

What is claimed is:

1. An antisense oligonucleotide of 16-30 nucleotides in length, wherein the antisense oligonucleotide is complementary to a portion of SEQ ID NO:1, and wherein the antisense oligonucleotide has a *CD33* Exon-2 skipping efficiency of 30% or greater according to a Standard Exon-Skipping Efficiency Assay for the antisense oligonucleotide.
2. The antisense oligonucleotide of claim 1, wherein the antisense oligonucleotide is complementary to a portion of:
 - a. SEQ ID NO:213;
 - b. SEQ ID NO:214;
 - c. SEQ ID NO:215;
 - d. SEQ ID NO:217;
 - e. SEQ ID NO:218;
 - f. SEQ ID NO:219; and/or
 - g. SEQ ID NO:220.
3. An antisense oligonucleotide comprising all or a portion of: PMO-002 (SEQ ID NO:2); PMO-003 (SEQ ID NO:3); PMO-036 (SEQ ID NO:36); PMO-037 (SEQ ID NO:37); PMO-004 (SEQ ID NO:4); PMO-038 (SEQ ID NO:38); PMO-039 (SEQ ID NO:39); PMO-005 (SEQ ID NO:5); PMO-082 (SEQ ID NO:82); PMO-083 (SEQ ID NO:83); PMO-006 (SEQ ID NO:6); PMO-096 (SEQ ID NO:96); PMO-007 (SEQ ID NO:7); PMO-097 (SEQ ID NO:97); PMO-008 (SEQ ID NO:8); MOE-009 (SEQ ID NO:9); MOE-128 (SEQ ID NO:128); MOE-010 (SEQ ID NO:10); MOE-132 (SEQ ID NO:132); MOE-135 (SEQ ID NO:135); MOE-011 (SEQ ID NO:11); MOE-012 (SEQ ID NO:12); MOE-136 (SEQ ID NO:136); MOE-013 (SEQ ID NO:13); MOE-014 (SEQ ID NO:14); MOE-015 (SEQ ID NO:15); MOE-183 (SEQ ID NO:183); MOE-184 (SEQ ID NO:184); MOE-190 (SEQ ID NO:190); MOE-196 (SEQ ID NO:196); or MOE-197 (SEQ ID NO:197).
4. The antisense oligonucleotide of claim 3, wherein the antisense oligonucleotide comprises all or a portion of PMO-002 (SEQ ID NO:2).
5. An antisense oligonucleotide comprising all or a portion of: PMO-221 (SEQ ID NO:221); PMO-222 (SEQ ID NO:222); PMO-223 (SEQ ID NO:223); PMO-224 (SEQ ID NO:224); PMO-225 (SEQ ID NO:225); PMO-226 (SEQ ID NO:226); PMO-227 (SEQ ID NO:227); PMO-228 (SEQ ID NO:228); PMO-229 (SEQ ID NO:229); PMO-230 (SEQ ID NO:230); PMO-231 (SEQ ID NO:231); PMO-232 (SEQ ID NO:232); PMO-233 (SEQ ID NO:233); PMO-234 (SEQ ID NO:234); PMO-235 (SEQ ID NO:235); PMO-236 (SEQ ID NO:236); PMO-237 (SEQ ID NO:237); PMO-238 (SEQ ID NO:238); PMO-239 (SEQ ID NO:239); PMO-240 (SEQ ID NO:240); PMO-241 (SEQ ID NO:241); PMO-242 (SEQ ID NO:242); PMO-243 (SEQ ID NO:243); PMO-244 (SEQ ID NO:244); PMO-324 (SEQ ID NO:224); Stereopattern: RRRRRRRRRRRRRRRRRRRRR; PMO-424 (SEQ ID NO:224);

Stereopattern: SSSSSSSSSSSSSSSSSSSSSS; PMO-402 (SEQ ID NO:002); Stereopattern: RRRRRRRRRRRRRRRRRRRRRRRRRRR; or PMO-502 (SEQ ID NO:002); Stereopattern: SSSSSSSSSSSSSSSSSSSSSS.

6. The antisense oligonucleotide of claim 5, wherein the antisense oligonucleotide comprises all or a portion of PMO-424 (SEQ ID NO:224); Stereopattern: SSSSSSSSSSSSSSSSSSSSSS.

7. An antisense oligonucleotide comprising all or a portion of: MOE-245 (SEQ ID NO:245); MOE-246 (SEQ ID NO:246); MOE-247 (SEQ ID NO:247); MOE-248 (SEQ ID NO:248); MOE-249 (SEQ ID NO:249); MOE-250 (SEQ ID NO:250); MOE-251 (SEQ ID NO:251); MOE-252 (SEQ ID NO:252); MOE-253 (SEQ ID NO:253); MOE-254 (SEQ ID NO:254); MOE-255 (SEQ ID NO:255); MOE-256 (SEQ ID NO:256); MOE-257 (SEQ ID NO:012); MOE-258 (SEQ ID NO:012); MOE-259 (SEQ ID NO:012); MOE-260 (SEQ ID NO:012); MOE-261 (SEQ ID NO:012); MOE-262 (SEQ ID NO:012); MOE-263 (SEQ ID NO:012); MOE-264 (SEQ ID NO:012); MOE-265 (SEQ ID NO:252); MOE-266 (SEQ ID NO:252); MOE-267 (SEQ ID NO:252); MOE-268 (SEQ ID NO:252); MOE-269 (SEQ ID NO:252); MOE-270 (SEQ ID NO:252); MOE-271 (SEQ ID NO:252); MOE-272 (SEQ ID NO:252); MOE-273 (SEQ ID NO:252); MOE-274 (SEQ ID NO:252); MOE-275 (SEQ ID NO:012); MOE-276 (SEQ ID NO:012); MOE-277 (SEQ ID NO:012); Stereopattern: SSSSSSSSSSSSSSSSSSSSS; MOE-278 (SEQ ID NO:012); Stereopattern: RRRRRRRRRRRRRRRRRRRRR; MOE-279 (SEQ ID NO:012); Stereopattern: SSSRSSSRSSSRSSSRSSS; MOE-280 (SEQ ID NO:012); Stereopattern: SSSRSSSRSSSRSSSRSSS; MOE-281 (SEQ ID NO:012); Stereopattern: SSSRSRSRSRSRSRSRSRS; MOE-282 (SEQ ID NO:012); Stereopattern: SSSSSSRRRRRRRSSSSSSS; MOE-283 (SEQ ID NO:012); Stereopattern: SSSRRSRRSRRSRRSRRSSS; MOE-284 (SEQ ID NO:012); Stereopattern: SSSRRSRRSRRSRRSRRSSS; MOE-285 (SEQ ID NO:012); Stereopattern: SSSSSRRRRRRRRRRSSSSS; MOE-286 (SEQ ID NO:012); Stereopattern: SSSRRRRRRRRRRRRRRSSS; MOE-287 (SEQ ID NO:012); Stereopattern: SSRSSSSSSSSRSRSSSSS; MOE-288 (SEQ ID NO:252); Stereopattern: SSSSSSSSSSSSSSSSSSSS; MOE-289 (SEQ ID NO:252); Stereopattern: RRRRRRRRRRRRRRRRRRR; MOE-290 (SEQ ID NO:252); Stereopattern: SSSRRRRRRRRRRRRSSS; MOE-291 (SEQ ID NO:252); Stereopattern: RRRRRRRRRSSSSSSSSS; MOE-292 (SEQ ID NO:252); Stereopattern: SSSSSSSSSRRRRRRRRR; MOE-293 (SEQ ID NO:252); Stereopattern: SSSRSSSRSSSRSSSRSSS; MOE-294 (SEQ ID NO:252); Stereopattern: SSSRSRSRSRSRSRSRS; MOE-295 (SEQ ID NO:252); Stereopattern: SRSSSRSSSRSSSRSSS; MOE-296 (SEQ ID NO:252); Stereopattern:

SSOSSRRSSSRSSOSSS; MOE-297 (SEQ ID NO:252); Stereopattern:
 SSSOSRSRSRSSSOSSS; MOE-298 (SEQ ID NO:252); Stereopattern:
 SOSSSRSSSRSSSOSSS; MOE-299 (SEQ ID NO:12); Stereopattern:
 SSSOSSSRSSSRSSSOSSS; MOE-300 (SEQ ID NO:252); Stereopattern:
 RRRORRROSSSSSSSSSS; MOE-301 (SEQ ID NO:252); Stereopattern:
 SRRORRROSSSSSSSSSS; MOE-303 (SEQ ID NO:252); Stereopattern:
 SSOOSSSSSSSSSSSSSS; MOE-304 (SEQ ID NO:252); Stereopattern:
 OOOOSSSSSSSSSSSSSS; MOE-305 (SEQ ID NO:252); Stereopattern:
 SSOSSSOSSSOSSSOSSS; MOE-306 (SEQ ID NO:252); Stereopattern:
 SOSSSSOSSSSSSSOSSS; MOE-307 (SEQ ID NO:252); Stereopattern:
 SSOSSSSSSSSSSSOSSS; MOE-308 (SEQ ID NO:12); Stereopattern:
 SSSOSSSSSSSSSSSOSSS; MOE-309 (SEQ ID NO:12); Stereopattern:
 SSSOSSSSSOSSSOSSSOSSS; MOE-310 (SEQ ID NO:252); Stereopattern:
 SSORRRRRSSSSSOSSS; or MOE-311 (SEQ ID NO:252). Stereopattern:
 RRRRROSSSSSSSSSOSSS.

8. The antisense oligonucleotide of claim 7, wherein the antisense oligonucleotide comprises all or a portion of MOE-307 (SEQ ID NO:252); Stereopattern:
SSOSSSSSSSSSSSOSSS.
9. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 18-30 nucleotides in length.
10. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 21-30 nucleotides in length.
11. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 21-25 nucleotides in length.
12. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 18-21 nucleotides in length.
13. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 18-25 nucleotides in length.
14. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 25-30 nucleotides in length.
15. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 21 nucleotides in length.
16. The antisense oligonucleotide of any one of claims 1-8, wherein the antisense oligonucleotide is 25 nucleotides in length.
17. The antisense oligonucleotide of any one of claims 1-16, wherein the antisense oligonucleotide comprises a non-natural sugar moiety, a non-natural internucleotide linkage, or a non-natural sugar moiety and a non-natural internucleotide linkage.

18. The antisense oligonucleotide of claim 17, wherein the antisense oligonucleotide comprises non-natural sugar moieties.
19. The antisense oligonucleotide of claim 18, wherein the non-natural sugar moieties comprise 2'-O-methoxyethyl ribose (2'-O-MOE).
20. The antisense oligonucleotide of claim 19, wherein the antisense oligonucleotide has a *CD33* Exon-2 skipping efficiency of 30% or greater according to a Standard Exon-Skipping Efficiency Assay for MOE ASOs.
21. The antisense oligonucleotide of claim 18, wherein the non-natural sugar moieties comprise phosphorodiamidate morpholino oligomers (PMOs).
22. The antisense oligonucleotide of claim 21, wherein the antisense oligonucleotide has a *CD33* Exon-2 skipping efficiency of 30% or greater according to a Standard Exon-Skipping Efficiency Assay for PMO ASOs.
23. The antisense oligonucleotide of claim 17, wherein the antisense oligonucleotide comprises non-natural internucleotide linkages.
24. The antisense oligonucleotide of claim 23, wherein the non-natural internucleotide linkages are stereopure.
25. The antisense oligonucleotide of claim 24, wherein the non-natural internucleotide linkages are all Sp.
26. The antisense oligonucleotide of claim 24, wherein the non-natural internucleotide linkages are all Rp.
27. The antisense oligonucleotide of claim 24, wherein the non-natural internucleotide linkages are independently selected from Sp and Rp.
28. The antisense oligonucleotide of claim 23, wherein the non-natural internucleotide linkages are stereorandom.
29. The antisense oligonucleotide of any one of claims 1-28, wherein the antisense oligonucleotide comprises modified nucleobases.
30. A composition comprising the antisense oligonucleotide of any one of claims 1-29 and a pharmaceutically acceptable carrier or excipient.
31. A method of inducing Exon-2 skipping in the *CD33* gene during pre-mRNA splicing, comprising introducing a nucleic acid molecule into a cell, wherein the nucleic acid molecule is an antisense oligonucleotide of any one of claims 1-29, or the composition of claim 30.
32. An antisense oligonucleotide according to any one of claims 1-29, or a composition according to claim 30, for use in a method of inducing Exon-2 skipping in the *CD33* gene during pre-mRNA splicing, comprising introducing into a cell the antisense oligonucleotide of any one of claims 1-29, or the composition of claim 30, wherein the antisense oligonucleotide hybridizes to a target region of the *CD33* gene and induces Exon-2 skipping during pre-mRNA splicing of the *CD33* gene.

33. The method of claim 31, the antisense oligonucleotide of claim 32, or the composition of claim 32, wherein the cell is an animal cell.
34. The method of claim 31, the antisense oligonucleotide of claim 32, or the composition of claim 32, wherein the cell is a human cell.
35. The method of claim 31, the antisense oligonucleotide of claim 32, or the composition of claim 32, wherein the method is performed *in vitro*.
36. The method of claim 31, the antisense oligonucleotide of claim 32, or the composition of claim 32, wherein the method is performed *in vivo*.
37. An antisense oligonucleotide according to any one of claims 1-29, or the composition of claim 30 for use in a method of treating a subject having a neurodegenerative disease wherein a therapeutically effective amount of the antisense oligonucleotide of any one of claims 1-29, or the composition of claim 30 is to be administered to said subject.
38. The antisense oligonucleotide of claim 37, wherein the neurodegenerative disease is Alzheimer's Disease.