CLAIMS

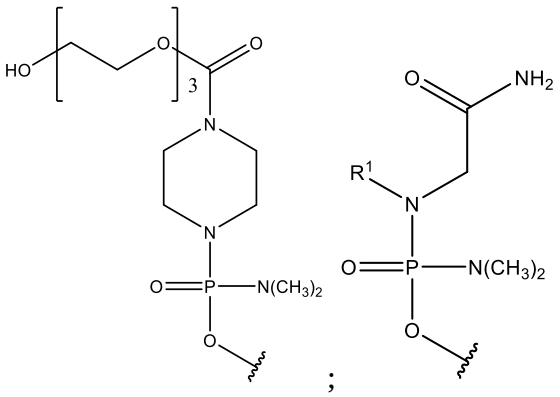
What is claimed is:

1. An antisense oligomer, or a pharmaceutically acceptable salt thereof, capable of binding a selected target to induce exon skipping in the human dystrophin gene, wherein the antisense oligomer comprises a sequence of bases that is complementary to an exon 50 target region of the dystrophin pre-mRNA designated as an annealing site, wherein the base sequence and annealing site are selected from:

Annealing Site	**Targeting Sequence [5' to 3']**	**SEQ ID NO:**
H50D(+04-18)	GGG ATC CAG TAT ACT TAC AGG C	SEQ ID NO: 1
H50D(+07-16)	GAT CCA GTA TAC TTA CAG GCT CC	SEQ ID NO: 3
H50D(+07-17)	GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 4
H50A(-19+07)	ACT TCC TCT TTA ACA GAA AAG CAT AC	SEQ ID NO: 5
H50D(+07-15)	ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 6
H50A(-02+23)	GAG CTC AGA TCT TCT AAC TTC CTC T	SEQ ID NO: 7
H50D(+06-18)	GGG ATC CAG TAT ACT TAC AGG CTC	SEQ ID NO: 8
H50D(+07-20)	ATG GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 9

wherein T of each of SEQ ID NOS: 1-9 is thymine or uracil.

2. The antisense oligomer of claim 1, wherein the antisense oligomer contains a **T** moiety attached to the 5' end of the antisense oligomer, wherein the **T** moiety is selected from:



; ; and ;

and wherein the antisense oligomer is optionally linked to a cell-penetrating peptide;

and wherein the antisense oligomer induces exon skipping in the human dystrophin gene, or a pharmaceutically acceptable salt thereof.

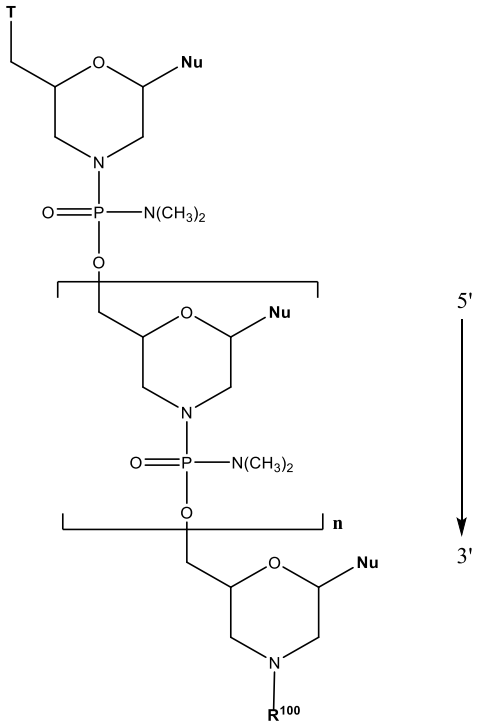
3. The antisense oligomer of any one of claims 1-2, wherein a cell penetrating peptide is attached to the 3' end of the antisense oligomer.

4. The antisense oligomer of claim 3, wherein the cell-penetrating peptide is an arginine-rich peptide.

5. The antisense oligomer of claim 4, wherein the arginine-rich peptide is selected from the group consisting of $–(RXR)_4-R^a$ (SEQ ID NO: 15), $R-(FFR)_3-R^a$ (SEQ ID NO: 16), $-B-X-(RXR)_4-R^a$ (SEQ ID NO: 17), $-B-X-R-(FFR)_3-R^a$ (SEQ ID NO: 18), $-GLY-R-(FFR)_3-R^a$ (SEQ ID NO: 19), $-GLY-R_5-R^a$ (SEQ ID NO: 20), $–R_5-R^a$ (SEQ ID NO: 21), $-GLY-R_6-R^a$ (SEQ ID NO: 11) and $–R_6-R^a$ (SEQ ID NO: 10), wherein R^a is selected from H, acyl, benzoyl, and stearoyl, and wherein R is arginine, X is 6-aminohexanoic acid, B is β-alanine, F is phenylalanine and GLY (or G) is glycine.

6. The antisense oligomer of any one of claims 1-5, wherein the nucleobases of the antisense oligomer are linked to morpholino ring structures.

7. An antisense oligomer according to Formula (I):

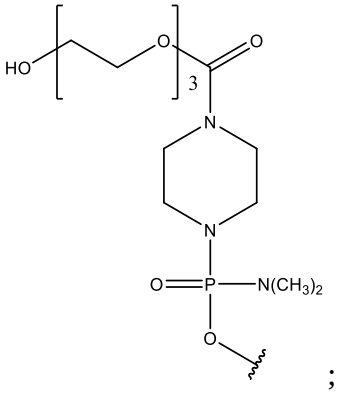
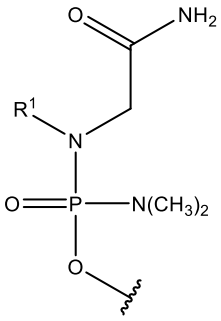


(I)

or a pharmaceutically acceptable salt thereof, wherein:

each **Nu** is a nucleobase which taken together form a targeting sequence;

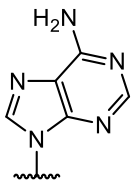
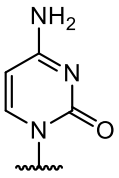
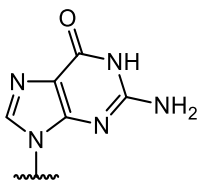
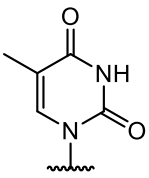
T is a moiety selected from:



; ; and  ; and the distal –OH or –NH_2 of the T moiety is optionally linked to a cell-penetrating peptide;

R^{100} is hydrogen or a cell-penetrating peptide;

each **Nu** from 1 to **n** and 5' to 3' corresponds to the nucleobases in one of the following:

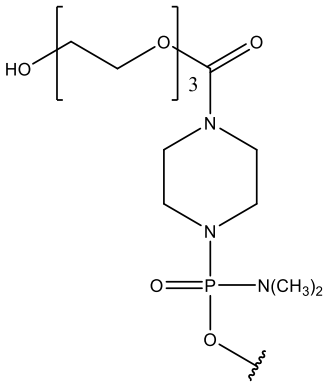
Annealing Site	**Targeting Sequence [5' to 3']**	**SEQ ID NO:**
H50D(+04-18)	GGG ATC CAG TAT ACT TAC AGG C	SEQ ID NO: 1
H50D(+07-16)	GAT CCA GTA TAC TTA CAG GCT CC	SEQ ID NO: 3
H50D(+07-17)	GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 4
H50A(-19+07)	ACT TCC TCT TTA ACA GAA AAG CAT AC	SEQ ID NO: 5
H50D(+07-15)	ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 6
H50A(-02+23)	GAG CTC AGA TCT TCT AAC TTC CTC T	SEQ ID NO: 7
H50D(+06-18)	GGG ATC CAG TAT ACT TAC AGG CTC	SEQ ID NO: 8
H50D(+07-20)	ATG GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 9

wherein A is , C is , G is , and T is .

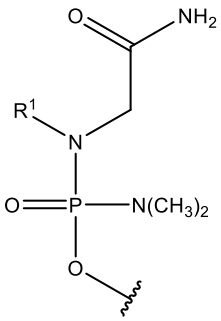
8. The antisense oligomer of claim 7, wherein each **Nu** from 1 to **n** and 5' to 3' corresponds to SEQ ID NO: 3.

9. The antisense oligomer of claim 7 or 8, wherein the antisense oligomer contains one cell penetrating peptide.

10. The antisense oligomer of any one of claims 7-9, wherein **T** is a moiety selected from:



;

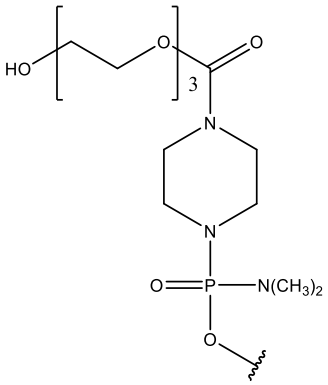


; and

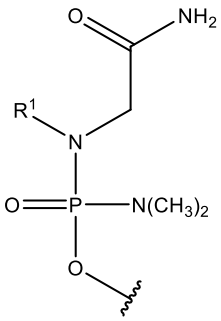


.

11. The antisense oligomer of any one of claims 7-10, wherein **T** is a moiety selected from:



;



; and

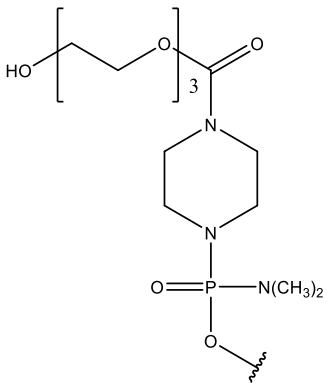


; and

R^{100} is a cell-penetrating peptide.

12. The antisense oligomer of claim 11, wherein:

T is ;



and

R^{100} is a cell-penetrating peptide.

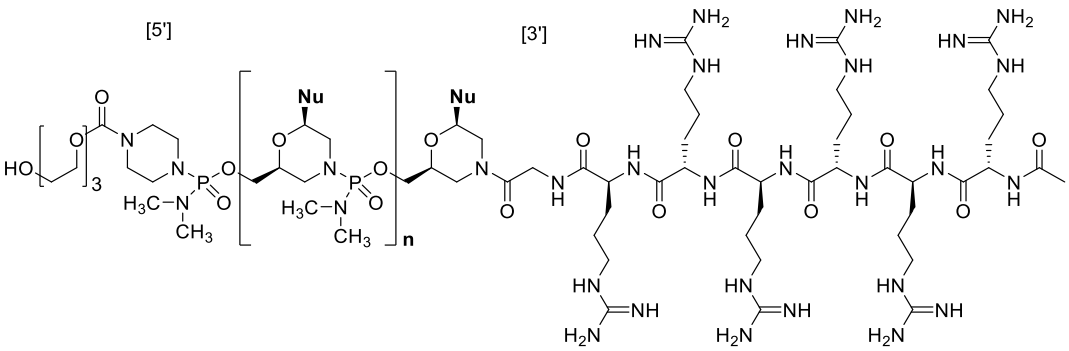
13. The antisense oligomer of any one of claims 7-12, wherein the cell-penetrating peptide is an arginine-rich peptide.

14. The antisense oligomer of claim 13, wherein the arginine-rich peptide is selected from the group consisting of $–(RXR)_4-R^a$ (SEQ ID NO: 15), $R-(FFR)_3-R^a$ (SEQ ID NO: 16), $-B-X-(RXR)_4-R^a$ (SEQ ID NO: 17), $-B-X-R-(FFR)_3-R^a$ (SEQ ID NO: 18), $-GLY-R-(FFR)_3-R^a$ (SEQ ID NO: 19), $-GLY-R_5-R^a$ (SEQ ID NO: 20), $–R_5-R^a$ (SEQ ID NO: 21), $-GLY-R_6-R^a$ (SEQ ID NO: 11) and $–R_6-R^a$ (SEQ ID NO: 10), wherein R^a is selected from H, acyl, benzoyl, and stearoyl, and wherein R is arginine, X is 6-aminohexanoic acid, B is β-alanine, F is phenylalanine and GLY (or G) is glycine.

15. The antisense oligomer of any one of claims 7-14, wherein the antisense oligomer is in free base form.

16. The antisense oligomer of any one of claims 7-14, wherein the antisense oligomer is a pharmaceutically acceptable salt thereof.

17. An antisense oligomer according to Formula (III):

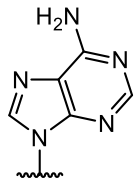
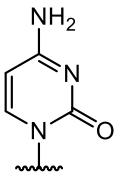
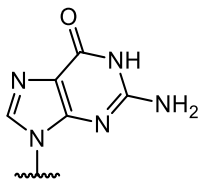
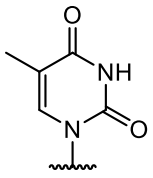


(III)

or a pharmaceutically acceptable salt thereof, where each **Nu** from 1 to **n** and 5' to 3' corresponds to the nucleobases in one of the following:

Annealing Site	**Targeting Sequence [5' to 3']**	**SEQ ID NO:**
H50D(+04-18)	GGG ATC CAG TAT ACT TAC AGG C	SEQ ID NO: 1
H50D(+07-18)	GGG ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 2
H50D(+07-16)	GAT CCA GTA TAC TTA CAG GCT CC	SEQ ID NO: 3
H50D(+07-17)	GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 4
H50A(-19+07)	ACT TCC TCT TTA ACA GAA AAG CAT AC	SEQ ID NO: 5
H50D(+07-15)	ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 6
H50A(-02+23)	GAG CTC AGA TCT TCT AAC TTC CTC T	SEQ ID NO: 7
H50D(+06-18)	GGG ATC CAG TAT ACT TAC AGG CTC	SEQ ID NO: 8

H50D(+07-20)	ATG GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 9

wherein A is  , C is  , G is  , and T is  ,

and the distal –OH of formula (III) is optionally linked to a cell penetrating peptide.

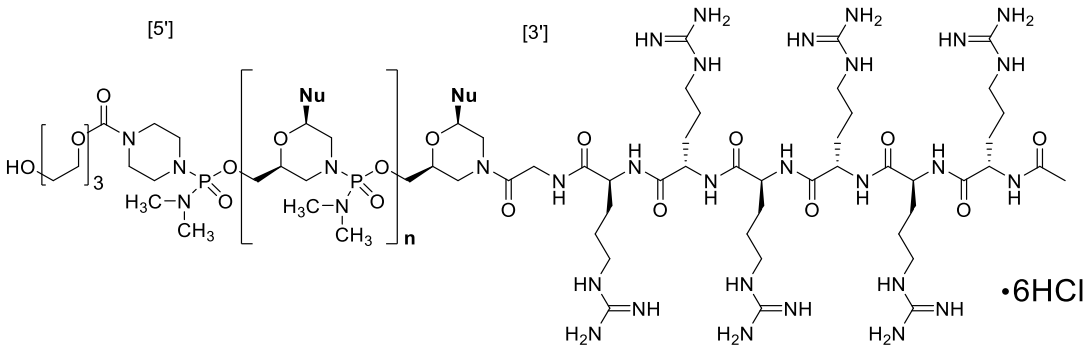
18. The antisense oligomer of claim 17, wherein each **Nu** from 1 to **n** and 5' to 3' of Formula (III) corresponds to SEQ ID NO: 3.

19. The antisense oligomer of any one of claims 17-18, wherein the antisense oligomer is in free base form.

20. The antisense oligomer of any one of claims 17-18, wherein the antisense oligomer is a pharmaceutically acceptable salt thereof.

21. The antisense oligomer of claim 20, wherein each **Nu** from 1 to **n** and 5' to 3' corresponds to SEQ ID NO: 3.

22. An antisense oligomer according to Formula (IV):

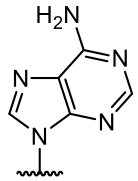
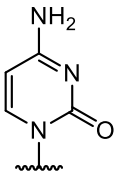
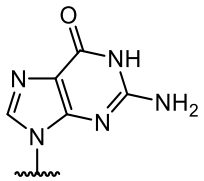
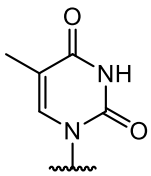


(IV)

where each **Nu** from 1 to **n** and 5' to 3' corresponds to the nucleobases in one of the following:

Annealing Site	**Targeting Sequence [5' to 3']**	**SEQ ID NO:**
H50D(+04-18)	GGG ATC CAG TAT ACT TAC AGG C	SEQ ID NO: 1
H50D(+07-18)	GGG ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 2
H50D(+07-16)	GAT CCA GTA TAC TTA CAG GCT CC	SEQ ID NO: 3
H50D(+07-17)	GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 4
H50A(-19+07)	ACT TCC TCT TTA ACA GAA AAG CAT AC	SEQ ID NO: 5
H50D(+07-15)	ATC CAG TAT ACT TAC AGG CTC C	SEQ ID NO: 6

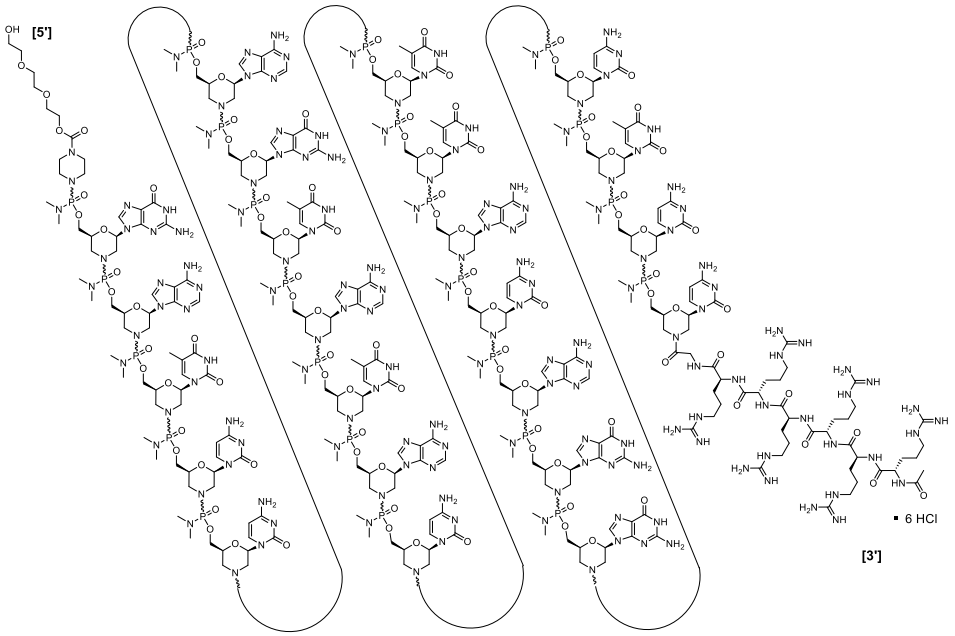
H50A(-02+23)	GAG CTC AGA TCT TCT AAC TTC CTC T	SEQ ID NO: 7
H50D(+06-18)	GGG ATC CAG TAT ACT TAC AGG CTC	SEQ ID NO: 8
H50D(+07-20)	ATG GGA TCC AGT ATA CTT ACA GGC TCC	SEQ ID NO: 9

wherein A is  , C is  , G is  , and T is 

and the distal –OH of formula (IV) is optionally linked to a cell penetrating peptide.

23. The antisense oligomer of claim 22, wherein each **Nu** from 1 to **n** and 5' to 3' of Formula (IV) corresponds to SEQ ID NO: 3.

24. The antisense oligomer of claim 22, wherein the antisense oligomer is according to the structure of Formula (IVa)



(IVa).

25. A pharmaceutical composition comprising an antisense oligomer of any one of claims 1-24, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

26. Use of the antisense oligomer of any one of claims 1-24 or the pharmaceutical composition of claim 25 in the manufacture of a medicament for the treatment of Duchenne muscular dystrophy (DMD) in a subject.

27. The use of claim 26, wherein the subject has a mutation of the dystrophin gene that is amenable to exon 50 skipping.

28. Use of the antisense oligomer of any one of claims 1-24 or the pharmaceutical composition of claim 25 in the manufacture of a medicament for the restoration of an mRNA reading frame to induce dystrophin production in a subject.

29. The use of claim 28, wherein the subject has a mutation of the dystrophin gene that is amenable to exon 50 skipping.