

WHAT IS CLAIMED IS:

1. An antisense oligonucleotide (ASO) targeting a regulatory RNA (regRNA) of human synaptic Ras GTPase activating protein 1 (SYNGAP1) comprising a nucleotide sequence complementary to at least 8 contiguous nucleotides of any one of SEQ ID NOs: 1, 2, 3, 4, 5, 6 or 7.
2. The ASO of claim 1, wherein the ASO comprises at least 16 contiguous nucleotides of any one of SEQ ID NOs: 10-4852.
3. The ASO of claim 1, wherein the ASO comprises a nucleotide sequence of any one of SEQ ID NOs: 10-4852.
4. The ASO of claim 3, wherein the ASO further comprises up to 4 additional nucleotides complementary to the regRNA at the 5' end of the nucleotide sequence.
5. The ASO of claim 3, wherein the ASO further comprises up to 4 additional nucleotides complementary to the regRNA at the 3' end of the nucleotide sequence.
6. The ASO of claim 1, wherein the ASO comprises the nucleotide sequence of any one of SEQ ID NOs: 111-119, 138-148, 160, 166-174, 182, 183, 193-203, 210, 215, 280-320, 324-429, 446-481, 495-525, 529-530, 532-541, 2981-3001, 3032-3035, 3089-3120, 3132-3233, 3251-3407, 3425-3638, 3656-3879, 3897-4367, and 4385-4852.
7. The ASO of claim 1, wherein the ASO comprises one or more chemical modifications.
8. The ASO of claim 7, wherein the one or more chemical modifications comprises one or more of a 2'-O-methoxyethyl, a 5-methyl on cytidine, a phosphodiester (PO) internucleotide bond, or a phosphorothioate (PS) internucleotide bond.
9. The ASO of claim 7, wherein each nucleotide of the ASO is modified by 2'-O-methoxyethyl.
10. The ASO of claim 7, wherein each cytidine in the ASO is modified by 5-methyl.

11. A pharmaceutical composition comprising the ASO of claim 1 and a pharmaceutically acceptable excipient.
12. An *in vitro* or *ex vivo* method of modulating expression of SYNGAP1 in a cell, comprising contacting the cell with the ASO of claim 1.
13. The *in vitro* or *ex vivo* method of claim 12, wherein the contacting increases expression of SYNGAP1 in the cell.
14. The *in vitro* or *ex vivo* method of claim **Error! Reference source not found.**, wherein the contacting increases expression of one or more isoforms of SYNGAP1 in the cell.
15. The *in vitro* or *ex vivo* method of claim **Error! Reference source not found.**, wherein the one or more isoforms of SYNGAP1 comprise SYNGAP1 A α 1, SYNGAP1 A α 2, SYNGAP1 A β , SYNGAP1 A γ , SYNGAP1 B α 1, SYNGAP1 B α 2, SYNGAP1 B β , SYNGAP1 B γ , SYNGAP1 C α 1, SYNGAP1 C α 2, SYNGAP1 C β , SYNGAP1 C γ , or any combination thereof.
16. The *in vitro* or *ex vivo* method of claim 12, wherein the cell is a mammalian cell.
17. The *in vitro* or *ex vivo* method of claim 16, wherein the cell is a human cell.
18. The ASO of claim 1 for use in therapy.
19. Use of the ASO of claim 1 in the manufacture of a medicament for treating a disease or disorder in a subject, wherein the disease or disorder is selected from the group consisting of a SYNGAP1-related disease or disorder, a central nervous system (CNS) disorder, and a peripheral nervous system (PNS) disorder.
20. The use of claim 19, wherein the SYNGAP1-related disease or disorder is SYNGAP1-related intellectual disability (ID), mental retardation, autosomal dominant 5 (MRD5), or SYNGAP1-related non-syndromic intellectual disability (NSID).
21. The use of claim 19, wherein the CNS disorder or PNS disorder is an affective disorder, schizophrenia, Alzheimer's disease, Parkinson's disease, Huntington's disease, an autism spectrum disorder (ASD), or a CNS or PNS trauma.

22. The use of claim 19, wherein the medicament is to be administered to the subject via an intravenous, intraarterial, intraperitoneal, intramuscular, subcutaneous, transdermal, intrapleural, intrathecal, intracavitary, intracerebral, intraventricular, intracerebroventricular, intracisternal, intraspinal, peri-spinal, intracavitary, or parenteral route, by perfusion through a catheter, by direct intralesional injection, or by local administration to an organ or tissue of the subject.
23. The use of claim 19, wherein the medicament ameliorates or prevents the onset of one or more symptoms or conditions associated with the disease or disorder.
24. The use of claim 23, wherein the one or more symptoms or conditions is epilepsy, cognitive impairment, hypotonia, global developmental delay, delayed language development, disordered sleep, oral dyspraxia, inattention, impulsivity, physical aggression, mood swings, sullenness, and rigidity.
25. The use of claim 19, wherein the medicament is to be administered simultaneously or separately with one or more additional therapeutics to the subject.
26. The use of claim 25, wherein the one or more additional therapeutics comprise one or more of an anti-epileptic agent, an anti-convulsant, a cholinesterase inhibitor, a dopamine agonist, levodopa, a dopamine reuptake inhibitor (SSRI), a selective serotonin reuptake inhibitor (NRI), a norepinephrine-dopamine reuptake inhibitor (NDRI), and a serotonin-norepinephrine-dopamine reuptake inhibitor (SNDRI).
27. The use of claim 19, further comprising measuring the level or change in the level of SYNAP1 mRNA or SYNGAP1 protein in a sample from the subject.
28. The use of claim 27, wherein the sample is blood, tissue, a neuron cell sample, or neurological fluid.
29. The use of claim 19, wherein the subject is a human.
30. Use of the ASO of claim 1 in the manufacture of a medicament for treating a disease or disorder ameliorated by modulating the expression of SYNGAP1 in a cell of a subject identified as having a SYNGAP1-related disorder, wherein the medicament is to be administered to the subject.

31. The use of claim 30, wherein the medicament increases expression of SYNGAP1 in a cell of the subject.
32. The use of claim 30, wherein the medicament modulates expression of one or more isoforms of SYNGAP1 in the cell.
33. The use of claim 32, wherein the one or more isoforms of SYNGAP1 comprise SYNGAP1 A α 1, SYNGAP1 A α 2, SYNGAP1 A β , SYNGAP1 A γ , SYNGAP1 B α 1, SYNGAP1 B α 2, SYNGAP1 B β , SYNGAP1 B γ , SYNGAP1 C α 1, SYNGAP1 C α 2, SYNGAP1 C β , SYNGAP1 C γ , or any combination thereof.