
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 18
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 19
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine

		modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-626-5	NonEnglishQualifier Value Residues	cgtacttccc cagctactaa gcagccgaaa ggctgc	36
3-627	Sequences		
3-627-1	Sequence Number [ID]	627	
3-627-2	Molecule Type	RNA	
3-627-3	Length	36	
3-627-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl adenosine modified_base 4	

	mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro adenosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-fluoro guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-O-methyl uridine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine

		modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-627-5	NonEnglishQualifier Value Residues	ggaggcgagaa gtatgattta gcagccgaaa ggctgc	36
3-628	Sequences		
3-628-1	Sequence Number [ID]	628	
3-628-2	Molecule Type	RNA	
3-628-3	Length	36	
3-628-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl guanosine modified_base 4 mod_base=OTHER note=2'-O-methyl uridine modified_base 5 mod_base=OTHER note=2'-O-methyl guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7	

	mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro cytidine modified_base 9 mod_base=OTHER note=2'-fluoro uridine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-O-methyl cytidine modified_base 15 mod_base=OTHER note=2'-O-methyl uridine modified_base 16 mod_base=OTHER note=2'-O-methyl uridine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc

		modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-628-5	NonEnglishQualifier Value Residues	gggtgcacta tggcttgtaa gcagccgaaa ggctgc	36
3-629	Sequences		
3-629-1	Sequence Number [ID]	629	
3-629-2	Molecule Type	RNA	
3-629-3	Length	36	
3-629-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl cytidine modified_base 3 mod_base=OTHER note=2'-O-methyl adenosine modified_base 4 mod_base=OTHER note=2'-O-methyl cytidine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-O-methyl uridine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro guanosine modified_base 10	

mod_base=OTHER
note=2'-fluoro cytidine
modified_base 11
mod_base=OTHER
note=2'-fluoro uridine
modified_base 12
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 13
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 14
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 15
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 16
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 17
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 18
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 19
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31
mod_base=OTHER
note=2'-O-methyl guanosine

		modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-629-5	NonEnglishQualifier Value Residues	gcactatggc ttgtacaaca gcagccgaaa ggctgc	36
3-630	Sequences		
3-630-1	Sequence Number [ID]	630	
3-630-2	Molecule Type	RNA	
3-630-3	Length	36	
3-630-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro adenosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-fluoro adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13	

mod_base=OTHER
note=2'-O-methyl uridine
modified_base 14
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 15
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 16
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 17
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 18
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 19
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 32
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 33
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 34
mod_base=OTHER
note=2'-O-methyl uridine

		modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-630-5	NonEnglishQualifier Value Residues	gatgagagaa actgcgttta gcagccgaaa ggctgc	36
3-631	Sequences		
3-631-1	Sequence Number [ID]	631	
3-631-2	Molecule Type	RNA	
3-631-3	Length	36	
3-631-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl guanosine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-O-methyl uridine modified_base 8 mod_base=OTHER note=2'-fluoro cytidine modified_base 9 mod_base=OTHER note=2'-fluoro cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-O-methyl adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16	

mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 17
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 18
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 19
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 32
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 33
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 34
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 35
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 36
mod_base=OTHER
note=2'-O-methyl cytidine
source 1..36
mol_type=other RNA
organism=synthetic construct

	NonEnglishQualifier Value		
3-631-5	Residues	gaggtgtcct tcaaggtgaa gcagccgaaa ggctgc	36
3-632	Sequences		
3-632-1	Sequence Number [ID]	632	
3-632-2	Molecule Type	RNA	
3-632-3	Length	36	
3-632-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl cytidine modified_base 2 mod_base=OTHER note=2'-O-methyl uridine modified_base 3 mod_base=OTHER note=2'-O-methyl cytidine modified_base 4 mod_base=OTHER note=2'-O-methyl adenosine modified_base 5 mod_base=OTHER note=2'-O-methyl cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-O-methyl uridine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl uridine modified_base 14 mod_base=OTHER note=2'-O-methyl uridine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl uridine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl guanosine modified_base 19	

		mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-632-5	NonEnglishQualifier Value Residues	ctcacctgct tcttctggta gcagccgaaa ggctgc	36
3-633	Sequences		
3-633-1	Sequence Number [ID]	633	
3-633-2	Molecule Type	RNA	
3-633-3	Length	36	
3-633-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2	

note=linked via phosphorothioate

modified_base 1

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 2

mod_base=OTHER

note=2'-O-methyl cytidine

modified_base 3

mod_base=OTHER

note=2'-O-methyl adenosine

modified_base 4

mod_base=OTHER

note=2'-O-methyl cytidine

modified_base 5

mod_base=OTHER

note=2'-O-methyl cytidine

modified_base 6

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 7

mod_base=OTHER

note=2'-O-methyl guanosine

modified_base 8

mod_base=OTHER

note=2'-fluoro cytidine

modified_base 9

mod_base=OTHER

note=2'-fluoro uridine

modified_base 10

mod_base=OTHER

note=2'-fluoro uridine

modified_base 11

mod_base=OTHER

note=2'-fluoro cytidine

modified_base 12

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 13

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 14

mod_base=OTHER

note=2'-O-methyl cytidine

modified_base 15

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 16

mod_base=OTHER

note=2'-O-methyl guanosine

modified_base 17

mod_base=OTHER

note=2'-O-methyl guanosine

modified_base 18

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 19

mod_base=OTHER

note=2'-O-methyl uridine

modified_base 20

mod_base=OTHER

note=2'-O-methyl adenosine

modified_base 21

mod_base=OTHER

note=2'-O-methyl guanosine

modified_base 22

		mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-633-5	NonEnglishQualifier Value Residues	tcacctgctt cttctggtta gcagccgaaa ggctgc	36
3-634	Sequences		
3-634-1	Sequence Number [ID]	634	
3-634-2	Molecule Type	RNA	
3-634-3	Length	36	
3-634-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl uridine modified_base 2 mod_base=OTHER note=2'-O-methyl cytidine modified_base 3 mod_base=OTHER	

note=2'-O-methyl uridine
modified_base 4
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 5
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 6
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 7
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 8
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 9
mod_base=OTHER
note=2'-fluoro adenosine
modified_base 10
mod_base=OTHER
note=2'-fluoro uridine
modified_base 11
mod_base=OTHER
note=2'-fluoro uridine
modified_base 12
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 13
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 14
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 15
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 16
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 17
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 18
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 19
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25

		mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-634-5	NonEnglishQualifier Value Residues	tctggttcat tctccaaata gcagccgaaa ggctgc	36
3-635	Sequences		
3-635-1	Sequence Number [ID]	635	
3-635-2	Molecule Type	RNA	
3-635-3	Length	36	
3-635-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl guanosine modified_base 2 mod_base=OTHER note=2'-O-methyl uridine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl cytidine modified_base 5 mod_base=OTHER note=2'-O-methyl adenosine modified_base 6 mod_base=OTHER	

note=2'-O-methyl uridine
modified_base 7
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 8
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 9
mod_base=OTHER
note=2'-fluoro uridine
modified_base 10
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 11
mod_base=OTHER
note=2'-fluoro cytidine
modified_base 12
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 13
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 14
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 15
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 16
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 17
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 18
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 19
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28

		mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-635-5	NonEnglishQualifier Value Residues	gttcattctc caaatcccca gcagccgaaa ggctgc	36
3-636	Sequences		
3-636-1	Sequence Number [ID]	636	
3-636-2	Molecule Type	RNA	
3-636-3	Length	36	
3-636-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl adenosine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl adenosine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-O-methyl guanosine modified_base 8 mod_base=OTHER note=2'-fluoro adenosine modified_base 9 mod_base=OTHER	

note=2'-fluoro uridine
modified_base 10
mod_base=OTHER
note=2'-fluoro guanosine
modified_base 11
mod_base=OTHER
note=2'-fluoro uridine
modified_base 12
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 13
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 14
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 15
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 16
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 17
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 18
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 19
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31

		mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-636-5	NonEnglishQualifier Value Residues	aaagtggatg tgcagttgaa gcagccgaaa ggctgc	36
3-637	Sequences		
3-637-1	Sequence Number [ID]	637	
3-637-2	Molecule Type	RNA	
3-637-3	Length	36	
3-637-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl adenosine modified_base 2 mod_base=OTHER note=2'-O-methyl adenosine modified_base 3 mod_base=OTHER note=2'-O-methyl cytidine modified_base 4 mod_base=OTHER note=2'-O-methyl uridine modified_base 5 mod_base=OTHER note=2'-O-methyl cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro guanosine modified_base 9 mod_base=OTHER note=2'-fluoro cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-fluoro cytidine modified_base 12 mod_base=OTHER	

note=2'-O-methyl cytidine
modified_base 13
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 14
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 15
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 16
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 17
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 18
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 19
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 32
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 33
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 34

		mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-637-5	NonEnglishQualifier Value Residues	aactccagct ccgtctatta gcagccgaaa ggctgc	36
3-638	Sequences		
3-638-1	Sequence Number [ID]	638	
3-638-2	Molecule Type	RNA	
3-638-3	Length	36	
3-638-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl adenosine modified_base 2 mod_base=OTHER note=2'-O-methyl cytidine modified_base 3 mod_base=OTHER note=2'-O-methyl cytidine modified_base 4 mod_base=OTHER note=2'-O-methyl uridine modified_base 5 mod_base=OTHER note=2'-O-methyl guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-O-methyl uridine modified_base 8 mod_base=OTHER note=2'-fluoro uridine modified_base 9 mod_base=OTHER note=2'-fluoro cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-fluoro uridine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl uridine modified_base 14 mod_base=OTHER note=2'-O-methyl guanosine modified_base 15 mod_base=OTHER	

note=2'-O-methyl guanosine
modified_base 16
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 17
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 18
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 19
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 20
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 21
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 22
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 23
mod_base=OTHER
note=2'-O-methyl adenosine
modified_base 24
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 25
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 26
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 27
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 28
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 29
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 30
mod_base=OTHER
note=2'-aminodiethoxymethanol-Adenine-GalNAc
modified_base 31
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 32
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 33
mod_base=OTHER
note=2'-O-methyl cytidine
modified_base 34
mod_base=OTHER
note=2'-O-methyl uridine
modified_base 35
mod_base=OTHER
note=2'-O-methyl guanosine
modified_base 36
mod_base=OTHER
note=2'-O-methyl cytidine
source 1..36

		mol_type=other RNA organism=synthetic construct	
3-638-5	NonEnglishQualifier Value Residues	acctgcttct tctggttcaa gcagccgaaa ggctgc	36
3-639	Sequences		
3-639-1	Sequence Number [ID]	639	
3-639-2	Molecule Type	RNA	
3-639-3	Length	36	
3-639-4	Features Location/ Qualifiers	misc_feature 1..36 note=synthetic construct misc_feature 1..2 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=2'-O-methyl adenosine modified_base 2 mod_base=OTHER note=2'-O-methyl guanosine modified_base 3 mod_base=OTHER note=2'-O-methyl uridine modified_base 4 mod_base=OTHER note=2'-O-methyl guanosine modified_base 5 mod_base=OTHER note=2'-O-methyl uridine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-O-methyl adenosine modified_base 8 mod_base=OTHER note=2'-fluoro adenosine modified_base 9 mod_base=OTHER note=2'-fluoro adenosine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-fluoro adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-O-methyl uridine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER	

		note=2'-O-methyl uridine modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl cytidine modified_base 23 mod_base=OTHER note=2'-O-methyl adenosine modified_base 24 mod_base=OTHER note=2'-O-methyl guanosine modified_base 25 mod_base=OTHER note=2'-O-methyl cytidine modified_base 26 mod_base=OTHER note=2'-O-methyl cytidine modified_base 27 mod_base=OTHER note=2'-O-methyl guanosine modified_base 28 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 29 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 30 mod_base=OTHER note=2'-aminodiethoxymethanol-Adenine-GalNAc modified_base 31 mod_base=OTHER note=2'-O-methyl guanosine modified_base 32 mod_base=OTHER note=2'-O-methyl guanosine modified_base 33 mod_base=OTHER note=2'-O-methyl cytidine modified_base 34 mod_base=OTHER note=2'-O-methyl uridine modified_base 35 mod_base=OTHER note=2'-O-methyl guanosine modified_base 36 mod_base=OTHER note=2'-O-methyl cytidine source 1..36 mol_type=other RNA organism=synthetic construct	
3-639-5	NonEnglishQualifier Value Residues	agtggtgaaag acatagctga gcagccgaaa ggctgc	36
3-640	Sequences		
3-640-1	Sequence Number [ID]	640	
3-640-2	Molecule Type	RNA	
3-640-3	Length	22	

3-640-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro uridine modified_base 4 mod_base=OTHER note=2'-fluoro uridine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-fluoro cytidine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl uridine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl modified modified_base 18 mod_base=OTHER note=2'-O-methyl cytidine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER

		note=2'-O-methyl adenosine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-640-5	NonEnglishQualifier Value Residues	ttttctcttg gagtcctcac gg	22
3-641	Sequences		
3-641-1	Sequence Number [ID]	641	
3-641-2	Molecule Type	RNA	
3-641-3	Length	22	
3-641-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro uridine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro cytidine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl adenosine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl uridine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine	

		modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine modified_base 18 mod_base=OTHER note=2'-O-methyl cytidine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-641-5	NonEnglishQualifier Value Residues	taaataccag agtagcaccc gg	22
3-642	Sequences		
3-642-1	Sequence Number [ID]	642	
3-642-2	Molecule Type	RNA	
3-642-3	Length	22	
3-642-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro guanosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER	

		note=2'-O-methyl cytidine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-642-5	NonEnglishQualifier Value Residues	tgaaatacca gagtagcacc gg	22
3-643	Sequences		
3-643-1	Sequence Number [ID]	643	
3-643-2	Molecule Type	RNA	
3-643-3	Length	22	
3-643-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4	

		mod_base=OTHER note=2'-fluoro guanosine modified_base 5 mod_base=OTHER note=2'-fluoro guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl uridine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl cytidine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-fluoro guanosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-643-5	NonEnglishQualifier Value Residues	ttaggaaata ccagagtagc gg	22
3-644	Sequences		
3-644-1	Sequence Number [ID]	644	

3-644-2	Molecule Type	RNA
3-644-3	Length	22
3-644-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro uridine modified_base 4 mod_base=OTHER note=2'-fluoro guanosine modified_base 5 mod_base=OTHER note=2'-fluoro uridine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro cytidine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl cytidine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine

		modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-644-5	NonEnglishQualifier Value Residues	tttgtaccct aggaaatacc gg	22
3-645	Sequences		
3-645-1	Sequence Number [ID]	645	
3-645-2	Molecule Type	RNA	
3-645-3	Length	22	
3-645-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro guanosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl guanosine modified_base 9 mod_base=OTHER note=2'-O-methyl adenosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-fluoro guanosine modified_base 15	

		mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl guanosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl guanosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-645-5	NonEnglishQualifier Value Residues	tgaaccagaa gaagcaggtg gg	22
3-646	Sequences		
3-646-1	Sequence Number [ID]	646	
3-646-2	Molecule Type	RNA	
3-646-3	Length	22	
3-646-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro guanosine modified_base 4 mod_base=OTHER note=2'-fluoro uridine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-fluoro uridine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl cytidine	

		modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl cytidine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-646-5	NonEnglishQualifier Value Residues	ttgtctttca cactggcttc gg	22
3-647	Sequences		
3-647-1	Sequence Number [ID]	647	
3-647-2	Molecule Type	RNA	
3-647-3	Length	22	
3-647-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER	

		note=2'-fluoro guanosine modified_base 5 mod_base=OTHER note=2'-fluoro uridine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro guanosine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl uridine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER note=2'-O-methyl guanosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-647-5	NonEnglishQualifier Value Residues	ttagtagctg gggaagtacg gg	22
3-648	Sequences		
3-648-1	Sequence Number [ID]	648	
3-648-2	Molecule Type	RNA	

3-648-3	Length	22
3-648-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro uridine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl adenosine modified_base 10 mod_base=OTHER note=2'-fluoro cytidine modified_base 11 mod_base=OTHER note=2'-O-methyl uridine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20

		mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-648-5	NonEnglishQualifier Value Residues	taaatacatc ttctgcctcc gg	22
3-649	Sequences		
3-649-1	Sequence Number [ID]	649	
3-649-2	Molecule Type	RNA	
3-649-3	Length	22	
3-649-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro cytidine modified_base 5 mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro guanosine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl cytidine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl uridine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER	

		note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine modified_base 18 mod_base=OTHER note=2'-O-methyl cytidine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-649-5	NonEnglishQualifier Value Residues	ttacaagcca tagtgcaccc gg	22
3-650	Sequences		
3-650-1	Sequence Number [ID]	650	
3-650-2	Molecule Type	RNA	
3-650-3	Length	22	
3-650-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro guanosine modified_base 3 mod_base=OTHER note=2'-fluoro uridine modified_base 4 mod_base=OTHER note=2'-fluoro uridine modified_base 5 mod_base=OTHER note=2'-fluoro guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl adenosine modified_base 10	

		mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl cytidine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl uridine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-650-5	NonEnglishQualifier Value Residues	tgtgtgacaa gccatagtc gg	22
3-651	Sequences		
3-651-1	Sequence Number [ID]	651	
3-651-2	Molecule Type	RNA	
3-651-3	Length	22	
3-651-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine	

		modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-fluoro cytidine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-O-methyl uridine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl uridine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-651-5	NonEnglishQualifier Value Residues	taaacgcagt ttctctcatc gg	22
3-652	Sequences		
3-652-1	Sequence Number [ID]	652	
3-652-2	Molecule Type	RNA	
3-652-3	Length	22	

3-652-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro cytidine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-fluoro uridine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl cytidine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER

		note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-652-5	NonEnglishQualifier Value Residues	ttcaccttga aggacacctc gg	22
3-653	Sequences		
3-653-1	Sequence Number [ID]	653	
3-653-2	Molecule Type	RNA	
3-653-3	Length	22	
3-653-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro cytidine modified_base 4 mod_base=OTHER note=2'-fluoro cytidine modified_base 5 mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine	

		modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl uridine modified_base 18 mod_base=OTHER note=2'-O-methyl guanosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine modified_base 20 mod_base=OTHER note=2'-O-methyl guanosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-653-5	NonEnglishQualifier Value Residues	taccagaaga agcaggtgag gg	22
3-654	Sequences		
3-654-1	Sequence Number [ID]	654	
3-654-2	Molecule Type	RNA	
3-654-3	Length	22	
3-654-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro cytidine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro guanosine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl adenosine modified_base 10 mod_base=OTHER	

		note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro cytidine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-654-5	NonEnglishQualifier Value Residues	taaccagaag aagcaggtagg	22
3-655	Sequences		
3-655-1	Sequence Number [ID]	655	
3-655-2	Molecule Type	RNA	
3-655-3	Length	22	
3-655-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro uridine modified_base 4 mod_base=OTHER note=2'-fluoro uridine modified_base 5	

		mod_base=OTHER note=2'-fluoro uridine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-fluoro guanosine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl adenosine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-655-5	NonEnglishQualifier Value Residues	tatttgga atgaaccaga gg	22
3-656	Sequences		
3-656-1	Sequence Number [ID]	656	
3-656-2	Molecule Type	RNA	
3-656-3	Length	22	

3-656-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro guanosine modified_base 3 mod_base=OTHER note=2'-fluoro guanosine modified_base 4 mod_base=OTHER note=2'-fluoro guanosine modified_base 5 mod_base=OTHER note=2'-fluoro guanosine modified_base 6 mod_base=OTHER note=2'-O-methyl adenosine modified_base 7 mod_base=OTHER note=2'-fluoro uridine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl uridine modified_base 10 mod_base=OTHER note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl guanosine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl guanosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl adenosine modified_base 16 mod_base=OTHER note=2'-O-methyl uridine modified_base 17 mod_base=OTHER note=2'-O-methyl guanosine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl adenosine modified_base 20 mod_base=OTHER

		note=2'-O-methyl cytidine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-656-5	NonEnglishQualifier Value Residues	tggggatttg gagaatgaac gg	22
3-657	Sequences		
3-657-1	Sequence Number [ID]	657	
3-657-2	Molecule Type	RNA	
3-657-3	Length	22	
3-657-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro cytidine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5 mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-fluoro uridine modified_base 8 mod_base=OTHER note=2'-O-methyl guanosine modified_base 9 mod_base=OTHER note=2'-O-methyl cytidine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl cytidine modified_base 12 mod_base=OTHER note=2'-O-methyl adenosine modified_base 13 mod_base=OTHER note=2'-O-methyl uridine modified_base 14 mod_base=OTHER note=2'-fluoro cytidine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine	

		modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl uridine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl uridine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-657-5	NonEnglishQualifier Value Residues	ttcaactgca catccacttt gg	22
3-658	Sequences		
3-658-1	Sequence Number [ID]	658	
3-658-2	Molecule Type	RNA	
3-658-3	Length	22	
3-658-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro adenosine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro uridine modified_base 5 mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl guanosine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl cytidine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER	

		note=2'-fluoro guanosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl cytidine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl guanosine modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine modified_base 18 mod_base=OTHER note=2'-O-methyl guanosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl uridine modified_base 20 mod_base=OTHER note=2'-O-methyl uridine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-658-5	NonEnglishQualifier Value Residues	taatagacgg agctggagtt gg	22
3-659	Sequences		
3-659-1	Sequence Number [ID]	659	
3-659-2	Molecule Type	RNA	
3-659-3	Length	22	
3-659-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro uridine modified_base 3 mod_base=OTHER note=2'-fluoro guanosine modified_base 4 mod_base=OTHER note=2'-fluoro adenosine modified_base 5	

		mod_base=OTHER note=2'-fluoro adenosine modified_base 6 mod_base=OTHER note=2'-O-methyl cytidine modified_base 7 mod_base=OTHER note=2'-fluoro cytidine modified_base 8 mod_base=OTHER note=2'-O-methyl adenosine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro adenosine modified_base 11 mod_base=OTHER note=2'-O-methyl adenosine modified_base 12 mod_base=OTHER note=2'-O-methyl guanosine modified_base 13 mod_base=OTHER note=2'-O-methyl adenosine modified_base 14 mod_base=OTHER note=2'-fluoro adenosine modified_base 15 mod_base=OTHER note=2'-O-methyl guanosine modified_base 16 mod_base=OTHER note=2'-O-methyl cytidine modified_base 17 mod_base=OTHER note=2'-O-methyl adenosine modified_base 18 mod_base=OTHER note=2'-O-methyl guanosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl guanosine modified_base 20 mod_base=OTHER note=2'-O-methyl uridine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-659-5	NonEnglishQualifier Value Residues	ttgaaccaga agaagcaggt gg	22
3-660	Sequences		
3-660-1	Sequence Number [ID]	660	
3-660-2	Molecule Type	RNA	
3-660-3	Length	22	

3-660-4	Features Location/ Qualifiers	misc_feature 1..22 note=synthetic construct misc_feature 1..4 note=linked via phosphorothioate modified_base 1 mod_base=OTHER note=5'-methoxyphosphonate-4-oxy uridine modified_base 2 mod_base=OTHER note=2'-fluoro cytidine modified_base 3 mod_base=OTHER note=2'-fluoro adenosine modified_base 4 mod_base=OTHER note=2'-fluoro guanosine modified_base 5 mod_base=OTHER note=2'-fluoro cytidine modified_base 6 mod_base=OTHER note=2'-O-methyl uridine modified_base 7 mod_base=OTHER note=2'-fluoro adenosine modified_base 8 mod_base=OTHER note=2'-O-methyl uridine modified_base 9 mod_base=OTHER note=2'-O-methyl guanosine modified_base 10 mod_base=OTHER note=2'-fluoro uridine modified_base 11 mod_base=OTHER note=2'-O-methyl cytidine modified_base 12 mod_base=OTHER note=2'-O-methyl uridine modified_base 13 mod_base=OTHER note=2'-O-methyl uridine modified_base 14 mod_base=OTHER note=2'-fluoro uridine modified_base 15 mod_base=OTHER note=2'-O-methyl cytidine modified_base 16 mod_base=OTHER note=2'-O-methyl adenosine modified_base 17 mod_base=OTHER note=2'-O-methyl cytidine modified_base 18 mod_base=OTHER note=2'-O-methyl adenosine misc_feature 18..20 note=linked via phosphorothioate modified_base 19 mod_base=OTHER note=2'-O-methyl cytidine modified_base 20 mod_base=OTHER

		note=2'-O-methyl uridine modified_base 21 mod_base=OTHER note=2'-O-methyl guanosine modified_base 22 mod_base=OTHER note=2'-O-methyl guanosine source 1..22 mol_type=other RNA organism=synthetic construct	
3-660-5	NonEnglishQualifier Value Residues	tcagctatgt ctttcacact gg	22
3-661	Sequences		
3-661-1	Sequence Number [ID]	661	
3-661-2	Molecule Type	RNA	
3-661-3	Length	19	
3-661-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-661-5	Residues	tgtccttcaa ggtgagccg	19
3-662	Sequences		
3-662-1	Sequence Number [ID]	662	
3-662-2	Molecule Type	RNA	
3-662-3	Length	19	
3-662-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-662-5	Residues	gtgtccttca aggtgagcc	19
3-663	Sequences		
3-663-1	Sequence Number [ID]	663	
3-663-2	Molecule Type	RNA	
3-663-3	Length	19	
3-663-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-663-5	Residues	ggtgtccttc aaggtgagc	19
3-664	Sequences		
3-664-1	Sequence Number [ID]	664	
3-664-2	Molecule Type	RNA	
3-664-3	Length	19	
3-664-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-664-5	Residues	aggtgtcctt caaggtgag	19
3-665	Sequences		
3-665-1	Sequence Number [ID]	665	
3-665-2	Molecule Type	RNA	
3-665-3	Length	19	
3-665-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-665-5	Residues	gaggtgtcct tcaaggtga	19
3-666	Sequences		
3-666-1	Sequence Number [ID]	666	
3-666-2	Molecule Type	RNA	
3-666-3	Length	19	
3-666-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-666-5	Residues	aggaggacag catggcctc	19
3-667	Sequences		
3-667-1	Sequence Number [ID]	667	
3-667-2	Molecule Type	RNA	
3-667-3	Length	19	
3-667-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-667-5	Residues	caggaggaca gcatggcct	19
3-668	Sequences		
3-668-1	Sequence Number [ID]	668	
3-668-2	Molecule Type	RNA	
3-668-3	Length	19	
3-668-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-668-5	Residues	ccaggaggac agcatggcc	19
3-669	Sequences		
3-669-1	Sequence Number [ID]	669	
3-669-2	Molecule Type	RNA	
3-669-3	Length	19	
3-669-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-669-5	Residues	tccaggagga cagcatggc	19
3-670	Sequences		
3-670-1	Sequence Number [ID]	670	
3-670-2	Molecule Type	RNA	
3-670-3	Length	19	
3-670-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-670-5	Residues	ttccaggagg acagcatgg	19
3-671	Sequences		
3-671-1	Sequence Number [ID]	671	
3-671-2	Molecule Type	RNA	
3-671-3	Length	19	
3-671-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-671-5	Residues	cttccaggag gacagcatg	19
3-672	Sequences		
3-672-1	Sequence Number [ID]	672	
3-672-2	Molecule Type	RNA	
3-672-3	Length	19	
3-672-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-672-5	Residues	gcttccagga ggacagcat	19
3-673	Sequences		
3-673-1	Sequence Number [ID]	673	
3-673-2	Molecule Type	RNA	
3-673-3	Length	19	
3-673-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-673-5	Residues	tgcttccagg aggacagca	19

3-674	Sequences	
3-674-1	Sequence Number [ID]	674
3-674-2	Molecule Type	RNA
3-674-3	Length	19
3-674-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-674-5	Residues	tcatcgctga ccgctgggt 19
3-675	Sequences	
3-675-1	Sequence Number [ID]	675
3-675-2	Molecule Type	RNA
3-675-3	Length	19
3-675-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-675-5	Residues	ctcatcgctg accgctggg 19
3-676	Sequences	
3-676-1	Sequence Number [ID]	676
3-676-2	Molecule Type	RNA
3-676-3	Length	19
3-676-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-676-5	Residues	tgtgactgtg gcctccagg 19
3-677	Sequences	
3-677-1	Sequence Number [ID]	677
3-677-2	Molecule Type	RNA
3-677-3	Length	19
3-677-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-677-5	Residues	actgtgactg tggcctcca 19
3-678	Sequences	
3-678-1	Sequence Number [ID]	678
3-678-2	Molecule Type	RNA
3-678-3	Length	19
3-678-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-678-5	Residues	cactgtgact gtggcctcc 19
3-679	Sequences	
3-679-1	Sequence Number [ID]	679
3-679-2	Molecule Type	RNA
3-679-3	Length	19
3-679-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-679-5	Residues	cctcccagat ctccctcac 19
3-680	Sequences	
3-680-1	Sequence Number [ID]	680
3-680-2	Molecule Type	RNA
3-680-3	Length	19
3-680-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-680-5	Residues	tcacctcca gatctcct 19
3-681	Sequences	

3-681-1	Sequence Number [ID]	681	
3-681-2	Molecule Type	RNA	
3-681-3	Length	19	
3-681-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-681-5	Residues	ttcacctccc agatctccc	19
3-682	Sequences		
3-682-1	Sequence Number [ID]	682	
3-682-2	Molecule Type	RNA	
3-682-3	Length	19	
3-682-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-682-5	Residues	ggtatttcct agggtacaa	19
3-683	Sequences		
3-683-1	Sequence Number [ID]	683	
3-683-2	Molecule Type	RNA	
3-683-3	Length	19	
3-683-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-683-5	Residues	tggtatttcc tagggtaca	19
3-684	Sequences		
3-684-1	Sequence Number [ID]	684	
3-684-2	Molecule Type	RNA	
3-684-3	Length	19	
3-684-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-684-5	Residues	gctaccgcaa gggcaagaa	19
3-685	Sequences		
3-685-1	Sequence Number [ID]	685	
3-685-2	Molecule Type	RNA	
3-685-3	Length	19	
3-685-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-685-5	Residues	ggctaccgca agggcaaga	19
3-686	Sequences		
3-686-1	Sequence Number [ID]	686	
3-686-2	Molecule Type	RNA	
3-686-3	Length	19	
3-686-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-686-5	Residues	catggcaggc cagcctcca	19
3-687	Sequences		
3-687-1	Sequence Number [ID]	687	
3-687-2	Molecule Type	RNA	
3-687-3	Length	19	
3-687-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-687-5	Residues	agggtgagtg gccatggca	19
3-688	Sequences		
3-688-1	Sequence Number [ID]	688	
3-688-2	Molecule Type	RNA	

3-688-3	Length	19	
3-688-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-688-5	NonEnglishQualifier Value Residues	cgagggtgag tggccatgg	19
3-689	Sequences		
3-689-1	Sequence Number [ID]	689	
3-689-2	Molecule Type	RNA	
3-689-3	Length	19	
3-689-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-689-5	Residues	gtcctccgag ggtgagtgg	19
3-690	Sequences		
3-690-1	Sequence Number [ID]	690	
3-690-2	Molecule Type	RNA	
3-690-3	Length	19	
3-690-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-690-5	Residues	tgtcctccga gggtagtg	19
3-691	Sequences		
3-691-1	Sequence Number [ID]	691	
3-691-2	Molecule Type	RNA	
3-691-3	Length	19	
3-691-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-691-5	Residues	gtgtcctccg agggtagtg	19
3-692	Sequences		
3-692-1	Sequence Number [ID]	692	
3-692-2	Molecule Type	RNA	
3-692-3	Length	19	
3-692-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-692-5	Residues	gcctggatga gagaaactg	19
3-693	Sequences		
3-693-1	Sequence Number [ID]	693	
3-693-2	Molecule Type	RNA	
3-693-3	Length	19	
3-693-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-693-5	Residues	ggcctggatg agagaaact	19
3-694	Sequences		
3-694-1	Sequence Number [ID]	694	
3-694-2	Molecule Type	RNA	
3-694-3	Length	19	
3-694-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-694-5	Residues	ctctggacta cggcttggc	19
3-695	Sequences		
3-695-1	Sequence Number [ID]	695	
3-695-2	Molecule Type	RNA	
3-695-3	Length	19	

3-695-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-695-5	NonEnglishQualifier Value Residues	tctctggact acggcttgg	19
3-696	Sequences		
3-696-1	Sequence Number [ID]	696	
3-696-2	Molecule Type	RNA	
3-696-3	Length	19	
3-696-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-696-5	Residues	tcacctgctt cttctggtt	19
3-697	Sequences		
3-697-1	Sequence Number [ID]	697	
3-697-2	Molecule Type	RNA	
3-697-3	Length	19	
3-697-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-697-5	Residues	ctcacctgct tcttctggt	19
3-698	Sequences		
3-698-1	Sequence Number [ID]	698	
3-698-2	Molecule Type	RNA	
3-698-3	Length	19	
3-698-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-698-5	Residues	caaagcccag aagatgctc	19
3-699	Sequences		
3-699-1	Sequence Number [ID]	699	
3-699-2	Molecule Type	RNA	
3-699-3	Length	19	
3-699-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-699-5	Residues	ccaagccca gaagatgct	19
3-700	Sequences		
3-700-1	Sequence Number [ID]	700	
3-700-2	Molecule Type	RNA	
3-700-3	Length	19	
3-700-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-700-5	Residues	gccaaagccc agaagatgc	19
3-701	Sequences		
3-701-1	Sequence Number [ID]	701	
3-701-2	Molecule Type	RNA	
3-701-3	Length	19	
3-701-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-701-5	Residues	tttgaataa agctgcctg	19
3-702	Sequences		
3-702-1	Sequence Number [ID]	702	
3-702-2	Molecule Type	RNA	
3-702-3	Length	19	
3-702-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-702-5	NonEnglishQualifier Value Residues	ctttggaata aagctgcct	19
3-703	Sequences		
3-703-1	Sequence Number [ID]	703	
3-703-2	Molecule Type	RNA	
3-703-3	Length	19	
3-703-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-703-5	Residues	ccctttgga taaagctgc	19
3-704	Sequences		
3-704-1	Sequence Number [ID]	704	
3-704-2	Molecule Type	RNA	
3-704-3	Length	19	
3-704-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-704-5	Residues	gccctttgga ataaagctg	19
3-705	Sequences		
3-705-1	Sequence Number [ID]	705	
3-705-2	Molecule Type	RNA	
3-705-3	Length	19	
3-705-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-705-5	Residues	tgccctttgg aataaagct	19
3-706	Sequences		
3-706-1	Sequence Number [ID]	706	
3-706-2	Molecule Type	RNA	
3-706-3	Length	19	
3-706-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-706-5	Residues	agctgccctt tggaaataa	19
3-707	Sequences		
3-707-1	Sequence Number [ID]	707	
3-707-2	Molecule Type	RNA	
3-707-3	Length	19	
3-707-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-707-5	Residues	cagctgccct ttggaataa	19
3-708	Sequences		
3-708-1	Sequence Number [ID]	708	
3-708-2	Molecule Type	RNA	
3-708-3	Length	19	
3-708-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-708-5	Residues	tgagctcagc tgccctttg	19
3-709	Sequences		
3-709-1	Sequence Number [ID]	709	
3-709-2	Molecule Type	RNA	
3-709-3	Length	19	
3-709-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-709-5	Residues	gtgagctcag ctgcccttt	19
3-710	Sequences		
3-710-1	Sequence Number [ID]	710	
3-710-2	Molecule Type	RNA	
3-710-3	Length	19	
3-710-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-710-5	Residues	agcttcggaa gccctggt	19
3-711	Sequences		
3-711-1	Sequence Number [ID]	711	
3-711-2	Molecule Type	RNA	
3-711-3	Length	19	
3-711-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-711-5	Residues	tcagcagcaa gaatgctgg	19
3-712	Sequences		
3-712-1	Sequence Number [ID]	712	
3-712-2	Molecule Type	RNA	
3-712-3	Length	19	
3-712-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-712-5	Residues	ctcagcagca agaatgctg	19
3-713	Sequences		
3-713-1	Sequence Number [ID]	713	
3-713-2	Molecule Type	RNA	
3-713-3	Length	19	
3-713-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-713-5	Residues	gctcagcagc aagaatgct	19
3-714	Sequences		
3-714-1	Sequence Number [ID]	714	
3-714-2	Molecule Type	RNA	
3-714-3	Length	19	
3-714-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-714-5	Residues	tggtctagca gcaagaatg	19
3-715	Sequences		
3-715-1	Sequence Number [ID]	715	
3-715-2	Molecule Type	RNA	
3-715-3	Length	19	
3-715-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-715-5	Residues	gtggctcagc agcaagaat	19
3-716	Sequences		
3-716-1	Sequence Number [ID]	716	
3-716-2	Molecule Type	RNA	
3-716-3	Length	19	
3-716-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-716-5	Residues	gatgtctgct ccagtgatg	19

3-717	Sequences	
3-717-1	Sequence Number [ID]	717
3-717-2	Molecule Type	RNA
3-717-3	Length	19
3-717-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-717-5	Residues	tgatgtctgc tccagtgat 19
3-718	Sequences	
3-718-1	Sequence Number [ID]	718
3-718-2	Molecule Type	RNA
3-718-3	Length	19
3-718-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-718-5	Residues	ctgatgtctg ctccagtga 19
3-719	Sequences	
3-719-1	Sequence Number [ID]	719
3-719-2	Molecule Type	RNA
3-719-3	Length	19
3-719-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-719-5	Residues	ccctgatgtc tgctccagt 19
3-720	Sequences	
3-720-1	Sequence Number [ID]	720
3-720-2	Molecule Type	RNA
3-720-3	Length	19
3-720-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-720-5	Residues	aagtgggtgac ctgaggaac 19
3-721	Sequences	
3-721-1	Sequence Number [ID]	721
3-721-2	Molecule Type	RNA
3-721-3	Length	19
3-721-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-721-5	Residues	caagtgggtga cctgaggaa 19
3-722	Sequences	
3-722-1	Sequence Number [ID]	722
3-722-2	Molecule Type	RNA
3-722-3	Length	19
3-722-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-722-5	Residues	gcaagtgggtg acctgagga 19
3-723	Sequences	
3-723-1	Sequence Number [ID]	723
3-723-2	Molecule Type	RNA
3-723-3	Length	19
3-723-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-723-5	Residues	agcaagtgggt gacctgagg 19
3-724	Sequences	

3-724-1	Sequence Number [ID]	724	
3-724-2	Molecule Type	RNA	
3-724-3	Length	19	
3-724-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-724-5	Residues	cagcaagtgg tgacctgag	19
3-725	Sequences		
3-725-1	Sequence Number [ID]	725	
3-725-2	Molecule Type	RNA	
3-725-3	Length	19	
3-725-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-725-5	Residues	ccagcaagtg gtgacctga	19
3-726	Sequences		
3-726-1	Sequence Number [ID]	726	
3-726-2	Molecule Type	RNA	
3-726-3	Length	19	
3-726-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-726-5	Residues	atccagcaag tggtgacct	19
3-727	Sequences		
3-727-1	Sequence Number [ID]	727	
3-727-2	Molecule Type	RNA	
3-727-3	Length	19	
3-727-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-727-5	Residues	tggatccagc aagtgtga	19
3-728	Sequences		
3-728-1	Sequence Number [ID]	728	
3-728-2	Molecule Type	RNA	
3-728-3	Length	19	
3-728-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-728-5	Residues	ctggatccag caagtgtg	19
3-729	Sequences		
3-729-1	Sequence Number [ID]	729	
3-729-2	Molecule Type	RNA	
3-729-3	Length	19	
3-729-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-729-5	Residues	cccgcacac aggtgtgat	19
3-730	Sequences		
3-730-1	Sequence Number [ID]	730	
3-730-2	Molecule Type	RNA	
3-730-3	Length	19	
3-730-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-730-5	Residues	acccgcacac caggtgtga	19
3-731	Sequences		
3-731-1	Sequence Number [ID]	731	
3-731-2	Molecule Type	RNA	

3-731-3	Length	19	
3-731-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-731-5	NonEnglishQualifier Value Residues	aactacttcg gcgtctaca	19
3-732	Sequences		
3-732-1	Sequence Number [ID]	732	
3-732-2	Molecule Type	RNA	
3-732-3	Length	19	
3-732-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-732-5	Residues	ttgatccac aggacctgt	19
3-733	Sequences		
3-733-1	Sequence Number [ID]	733	
3-733-2	Molecule Type	RNA	
3-733-3	Length	19	
3-733-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-733-5	Residues	tgcagttgat cccacagga	19
3-734	Sequences		
3-734-1	Sequence Number [ID]	734	
3-734-2	Molecule Type	RNA	
3-734-3	Length	19	
3-734-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-734-5	Residues	agaggtgtcc ttcaaggtg	19
3-735	Sequences		
3-735-1	Sequence Number [ID]	735	
3-735-2	Molecule Type	RNA	
3-735-3	Length	19	
3-735-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-735-5	Residues	gagaggtgtc cttcaaggt	19
3-736	Sequences		
3-736-1	Sequence Number [ID]	736	
3-736-2	Molecule Type	RNA	
3-736-3	Length	19	
3-736-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-736-5	Residues	ctggagaggt gtccttcaa	19
3-737	Sequences		
3-737-1	Sequence Number [ID]	737	
3-737-2	Molecule Type	RNA	
3-737-3	Length	19	
3-737-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-737-5	Residues	aggttcgggg tcgacacat	19
3-738	Sequences		
3-738-1	Sequence Number [ID]	738	
3-738-2	Molecule Type	RNA	
3-738-3	Length	19	

3-738-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-738-5	NonEnglishQualifier Value Residues	attcaccttc cagtgtgag	19
3-739	Sequences		
3-739-1	Sequence Number [ID]	739	
3-739-2	Molecule Type	RNA	
3-739-3	Length	19	
3-739-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-739-5	Residues	cattcacctt ccagtgtga	19
3-740	Sequences		
3-740-1	Sequence Number [ID]	740	
3-740-2	Molecule Type	RNA	
3-740-3	Length	19	
3-740-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-740-5	Residues	acattcacct tccagtgtg	19
3-741	Sequences		
3-741-1	Sequence Number [ID]	741	
3-741-2	Molecule Type	RNA	
3-741-3	Length	19	
3-741-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-741-5	Residues	gacattcacc ttccagtgt	19
3-742	Sequences		
3-742-1	Sequence Number [ID]	742	
3-742-2	Molecule Type	RNA	
3-742-3	Length	19	
3-742-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-742-5	Residues	ggacattcac cttccagtg	19
3-743	Sequences		
3-743-1	Sequence Number [ID]	743	
3-743-2	Molecule Type	RNA	
3-743-3	Length	19	
3-743-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-743-5	Residues	gcagagccac attccagtg	19
3-744	Sequences		
3-744-1	Sequence Number [ID]	744	
3-744-2	Molecule Type	RNA	
3-744-3	Length	19	
3-744-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-744-5	Residues	tgcagagcca cattccagt	19
3-745	Sequences		
3-745-1	Sequence Number [ID]	745	
3-745-2	Molecule Type	RNA	
3-745-3	Length	19	
3-745-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-745-5	NonEnglishQualifier Value Residues	ttgcagagcc acattccag	19
3-746	Sequences		
3-746-1	Sequence Number [ID]	746	
3-746-2	Molecule Type	RNA	
3-746-3	Length	19	
3-746-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-746-5	Residues	tttgcagagc cacattcca	19
3-747	Sequences		
3-747-1	Sequence Number [ID]	747	
3-747-2	Molecule Type	RNA	
3-747-3	Length	19	
3-747-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-747-5	Residues	aaactgcgtt tgcagagcc	19
3-748	Sequences		
3-748-1	Sequence Number [ID]	748	
3-748-2	Molecule Type	RNA	
3-748-3	Length	19	
3-748-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-748-5	Residues	gaaactgcgt ttgcagagc	19
3-749	Sequences		
3-749-1	Sequence Number [ID]	749	
3-749-2	Molecule Type	RNA	
3-749-3	Length	19	
3-749-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-749-5	Residues	agaaactgcg tttgcagag	19
3-750	Sequences		
3-750-1	Sequence Number [ID]	750	
3-750-2	Molecule Type	RNA	
3-750-3	Length	19	
3-750-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-750-5	Residues	gagaaactgc gtttgcaga	19
3-751	Sequences		
3-751-1	Sequence Number [ID]	751	
3-751-2	Molecule Type	RNA	
3-751-3	Length	19	
3-751-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-751-5	Residues	agagaaactg cgtttgcag	19
3-752	Sequences		
3-752-1	Sequence Number [ID]	752	
3-752-2	Molecule Type	RNA	
3-752-3	Length	19	
3-752-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-752-5	Residues	gagagaaact gcgtttgca	19
3-753	Sequences		
3-753-1	Sequence Number [ID]	753	
3-753-2	Molecule Type	RNA	
3-753-3	Length	19	
3-753-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-753-5	Residues	tgagagaaac tgcgtttgc	19
3-754	Sequences		
3-754-1	Sequence Number [ID]	754	
3-754-2	Molecule Type	RNA	
3-754-3	Length	19	
3-754-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-754-5	Residues	atgagagaaa ctgcgtttg	19
3-755	Sequences		
3-755-1	Sequence Number [ID]	755	
3-755-2	Molecule Type	RNA	
3-755-3	Length	19	
3-755-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-755-5	Residues	gatgagagaa actgcgttt	19
3-756	Sequences		
3-756-1	Sequence Number [ID]	756	
3-756-2	Molecule Type	RNA	
3-756-3	Length	19	
3-756-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-756-5	Residues	ggatgagaga aactgcgtt	19
3-757	Sequences		
3-757-1	Sequence Number [ID]	757	
3-757-2	Molecule Type	RNA	
3-757-3	Length	19	
3-757-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-757-5	Residues	tggatgagag aaactgcgt	19
3-758	Sequences		
3-758-1	Sequence Number [ID]	758	
3-758-2	Molecule Type	RNA	
3-758-3	Length	19	
3-758-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-758-5	Residues	ctggatgaga gaaactgcg	19
3-759	Sequences		
3-759-1	Sequence Number [ID]	759	
3-759-2	Molecule Type	RNA	
3-759-3	Length	19	
3-759-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-759-5	Residues	cctggatgag agaaactgc	19

3-760	Sequences	
3-760-1	Sequence Number [ID]	760
3-760-2	Molecule Type	RNA
3-760-3	Length	19
3-760-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-760-5	Residues	cctgtgatgg ggtcaagga 19
3-761	Sequences	
3-761-1	Sequence Number [ID]	761
3-761-2	Molecule Type	RNA
3-761-3	Length	19
3-761-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-761-5	Residues	ttgtacaacc agtcggacc 19
3-762	Sequences	
3-762-1	Sequence Number [ID]	762
3-762-2	Molecule Type	RNA
3-762-3	Length	19
3-762-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-762-5	Residues	cttgtacaac cagtcggac 19
3-763	Sequences	
3-763-1	Sequence Number [ID]	763
3-763-2	Molecule Type	RNA
3-763-3	Length	19
3-763-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-763-5	Residues	gcttgtacaa ccagtcgga 19
3-764	Sequences	
3-764-1	Sequence Number [ID]	764
3-764-2	Molecule Type	RNA
3-764-3	Length	19
3-764-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-764-5	Residues	tggcttgtac aaccagtcg 19
3-765	Sequences	
3-765-1	Sequence Number [ID]	765
3-765-2	Molecule Type	RNA
3-765-3	Length	19
3-765-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-765-5	Residues	atggcttgta caaccagtc 19
3-766	Sequences	
3-766-1	Sequence Number [ID]	766
3-766-2	Molecule Type	RNA
3-766-3	Length	19
3-766-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-766-5	Residues	tatggcttgt acaaccagt 19
3-767	Sequences	

3-767-1	Sequence Number [ID]	767	
3-767-2	Molecule Type	RNA	
3-767-3	Length	19	
3-767-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-767-5	Residues	ctatggcttg tacaaccag	19
3-768	Sequences		
3-768-1	Sequence Number [ID]	768	
3-768-2	Molecule Type	RNA	
3-768-3	Length	19	
3-768-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-768-5	Residues	actatggctt gtacaacca	19
3-769	Sequences		
3-769-1	Sequence Number [ID]	769	
3-769-2	Molecule Type	RNA	
3-769-3	Length	19	
3-769-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-769-5	Residues	cactatggct tgtacaacc	19
3-770	Sequences		
3-770-1	Sequence Number [ID]	770	
3-770-2	Molecule Type	RNA	
3-770-3	Length	19	
3-770-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-770-5	Residues	gcactatggc ttgtacaac	19
3-771	Sequences		
3-771-1	Sequence Number [ID]	771	
3-771-2	Molecule Type	RNA	
3-771-3	Length	19	
3-771-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-771-5	Residues	tgcactatgg cttgtacaa	19
3-772	Sequences		
3-772-1	Sequence Number [ID]	772	
3-772-2	Molecule Type	RNA	
3-772-3	Length	19	
3-772-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-772-5	Residues	gtgcactatg gcttgtaca	19
3-773	Sequences		
3-773-1	Sequence Number [ID]	773	
3-773-2	Molecule Type	RNA	
3-773-3	Length	19	
3-773-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-773-5	Residues	ggtgcactat ggcttgtac	19
3-774	Sequences		
3-774-1	Sequence Number [ID]	774	
3-774-2	Molecule Type	RNA	

3-774-3	Length	19	
3-774-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-774-5	Residues	gggtgcacta tggcttgta	19
3-775	Sequences		
3-775-1	Sequence Number [ID]	775	
3-775-2	Molecule Type	RNA	
3-775-3	Length	19	
3-775-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-775-5	Residues	cgggtgcact atggcttggt	19
3-776	Sequences		
3-776-1	Sequence Number [ID]	776	
3-776-2	Molecule Type	RNA	
3-776-3	Length	19	
3-776-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-776-5	Residues	tgcgggtgca ctatggctt	19
3-777	Sequences		
3-777-1	Sequence Number [ID]	777	
3-777-2	Molecule Type	RNA	
3-777-3	Length	19	
3-777-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-777-5	Residues	gtgtgcgggt gcactatgg	19
3-778	Sequences		
3-778-1	Sequence Number [ID]	778	
3-778-2	Molecule Type	RNA	
3-778-3	Length	19	
3-778-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-778-5	Residues	tggacgatcc agaacagga	19
3-779	Sequences		
3-779-1	Sequence Number [ID]	779	
3-779-2	Molecule Type	RNA	
3-779-3	Length	19	
3-779-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-779-5	Residues	cagtggacga tccagaaca	19
3-780	Sequences		
3-780-1	Sequence Number [ID]	780	
3-780-2	Molecule Type	RNA	
3-780-3	Length	19	
3-780-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-780-5	Residues	aagtatgatt tgccgtgca	19
3-781	Sequences		
3-781-1	Sequence Number [ID]	781	
3-781-2	Molecule Type	RNA	
3-781-3	Length	19	

3-781-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-781-5	NonEnglishQualifier Value Residues	gaagtatgat ttgccgtgc	19
3-782	Sequences		
3-782-1	Sequence Number [ID]	782	
3-782-2	Molecule Type	RNA	
3-782-3	Length	19	
3-782-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-782-5	Residues	agaagtatga ttgcccgtg	19
3-783	Sequences		
3-783-1	Sequence Number [ID]	783	
3-783-2	Molecule Type	RNA	
3-783-3	Length	19	
3-783-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-783-5	Residues	cagaagtatg attgccgt	19
3-784	Sequences		
3-784-1	Sequence Number [ID]	784	
3-784-2	Molecule Type	RNA	
3-784-3	Length	19	
3-784-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-784-5	Residues	ggcagaagta tgatttgcc	19
3-785	Sequences		
3-785-1	Sequence Number [ID]	785	
3-785-2	Molecule Type	RNA	
3-785-3	Length	19	
3-785-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-785-5	Residues	aggcagaagt atgatttgc	19
3-786	Sequences		
3-786-1	Sequence Number [ID]	786	
3-786-2	Molecule Type	RNA	
3-786-3	Length	19	
3-786-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-786-5	Residues	gaggcagaag tatgatttg	19
3-787	Sequences		
3-787-1	Sequence Number [ID]	787	
3-787-2	Molecule Type	RNA	
3-787-3	Length	19	
3-787-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-787-5	Residues	ggaggcagaa gtatgattt	19
3-788	Sequences		
3-788-1	Sequence Number [ID]	788	
3-788-2	Molecule Type	RNA	
3-788-3	Length	19	
3-788-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-788-5	NonEnglishQualifier Value Residues	acttccccag ctactactc	19
3-789	Sequences		
3-789-1	Sequence Number [ID]	789	
3-789-2	Molecule Type	RNA	
3-789-3	Length	19	
3-789-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-789-5	Residues	cgtacttccc cagctacta	19
3-790	Sequences		
3-790-1	Sequence Number [ID]	790	
3-790-2	Molecule Type	RNA	
3-790-3	Length	19	
3-790-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-790-5	Residues	tgcacagcta ctacgaccc	19
3-791	Sequences		
3-791-1	Sequence Number [ID]	791	
3-791-2	Molecule Type	RNA	
3-791-3	Length	19	
3-791-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-791-5	Residues	agaagggcct gcacagcta	19
3-792	Sequences		
3-792-1	Sequence Number [ID]	792	
3-792-2	Molecule Type	RNA	
3-792-3	Length	19	
3-792-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-792-5	Residues	accgactggc catgtatga	19
3-793	Sequences		
3-793-1	Sequence Number [ID]	793	
3-793-2	Molecule Type	RNA	
3-793-3	Length	19	
3-793-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-793-5	Residues	gttgttaccg ctacagcta	19
3-794	Sequences		
3-794-1	Sequence Number [ID]	794	
3-794-2	Molecule Type	RNA	
3-794-3	Length	19	
3-794-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-794-5	Residues	gggttggttac cgctacagc	19
3-795	Sequences		
3-795-1	Sequence Number [ID]	795	
3-795-2	Molecule Type	RNA	
3-795-3	Length	19	
3-795-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-795-5	Residues	tgggttgta ccgctacag	19
3-796	Sequences		
3-796-1	Sequence Number [ID]	796	
3-796-2	Molecule Type	RNA	
3-796-3	Length	19	
3-796-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-796-5	Residues	ctgggttggtt accgctaca	19
3-797	Sequences		
3-797-1	Sequence Number [ID]	797	
3-797-2	Molecule Type	RNA	
3-797-3	Length	19	
3-797-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-797-5	Residues	attccacgct gggttgta	19
3-798	Sequences		
3-798-1	Sequence Number [ID]	798	
3-798-2	Molecule Type	RNA	
3-798-3	Length	19	
3-798-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-798-5	Residues	aattccacgc tgggttggtt	19
3-799	Sequences		
3-799-1	Sequence Number [ID]	799	
3-799-2	Molecule Type	RNA	
3-799-3	Length	19	
3-799-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-799-5	Residues	tgtgaaagac atagctgca	19
3-800	Sequences		
3-800-1	Sequence Number [ID]	800	
3-800-2	Molecule Type	RNA	
3-800-3	Length	19	
3-800-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-800-5	Residues	gtgtgaaaga catagctgc	19
3-801	Sequences		
3-801-1	Sequence Number [ID]	801	
3-801-2	Molecule Type	RNA	
3-801-3	Length	19	
3-801-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-801-5	Residues	agtgtgaaag acatagctg	19
3-802	Sequences		
3-802-1	Sequence Number [ID]	802	
3-802-2	Molecule Type	RNA	
3-802-3	Length	19	
3-802-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-802-5	Residues	cagtgtgaaa gacatagct	19

3-803	Sequences	
3-803-1	Sequence Number [ID]	803
3-803-2	Molecule Type	RNA
3-803-3	Length	19
3-803-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-803-5	Residues	ccagtgtgaa agacatagc 19
3-804	Sequences	
3-804-1	Sequence Number [ID]	804
3-804-2	Molecule Type	RNA
3-804-3	Length	19
3-804-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-804-5	Residues	gccagtgtga aagacatag 19
3-805	Sequences	
3-805-1	Sequence Number [ID]	805
3-805-2	Molecule Type	RNA
3-805-3	Length	19
3-805-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-805-5	Residues	agccagtgtg aaagacata 19
3-806	Sequences	
3-806-1	Sequence Number [ID]	806
3-806-2	Molecule Type	RNA
3-806-3	Length	19
3-806-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-806-5	Residues	aagccagtgt gaaagacat 19
3-807	Sequences	
3-807-1	Sequence Number [ID]	807
3-807-2	Molecule Type	RNA
3-807-3	Length	19
3-807-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-807-5	Residues	gaagccagtg tgaaagaca 19
3-808	Sequences	
3-808-1	Sequence Number [ID]	808
3-808-2	Molecule Type	RNA
3-808-3	Length	19
3-808-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-808-5	Residues	ctgctgtcca cagtcaaca 19
3-809	Sequences	
3-809-1	Sequence Number [ID]	809
3-809-2	Molecule Type	RNA
3-809-3	Length	19
3-809-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-809-5	Residues	agctgctgtc cacagtcaa 19
3-810	Sequences	

3-810-1	Sequence Number [ID]	810	
3-810-2	Molecule Type	RNA	
3-810-3	Length	19	
3-810-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-810-5	Residues	gttcattctc caaatcccc	19
3-811	Sequences		
3-811-1	Sequence Number [ID]	811	
3-811-2	Molecule Type	RNA	
3-811-3	Length	19	
3-811-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-811-5	Residues	ggttcattct ccaaatccc	19
3-812	Sequences		
3-812-1	Sequence Number [ID]	812	
3-812-2	Molecule Type	RNA	
3-812-3	Length	19	
3-812-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-812-5	Residues	tggttcattc tccaaatcc	19
3-813	Sequences		
3-813-1	Sequence Number [ID]	813	
3-813-2	Molecule Type	RNA	
3-813-3	Length	19	
3-813-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-813-5	Residues	ctggttcatt ctccaaatc	19
3-814	Sequences		
3-814-1	Sequence Number [ID]	814	
3-814-2	Molecule Type	RNA	
3-814-3	Length	19	
3-814-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-814-5	Residues	tctggttcatt tctccaaat	19
3-815	Sequences		
3-815-1	Sequence Number [ID]	815	
3-815-2	Molecule Type	RNA	
3-815-3	Length	19	
3-815-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-815-5	Residues	ttctggttca ttctccaaa	19
3-816	Sequences		
3-816-1	Sequence Number [ID]	816	
3-816-2	Molecule Type	RNA	
3-816-3	Length	19	
3-816-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-816-5	Residues	cttctggttc attctccaa	19
3-817	Sequences		
3-817-1	Sequence Number [ID]	817	
3-817-2	Molecule Type	RNA	

3-817-3	Length	19	
3-817-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-817-5	Residues	cttcttctgg ttcattctc	19
3-818	Sequences		
3-818-1	Sequence Number [ID]	818	
3-818-2	Molecule Type	RNA	
3-818-3	Length	19	
3-818-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-818-5	Residues	gcttcttctg gttcattct	19
3-819	Sequences		
3-819-1	Sequence Number [ID]	819	
3-819-2	Molecule Type	RNA	
3-819-3	Length	19	
3-819-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-819-5	Residues	tgcttcttct ggttcattc	19
3-820	Sequences		
3-820-1	Sequence Number [ID]	820	
3-820-2	Molecule Type	RNA	
3-820-3	Length	19	
3-820-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-820-5	Residues	ctgcttcttc tggttcatt	19
3-821	Sequences		
3-821-1	Sequence Number [ID]	821	
3-821-2	Molecule Type	RNA	
3-821-3	Length	19	
3-821-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-821-5	Residues	cctgcttctt ctggttcat	19
3-822	Sequences		
3-822-1	Sequence Number [ID]	822	
3-822-2	Molecule Type	RNA	
3-822-3	Length	19	
3-822-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-822-5	Residues	acctgcttct tctggttca	19
3-823	Sequences		
3-823-1	Sequence Number [ID]	823	
3-823-2	Molecule Type	RNA	
3-823-3	Length	19	
3-823-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-823-5	Residues	cacctgcttc ttctggttc	19
3-824	Sequences		
3-824-1	Sequence Number [ID]	824	
3-824-2	Molecule Type	RNA	
3-824-3	Length	19	

3-824-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
3-824-5	NonEnglishQualifier Value Residues	cagctccgctc tattccttt	19
3-825	Sequences		
3-825-1	Sequence Number [ID]	825	
3-825-2	Molecule Type	RNA	
3-825-3	Length	19	
3-825-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-825-5	Residues	actccagctc cgtctattc	19
3-826	Sequences		
3-826-1	Sequence Number [ID]	826	
3-826-2	Molecule Type	RNA	
3-826-3	Length	19	
3-826-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-826-5	Residues	aactccagct ccgctctatt	19
3-827	Sequences		
3-827-1	Sequence Number [ID]	827	
3-827-2	Molecule Type	RNA	
3-827-3	Length	19	
3-827-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-827-5	Residues	agatgctcaa ggagctcat	19
3-828	Sequences		
3-828-1	Sequence Number [ID]	828	
3-828-2	Molecule Type	RNA	
3-828-3	Length	19	
3-828-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-828-5	Residues	aagatgctca aggagctca	19
3-829	Sequences		
3-829-1	Sequence Number [ID]	829	
3-829-2	Molecule Type	RNA	
3-829-3	Length	19	
3-829-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-829-5	Residues	gaagatgctc aaggagctc	19
3-830	Sequences		
3-830-1	Sequence Number [ID]	830	
3-830-2	Molecule Type	RNA	
3-830-3	Length	19	
3-830-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-830-5	Residues	agaagatgct caaggagct	19
3-831	Sequences		
3-831-1	Sequence Number [ID]	831	
3-831-2	Molecule Type	RNA	
3-831-3	Length	19	
3-831-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA	

		organism=synthetic construct	
3-831-5	NonEnglishQualifier Value Residues	cagaagatgc tcaaggagc	19
3-832	Sequences		
3-832-1	Sequence Number [ID]	832	
3-832-2	Molecule Type	RNA	
3-832-3	Length	19	
3-832-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-832-5	Residues	ccagaagatg ctcaaggag	19
3-833	Sequences		
3-833-1	Sequence Number [ID]	833	
3-833-2	Molecule Type	RNA	
3-833-3	Length	19	
3-833-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-833-5	Residues	cccagaagat gctcaagga	19
3-834	Sequences		
3-834-1	Sequence Number [ID]	834	
3-834-2	Molecule Type	RNA	
3-834-3	Length	19	
3-834-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-834-5	Residues	aagcccagaa gatgctcaa	19
3-835	Sequences		
3-835-1	Sequence Number [ID]	835	
3-835-2	Molecule Type	RNA	
3-835-3	Length	19	
3-835-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-835-5	Residues	aaagcccaga agatgtctca	19
3-836	Sequences		
3-836-1	Sequence Number [ID]	836	
3-836-2	Molecule Type	RNA	
3-836-3	Length	19	
3-836-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-836-5	Residues	gtcagccagg tgtactcag	19
3-837	Sequences		
3-837-1	Sequence Number [ID]	837	
3-837-2	Molecule Type	RNA	
3-837-3	Length	19	
3-837-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-837-5	Residues	ggtcagccag gtgtactca	19
3-838	Sequences		
3-838-1	Sequence Number [ID]	838	
3-838-2	Molecule Type	RNA	
3-838-3	Length	19	
3-838-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		

3-838-5	Residues	actctggtat ttcctaggg	19
3-839	Sequences		
3-839-1	Sequence Number [ID]	839	
3-839-2	Molecule Type	RNA	
3-839-3	Length	19	
3-839-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-839-5	Residues	tactctggta tttcctagg	19
3-840	Sequences		
3-840-1	Sequence Number [ID]	840	
3-840-2	Molecule Type	RNA	
3-840-3	Length	19	
3-840-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-840-5	Residues	ctactctggt atttcctag	19
3-841	Sequences		
3-841-1	Sequence Number [ID]	841	
3-841-2	Molecule Type	RNA	
3-841-3	Length	19	
3-841-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-841-5	Residues	gctactctgg tatttccta	19
3-842	Sequences		
3-842-1	Sequence Number [ID]	842	
3-842-2	Molecule Type	RNA	
3-842-3	Length	19	
3-842-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-842-5	Residues	tgctactctg gtatttcct	19
3-843	Sequences		
3-843-1	Sequence Number [ID]	843	
3-843-2	Molecule Type	RNA	
3-843-3	Length	19	
3-843-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-843-5	Residues	gtgctactct ggtatttcc	19
3-844	Sequences		
3-844-1	Sequence Number [ID]	844	
3-844-2	Molecule Type	RNA	
3-844-3	Length	19	
3-844-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-844-5	Residues	ggtgctactc tggattttc	19
3-845	Sequences		
3-845-1	Sequence Number [ID]	845	
3-845-2	Molecule Type	RNA	
3-845-3	Length	19	
3-845-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-845-5	Residues	gggtgctact ctggtattt	19

3-846	Sequences	
3-846-1	Sequence Number [ID]	846
3-846-2	Molecule Type	RNA
3-846-3	Length	19
3-846-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-846-5	Residues	ggactccaag agaaaagcc 19
3-847	Sequences	
3-847-1	Sequence Number [ID]	847
3-847-2	Molecule Type	RNA
3-847-3	Length	19
3-847-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-847-5	Residues	aggactccaa gagaaaagc 19
3-848	Sequences	
3-848-1	Sequence Number [ID]	848
3-848-2	Molecule Type	RNA
3-848-3	Length	19
3-848-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-848-5	Residues	tgaggactcc aagagaaaa 19
3-849	Sequences	
3-849-1	Sequence Number [ID]	849
3-849-2	Molecule Type	RNA
3-849-3	Length	19
3-849-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-849-5	Residues	gtgaggactc caagagaaa 19
3-850	Sequences	
3-850-1	Sequence Number [ID]	850
3-850-2	Molecule Type	RNA
3-850-3	Length	19
3-850-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-850-5	Residues	tgtgaggact ccaagagaa 19
3-851	Sequences	
3-851-1	Sequence Number [ID]	851
3-851-2	Molecule Type	RNA
3-851-3	Length	19
3-851-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-851-5	Residues	ctgtgaggac tccaagaga 19
3-852	Sequences	
3-852-1	Sequence Number [ID]	852
3-852-2	Molecule Type	RNA
3-852-3	Length	19
3-852-4	Features Location/ Qualifiers	source 1..19 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-852-5	Residues	cctgtgagga ctccaagag 19
3-853	Sequences	

3-853-1	Sequence Number [ID]	853
3-853-2	Molecule Type	DNA
3-853-3	Length	2475
3-853-4	Features Location/ Qualifiers	source 1..2475 mol_type=other DNA organism=Homo sapiens
	NonEnglishQualifier Value	
3-853-5	Residues	atgcccgtag ccgaggcccc ccaggtagct ggcgggcagg gggacggagg tgatggcgag 60 gaagcggagc cggaggggat gttcaaggcc tgtgaggact ccaagagaaa agcccggggc 120 tacctccgcc tggtagccct gtttgtgctg ctggccctgc tcgtgctggc ttcggcgggg 180 gtgtactctt ggtatttctt aggggtacaag gcggagggtga tggtcagcca ggtgtactca 240 ggcagtgctg gtgtactcaa tcgccacttc tcccaggatc ttaccgcggc ggaatctagt 300 gccttccgca gtgaaaccgc caaagcccag aagatgtcga aggagctcat caccagcacc 360 cgcttgggaa cttactacaa ctccagctcc gtctattcct ttggggaggg acccctcacc 420 tgcttcttct ggttcattct ccaaattccc gagcaccgcc ggctgatgct gagccccgag 480 gtggtgcagg cactgctggt ggaggagctg ctgtccacag tcaacagctc ggctgccgtc 540 ccctacaggg ccgagtacga agtggacccc gagggcctag tgatcctgga agccagtgtg 600 aaagacatag ctgcattgaa ttccacgctg ggttgttacc gctacagcta cgtgggccag 660 ggccagggtc tccggctgaa ggggcctgac cacctggcct ccagctgcct gtggcacctg 720 cagggcccca aggacctcat gctcaaaactc cggttgaggt ggacgtggc agagtgccgg 780 gaccgactgg ccatgtatga cgtggccggg cccctggaga agaggctcat cacctcgggt 840 tacggctgca gccgccagga gcccggtgtg gaggttcttg cgctcggggc catcatggcg 900 gtcgtctgga agaaggcctt gcacagctac tacgacctc tcgtgctctc cgtgcagccg 960 gtggtcttcc aggcctgtga agtgaacctg acgctggaca acaggctcga ctcccagggc 1020 gtcctcagca ccccgactt cccagctac tactcgcccc aaaccactg ctcctggcac 1080 ctcacggtgc cctctctgga ctacggcttg gccctctggt ttgatgccta tgactgagg 1140 aggcagaagt atgatttgcc gtgcaccag gccagtgga cgatccagaa caggaggctg 1200 tgtggcttgc gctacctgca gccctacgcc gagaggatcc ccgtggtggc cacggccggg 1260 atcaccatca acttcacctc ccagatctcc ctaccggggc ccggtgtgct ggtgcactat 1320 ggcttgtaca accagtcgga cccctgccct ggagagtctc tctgttctgt gaatggactc 1380 tgtgtccctg cctgtgatgg ggtcaaggac tgccccaacg gcctggatga gagaactgc 1440 gtttgcagag ccacattcca gtgcaaagag gacagcacat gcatctcact gccaaggtc 1500 tgtgatggc agcctgattg tctcaacggc agcgacgaag agcagtgcga ggaaggggtg 1560 ccatgtggga cattcacctt ccagtgtgag gaccggagct gcgtgaagaa gccaacccg 1620 cagtgtgatg ggcggcccga ctgcagggac ggctcggatg aggagcactg tgactgtggc 1680 ctccagggcc cctccagccg cattgttggg ggagctgtgt cctccgaggg tgagtggcca 1740 tggcaggcca gcctccaggt tcggggtcga cacatctgtg ggggggccct catcgtgac 1800 cgctgggtga taacagctgc ccactgctc caggaggaca gcatggcctc cacgtgctg 1860 tggaccgtgt tcctgggcaa ggtgtggcag aactcgcgct ggcctggaga ggtgtccttc 1920 aagtgtagcc gcctgctcct gcacccgtac cacgaagagg acagccatga ctacgacgtg 1980 gcgtgctgca agctcgacca cccggtgtgt cgctcggccc ccgtgcgccc cgtctgcctg 2040 cccgcgcgct ccacttctt cgagccgggc ctgactgctt ggattacggg ctggggcgcc 2100 ttgcgcgagg gcgccctacg ggcgatgctt gtggccctat ttatggatg gagaaccaa 2160 ggctcagaga catgttgctg ccccatcagc aacgctctgc agaaagtga tgtgcagttg 2220 atcccacagg acctgtgag cgaggtctat cgctaccagg tgacgccacg catgtgtgt 2280 gccggctacc gcaagggcaa gaaggatgcc tgtcagggtg actcaggtgg tccgtggtg 2340 tgcaaggcac tcagtggccg ctggttctg gcggggctg tcagctgggg cctgggctgt 2400 ggccggccta actacttcg cgtctacacc cgcacacag gtgtgatcag ctggatccag 2460 caagtggtag cctga 2475
3-854	Sequences	
3-854-1	Sequence Number [ID]	854
3-854-2	Molecule Type	DNA
3-854-3	Length	2400
3-854-4	Features Location/ Qualifiers	source 1..2400 mol_type=other DNA organism=Mus musculus
	NonEnglishQualifier Value	
3-854-5	Residues	atgccacca ccagggtccc ccaagcggtt gatggtcagg gcgatgcggg tgatggagag 60 gaagctgctg agccagaggg gaagttcaag ccccaaaaa acaccaagag aaaaaccgg 120 gactacgtcc gcttcacgcc actgttgctg gtcttgctg cgctgtgctc agcaggggtc 180 atgctttggt atttcctagg gtacaaagcg gaagtgaccg taagccaggt gtactctggc 240 agcctccggg tgcacaaccg tcatcttccc caggacctgg gccacggga gtctattgct 300 ttccgcagtg aatctgccaa agcccagaag atgctccaag aactggttgc cagcaccgc 360 ctgggtactt actacaactc tagttctgtc tactcctttg gggagggacc cctcacctgc 420 ttcttctggt ttatccttga catccctgag taccagcgac tgacctgag ccctgaagta 480

		gtgcgcgagc tctctggtgga tgagctactg tccaacagct caaccctggc ttcctataag 540 accgaatatg aggtggaccc ggaaggcctg gtgatcctgg aagccagtgt gaacgacata 600 gtcgtactga attccacgct gggctgttat cgctacagct atgtgaaccc aggccaggtc 660 ctcccattga aggggcctga ccagcagacc acaagctgcc tgtggcatct gcaaggggcc 720 gaagacctca tgatcaaaagt gcggctggag tggaccggg tcgattgcag agacaggggtg 780 gcgatgtacg acgcagctgg gccctggag aagagactta tcacctgggt ctatgggtgc 840 agccgccagg aacctgtgat ggagggtgct gcatcgggct ccgtcatggc cgtgtgtgtg 900 aaaaagggca tgcatagcta ctatgacctt ttcctgtctt cagtgaagtc tgtggccttc 960 caggactgcc aggtgaacct gacactggag ggccggctgg acacacaggg cttcctccgt 1020 acaccctact accccagtta ctactctccc agtaccact gctcctggca tctcacggta 1080 ccctctctgg actacggctt ggcgctctgg ttcgatgcct acgcactgag gaggcagaag 1140 tacaaccgac tgtgtactca gggccagtgg atgatccaga acaggaggct gtgtggcttc 1200 cgtaccctgc agccatatgc tgagaggatc cccatggtgg cctcagatgg tgtcaccatc 1260 aacttcacct ccagatctc cctcacaggc ccgggtgtgc aagtgtacta cagcttgtac 1320 aaccaatcag acccctgccc tgggtgagttc ctctgctctg tgaatggact gtgtgtccct 1380 gcgtgtgacg ggatcaagga ctgcccgaat ggccctggatg agagaaactg tgtctgcaga 1440 gccatgttcc agtgccaaga ggacagcacg tgcatttcac tgcctagagt ctgtgaccgg 1500 cagcccgact gtctcaatgg cagtgcagaa gaacagtgcc aagaaggagt gccctgtggg 1560 acattcactt tccagtgtga ggaccggagc tgtgtgaaga agcccacccc agagtgtgac 1620 ggccagtcat attgcagaga cggctcagat gagcaacact gtgactgtgg cctccagggc 1680 ctctccagcc gtattgtggg cgggaccgtg tcctccgagg gtgagtggcc atggcaggcc 1740 agcctccaga ttcggggctg acacatctgt gggggggctc tcatcgctga ccgctgggtc 1800 ataacggccg ccactgctt ccaggaggac agcatggcct ccccgaaagt gtggaccgtg 1860 ttcctgggaa agatgcggca gaactcgcgc tggccaggcg aggtgtcctt caaggtgagc 1920 cgtctgttcc tgcaccgcta ccacaggag gacagccatg actacgacgt ggccctgctg 1980 cagctcgacc acccctgggt gtactcgccc actgtgcgcc ccgtctgcct gcctgcccg 2040 tcccacttct ttgagccagg ccagcactgc tggatcacag gctggggagc ccagcgagag 2100 ggtggtccgg tgagcaacac cctgcagaag gtggacgtac agctggtccc tcaggacctc 2160 tgcatgtagg cctaccgcta ccagggttcc ccacgcatgc tctgtgtctg ctaccgcaag 2220 ggcaagaaag atgcctgcca gggtgactct ggaggccac tggtttgtag ggagcccagt 2280 ggccgctggt tcctggcagg gttggttagc tggggcctgg gctgtggccg acccaatttc 2340 tttggcgtct acaccctgtt cacacgtgtg atcaactgga tccagcaggt gctgacctga 2400
3-855	Sequences	
3-855-1	Sequence Number [ID]	855
3-855-2	Molecule Type	DNA
3-855-3	Length	2403
3-855-4	Features Location/ Qualifiers	source 1..2403 mol_type=other DNA organism=Macaca mulatta
3-855-5	NonEnglishQualifier Value Residues	atgcctgtgg ccaaggcccc ccagggtggct ggccggcagg gggacggagg tgatggcgag 60 gaagcggagc cagaggggat gttcgaggcc cgtgaggact ccaagagaaa agcccggggc 120 tacctccgcc tggcgccctt gtggctgacc ctggttgtgc tgacttcagt gggggtgcta 180 ctctggtatt tcctagggtg caaggcggag gtgacggtca gccagggtga ctcaggcagc 240 cttcgcgtgc tcaatcgcca cttctccag gatcttacc gccgggaatc cagtgccttc 300 cgcatgaaa ccgcaaaagc ccagaagatg ctcaaggagc tcatcgccag caccgcctg 360 ggaacttatt acaactcag ctccgtctat tcctttgggg agggaccgct cacctgcttc 420 ttctggttca ttctccaaat ccccgagcac cgccggccga tgcctgagccc cgagggtgtg 480 caggcactgc tgggtggagga gctgctgtcc acagtcaaca gctcggcggc cgtcccctac 540 agggccgagt acgaagtgga ccccgagggc ctagtgatcc tagaagccag tgtgaaagac 600 atagctgcac tgaattccac gctgggttgt taccgctaca gctacgtggg ccagggtcag 660 gtctccggc tgaagggacc cgaccacctg gcctccagct gcctgtggca cctgcagggc 720 cccgaagacc tcatgctgaa actccggctg gagtggacgc tggccgagtg ccgggaccga 780 ctggccatgt atgacgtggc tgggcccctg gagaagaggc tcatcacctc ggtgtatggc 840 tgagccgcc aggagcctgt ggtggaagtc ctggcatcgg gggccatcat ggcggtggtc 900 tggagaagg gcctgcacag ctactacgac ccctttatgc tctccgtgca gtcggtggtc 960 ttccaggcct gcgaggtaaa cctgacgtg gatgacaggc tggactccca gggcgtcctc 1020 agcaccctgt acttccccag ctactactcg cccgaaccc actgctcctg gcacctcacg 1080 gtgccctctc tggactacgg cttggccctc tggtttgacg cctacgcact gcggaggcag 1140 aagtatgatt tgcctgtcac ccagggccag tggacgatcc agaacaggag gctgtgtggc 1200 ctgcgcatcc tgcagcctta cgccgagagg atccccgtgg tggccacggc cggcacacc 1260 atcaatttca cctcccagat ctccctcaca gggcctgggt tgcgggtgca ctatggcttg 1320 tacaaccagt cggacccttg ccctggagag ttcctctgct ctgtgaacgg actctgcgtc 1380 cctgcctgtg atggggtcaa ggactgcccc aacggcctgg atgagagaaa ctgcgtttgc 1440 agagccacat tccagtgcca agaggacagc acgtgcatct cactgcttaa ggtctgtgac 1500

		gggcagcctg actgtctcaa tggcagcgat gaagagcggg gccaggaagg ggtgccctgc 1560 gggacattca ccttccagtg tgaggaccag agctgcgtga agaagcccaa cccacagtgt 1620 gatgggcggc ccgactgcag ggacgggtca gacgagcagc actgtgactg tggcctccag 1680 ggcccctcca gtcgcattgt tgggtggggc gtgtcctccg aggggtgagt gccatggcag 1740 gccagcctcc aggttcgggg tcgacacatc tgtgggggcg ccctcatcgc tgaccgctgg 1800 gtgataacag ctgcccattg cttccaggag gacagcatgg cctccccggc gctgtggacg 1860 gtgttcctgg gcaagggtgt gcagaactcg cgctggcctg gagaggtgtc cttcaagggt 1920 agccgcctac tcctgcatcc gtatcacgaa gaggacagcc acgactacga cgtggcgctg 1980 ttgcagctcg accacccggg ggtgcgctcg gccgccgtgc gtcccgtctg cctgcccgcg 2040 cgctcccact tcttcgaacc cggcctgcac tgctggatca ctggctgggg cgccctgcgc 2100 gaaggcggcc ccaccagcaa tgctctgcag aaagtggacg tgcagtgat cccacaggac 2160 ctgtgcagcg aggcctatcg ctaccagggt acgccacgca tgctgtgtgc cggctaccgc 2220 aagggaaga aggatgcctg ccagggtgac tcgggtggtc cgctgggtat caaggcactc 2280 agtggccgct ggttcctggc agggctgggt agctggggcc tgggctgtgg ccggcctaac 2340 tacttcggcg tctacaccg catcacagg gtgatcggct ggatccagca agtggtgacc 2400 tga 2403
3-856	Sequences	
3-856-1	Sequence Number [ID]	856
3-856-2	Molecule Type	RNA
3-856-3	Length	16
3-856-4	Features Location/ Qualifiers	source 1..16 mol_type=other RNA organism=synthetic construct
	NonEnglishQualifier Value	
3-856-5	Residues	gcagccgaaa ggctgc 16
3-857	Sequences	
3-857-1	Sequence Number [ID]	857
3-857-2	Molecule Type	DNA
3-857-3	Length	19
3-857-4	Features Location/ Qualifiers	source 1..19 mol_type=other DNA organism=synthetic construct
	NonEnglishQualifier Value	
3-857-5	Residues	agcctgattg tctcaacgg 19
3-858	Sequences	
3-858-1	Sequence Number [ID]	858
3-858-2	Molecule Type	DNA
3-858-3	Length	20
3-858-4	Features Location/ Qualifiers	source 1..20 mol_type=other DNA organism=synthetic construct
	NonEnglishQualifier Value	
3-858-5	Residues	ctggaagggtg aatgtcccac 20
3-859	Sequences	
3-859-1	Sequence Number [ID]	859
3-859-2	Molecule Type	DNA
3-859-3	Length	22
3-859-4	Features Location/ Qualifiers	source 1..22 mol_type=other DNA organism=synthetic construct
	NonEnglishQualifier Value	
3-859-5	Residues	acgaagagca gtgccaggaa gg 22
3-860	Sequences	
3-860-1	Sequence Number [ID]	860
3-860-2	Molecule Type	DNA
3-860-3	Length	21
3-860-4	Features Location/ Qualifiers	source 1..21 mol_type=other DNA organism=synthetic construct
	NonEnglishQualifier Value	
3-860-5	Residues	gtactcaatc gccacttctc c 21
3-861	Sequences	
3-861-1	Sequence Number [ID]	861
3-861-2	Molecule Type	DNA
3-861-3	Length	21

3-861-4	Features Location/ Qualifiers	source 1..21 mol_type=other DNA organism=synthetic construct	
3-861-5	NonEnglishQualifier Value Residues	gaatagacgg agctggagtt g	21
3-862	Sequences		
3-862-1	Sequence Number [ID]	862	
3-862-2	Molecule Type	DNA	
3-862-3	Length	22	
3-862-4	Features Location/ Qualifiers	source 1..22 mol_type=other DNA organism=synthetic construct	
	NonEnglishQualifier Value		
3-862-5	Residues	cagtgaaacc gccaaagccc ag	22